

# Doctoral Program

Graduate School of Medical and Dental Sciences

## Syllabus

2 0 1 8

Tokyo Medical and Dental University

# Doctoral Program: Medical and Dental Sciences

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## Initial Research Training (for international students)

(Code : 3 1 0 2 1<sup>st</sup> year 1 unit)

### [Course Description]

Research work should be done in accordance with various rules and regulations including those related to ethics, and those related to handling of toxic substances, radioactive materials and animals. This series of lectures introduce rules and regulations that the students should follow during research work. Also, the students learn how to use libraries and data bases, and how to avoid scientific misconducts.

### [Grading]

Attendance

### [Course Schedule]

See the next page; Table

### [Notes]

When you register for “Initial Research Training”, you must choose code No.3102.

If you are the Japanese or the international students who are fluent speakers of Japanese, you should be advised to take part in “Initial Research Training for Japanese” (Code: 3002).

### [Inquiring]

Educational Planning Section

TEL 5803-4679, 4676

# Initial Research Training FY2018 Graduate School of Medical and Dental Sciences

Date : Mon. 23th April to Fri. 27th April 2018

Venue: Common use Lecture Room 1, 2nd floor, M&D Tower ( Excepting the lectures with \*1 )

Timetable :

date	First (14:40~15:40)	Second (15:50~16:50)	Third (17:00~18:00)
23-Apr Mon.	Ethics of Researcher Sachiko ISEKI Professor Molecular Craniofacial Embryology	Thesis Writing and Presenting Research David Richard CANNELL Institute of Global Affairs Associate Professor	Methods for studying the development Hiroshi NISHINA Professor Developmental and Regenerative Biology
24-Apr Tue.	Environment and safety in research Takao HANAWA Metallic Biomaterials Professor	To conduct a safe and fair research Masami KANAI Research Safety and management committee chairman	How to make scientific researches reliable and successful Tetsuya TAGA Stem Cell Regulation Professor
25-Apr Wed.	Flow cytometry for protein analysis Toshiaki OHTEKI Biodefense Research Professor	Use and Handling of Radioisotopes and Radiations Masayuki HARA General Isotope Research Division Associate Professor	Study of Functional gene and genome Toshihiro TANAKA Human Gene Sciences Research Division Professor
26-Apr Thu.	The Design of Animal Experiments Masami KANAI Experimental Animal Model for Human Disease Professor	Immunology in Medical Research Mari KANNAGI Immunotherapeutics Professor	Biosafety and basic microbiological techniques Shoji YAMAOKA Molecular Virology Professor
27-Apr Fri.	Bioethics Masayuki YOSHIDA Life Science and Bioethics Research Center Professor	APRIN e-learning program (CITI Japan) *2 Masayuki YOSHIDA Life Science and Bioethics Research Center Professor	Literature search · Utilization of library *1 Atsuhiko KINOSHITA Institute for Library and Media Information Technology Professor

\*1 : Venue: 4th floor, M&D Tower

\*2 : Video Screening

# Basic-Clinical Borderless Education

Lecture (Code: 8603, 1<sup>st</sup> ~3<sup>rd</sup>year: 6units)

## 1. Instructors:

Contact person: Sachiko ISEKI E-mail s.iseki.emb@tmd.ac.jp

## 2 Description and Timetable

This course consists of "course lectures" and "research progress meeting". At the end of the course, understanding and exploring the interrelation between the basic and clinical research is achieved.

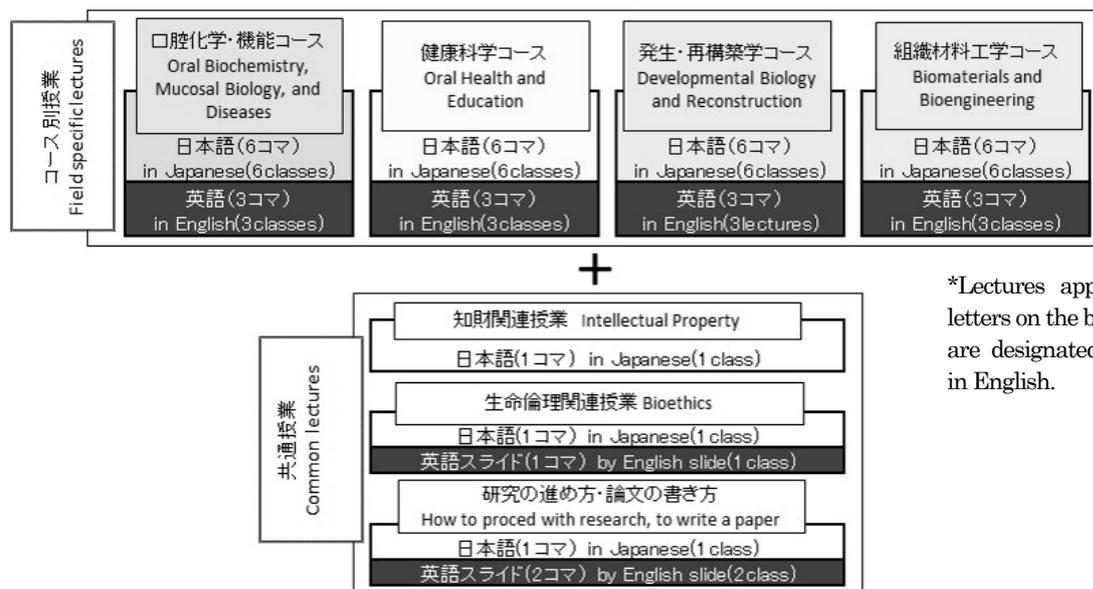
### Course Lectures

Outline:

Students who take this course will select one of following five lecture series.

- Oral Biochemistry, Mucosal Biology and Diseases
- Oral Health and Education
- Developmental Biology and Reconstruction
- Biomaterials and Bioengineering
- Lecture Series in English

Each lecture series comprises 9 field specific lectures and 6 common lectures. Lecture series in English is composed of three lectures held in English from each research field (total 9 lectures) and 6 common lectures in which the slides are presented in English.



Each lecture series provides current topics in the research field with the interest in the methods, basic study and the possibility of clinical application.

Common lectures are set up for understanding the bioethics, intellectual properties and the basics knowledge required for conducting the research.

For the detail of the lectures including the schedule, venues, please check the website and bulletin board.

### Research progress meeting

Outline:

Our program adopted a "Three supervisor system". For each student, the main supervisor and two sub-supervisors are selected from both basic and clinical teaching staffs.

The three supervisor system works to improve research plans and directions of the student by holding regular discussions, and supports students to write papers (thesis).

By the middle of 2nd year grade three supervisors are selected according to the research theme of each student. A notice of research progress meeting is issued by Educational Planning Section at least once a year and students arrange their meeting with their supervisors. After the meeting, a report with the fixed form is submitted to Educational Planning Section. The submission of the report is required for credit earning, and the data is used to verify the research progress and focus on problems.

Note:

In case of postponement of the research progress meeting, consult with the main-supervisor and inform Educational Planning Section. Change of the supervisor shall be discussed with the professor of affiliated section and informed to Educational Planning Section. Research progress meeting is carried out until completion of writing the manuscript.

### **3. Course Format:**

Course Lectures and group discussion (research progress meeting)

### **4. Venue:**

For venues and other detailed information, please check the website and bulletin board.

For the research progress meeting, the students arrange the venue by themselves.

### **5. Grading:**

Evaluation will be given according to the participation in the lecture series and report submission of the research progress meeting. The research progress meeting report needs to be submitted more than twice by the end of 3rd year,.

Course outline is introduced at the first lecture of each lecture series, therefore registered students are asked to attend it.

### **6. Notes:**

For detailed information, please check the website and bulletin board.

URL [http://www.tmd.ac.jp/faculties/graduate\\_school/seminar/2018/index.html](http://www.tmd.ac.jp/faculties/graduate_school/seminar/2018/index.html)

# Overview of Public Health Medicine in Disease Prevention

Lecture (code: 8 6 0 6 one of the 1st~3rd :2units)

## 1. Instructor(s)

	Name	Department	Contact Information
Chief Instructor	Keiko Nakamura	Global Health Entrepreneurship	nakamura.ith@tmd.ac.jp
Instructors	Yoshinobu Eishi	Human Pathology	
	Shoji Yamaoka	Molecular Virology	
	Takeo Fujiwara	Global Health Promotion	
	Shiro Iwanaga	Environmental Parasitology	
	Kazuki Takada	Professional Development in Health Sciences	
	Masayuki Yoshida	Life Sciences and Bioethics	
	Kaoruko Seino	Global Health Entrepreneurship	

## 2. Classroom/Lab

Special Lecture Room, 6th Floor, Building 3 (January 15, 2019, at Active Learning Room, M&D Tower 4F)

## 3. Course Purpose and Outline

This course offers a general introduction to public health medicine, addressing fundamental topics and basic measures required for a global leader in disease prevention. The course focuses on development of essential knowledge and skills for global disease prevention through lectures and discussions based on selected case studies.

## 4. Course Objective(s)

At the end of the course, participants will be able to:

- 1) Describe the roles and responsibilities of public health in disease prevention
- 2) Describe the global distribution and causes of major diseases, injuries and health risk factors, and the main prevention and control strategies
- 3) Describe and apply the basic principles and methods of medical research to disease prevention
- 4) Describe the main ethical issues in international medical research
- 5) Describe cross-border health issues in relation to globalization

## 5. Format

Lectures, group discussions, and team project. All programs are conducted in English.

International students and Japanese students attend the same class and use English in the classroom.

Students from the Medical and Dental Science or Biomedical Science departments are both welcome to the course.

## 6. Course Description and Timetable

	Day Time	Topics	Instructor
1.	Tuesday, Nov 6, 2018 16:00–17:30, 17:40–19:10	Global public health	Keiko Nakamura
2.	Tuesday, Nov 13, 2018 16:00–17:30, 17:40–19:10	Prevention and control of cancer	Yoshinobu Eishi
3.	Tuesday, Nov 20, 2018 16:00–17:30, 17:40–19:10	Prevention and control of communicable disease	Shoji Yamaoka
4.	Tuesday, Dec 4, 2018 16:00–17:30, 17:40–19:10	Health promotion	Takeo Fujiwara
5.	Tuesday, Dec 11, 2018 16:00–17:30, 17:40–19:10	Prevention and control of tropical disease	(to be announced)
6.	Tuesday, Dec 18, 2018 16:00–17:30, 17:40–19:10	Prevention and control of non-communicable disease	Kaoruko Seino
7.	Tuesday, Jan 8, 2019 16:00–17:30, 17:40–19:10	Ethics in medical research	Masayuki Yoshida
8.	Tuesday, Jan 15, 2019 16:20–17:50, 18:00–19:30 (Active Learning Room, M&D Tower 4F)	Leadership	Kazuki Takada

## 7. Grading System

Grades are based on attendance at lectures, performances on assignments, and levels of attitude, skills and knowledge.

## 8. Prerequisite Reading

When reading materials are distributed or specified in advance, participants are expected to read those materials beforehand.

## 9. Reference Materials

To be announced before or during individual classes, when relevant.

## 10. Important Course Requirements

This is a required course for students of "Disease Prevention Global Leader Program (DP-GLP)". PhD candidates at departments of Medical and Dental Science and Biomedical Science who are enrolled in this program through a special selection must attain credits from this course.

PhD candidates of general selection at departments of Medical and Dental Science and Biomedical Science can also participate in this course.

## 11. Lectures in English

Lectures and all communications are in English.

## 12. Office Hour

Please contact Prof. Keiko Nakamura at nakamura.ith@tmd.ac.jp

## 13. Note(s) to students

Both international and Japanese students participate in the same program provided in English and learn together on public health medicine in disease prevention. The course is a core part of nurturing global leaders in disease prevention that TMDU provides.

# Management

(Code: 6330 1st year 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Katsuyuki Takeuchi	Specially Appointed Professor, Career Development Office, TMDU	takeuchi.k.mds@tmd.ac.jp
Instructors	Masahiko Itagoshi	Adviser and Executive Coach for Human Resource Technology, Business Coach, Inc.	
	Tomoko Kanayama	Section Chief, Japan Academic Association For Copyright Clearance	
	Sei Matsueda	Manager, Japan Academic Association For Copyright Clearance	
	Toshimichi Ishijima	Manager, Japan Academic Association For Copyright Clearance	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Equipping students with the fundamental knowledge and skill of Management (including Project Management, Career Management and Business Communication) to train them skills that can be incorporated to practice in day to day medical and research activities.

### Outline

Explaining Management Skills focusing mainly on Project Management, Career Management and Business Communication to equip students with necessary skill of management to foster them to be medical human resources, researchers or business persons in the future.

## 4. Course Objective(s)

Understanding the essence of Management Skills and gaining the skills will help students to apply them on day to day medical and research activities.

## 5. Format

Teaching the essence of Management Skills and giving these practical skills through workshops.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (60%) and comments in discussions (40%).

## 8. Prerequisite Reading

None.

## 9. Reference Materials

None.

## 10. Important Course Requirements

None.

**1 1 . Availability in English**

Same classes are offered in English on different schedules.

**1 2 . Office hours**

Weekdays only. Advanced appointments are required. Contact to Katsuyuki Takeuchi in Career Development Office, e-mail: takeuchi.k.mds@tmd.ac.jp

**1 3 . Note(s) to students**

We will inform the students who registered these lectures as soon as the date, time and venue have been decided upon conclusively.

## Schedule

No.	Day Time	Topics Venue	Instructor
1	Mid-September	Introduction of Management (TBD)	Katsuyuki Takeuchi and others
2	Mid-September	Project Management (TBD)	Masahiko Itagoshi
3	Late-September	Human Resource Management (TBD)	Masahiko Itagoshi
4	Late-September	Career Management (TBD)	Katsuyuki Takeuchi, Tomoko Kanayama and others
5	Early-October	Business Communication (Workshop) (TBD)	Masahiko Itagoshi, Sei Matsueda and others
6	Early-October	Business Communication (Workshop) (TBD)	Masahiko Itagoshi, Sei Matsueda and others
7	Mid-October	Project Design (Workshop) (TBD)	Katsuyuki Takeuchi, Toshimichi Ishijima and others
8	Mid-October	Project Design (Workshop) (TBD)	Katsuyuki Takeuchi, Toshimichi Ishijima and others

# Global Trends

(Code: 6340 1st or 2nd grade 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Katsuyuki Takeuchi	Specially Appointed Professor, Career Development Office, TMDU	takeuchi.k.mds@tmd.ac.jp
Instructors	Shinichi Kobayashi	Visiting Professor, The Open University of Japan	
	Keiko Nakamura	Professor, Department of Global Health Entrepreneurship, TMDU	
	Takeo Fujiwara	Professor, Department of Global Health Promotion, TMDU	
	Fumikazu Sato	Deputy Director-General, Industrial Science and Technology Policy and Environment Bureau, Ministry of Economy, Trade and Industry	
	Yutaka Tokushima	Founder, FabLab Bohol	
	Shohei Shirakami	Senior Manager, External Relations, Astellas Pharma Inc.	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Explaining global situation and international affairs that are related with area of Life Science and equipping students with the education, global perspective and higher viewpoints which are required to be human resources who are active at the global level in the future through having multifaceted discussion among students will help us to be such assets.

### Outline

Explaining global situation focusing mainly on Science Technology, Medical/Healthcare, Industry, Environment, Economic, Politics to equip students with necessary basic education and global perspective to foster them to be medical human resources, researchers or business persons in the future.

## 4. Course Objective(s)

The goal is to improve / develop students' expertise or gain fundamental social knowledge to acquire new viewpoints.

## 5. Format

Giving fundamental knowledge to understand global situation and international affairs that are related with Science Technology, Medical / Healthcare to develop international viewpoints by explaining the most advanced topics in various area. Based on interactive lectures, and introducing group discussions depending on the number of students.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (60%) and comments in discussions (40%).

**8 . Prerequisite Reading**

None.

**9 . Reference Materials**

None.

**1 0 . Important Course Requirements**

None.

**1 1 . Availability in English**

Same classes are offered in English on different schedules.

**1 2 . Office hours**

Weekdays only. Advanced appointments are required. Contact to Katsuyuki Takeuchi in Career Development Office, e-mail: takeuchi.k.mds@tmd.ac.jp

**1 3 . Note(s) to students**

We will inform the students who registered these lectures as soon as the date, time and venue have been decided upon conclusively.

## Schedule

No.	Day Time	Topics Venue	Instructor
1	Early-May	International Trends in Science and Technology Policy (TBD)	Shinichi Kobayashi
2	Mid-May	Health Challenges and Politics in OECD Countries (TBD)	Keiko Nakamura
3	Late-May	Global Public Health (TBD)	Keiko Nakamura
4	Early-June	Food/Resource Problem and Security (TBD)	Katsuyuki Takeuchi and others
5	Mid-June	Technological Innovation through Healthcare and Medical-Engineering Cooperation (TBD)	Fumikazu Sato
6	Late-June	Climate Change, Society and Health (TBD)	Takeo Fujiwara
7	Early-July	International Trend in Healthcare Industries (TBD)	Shohei Shirakami
8	Mid-July	Design of Medical Equipment and Aid for a Developing Nation (TBD)	Yutaka Tokushima

# Intellectual Property

(Code: 6350 1st or 2nd grade 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Katsuyuki Takeuchi	Specially Appointed Professor, Career Development Office, TMDU	takeuchi.k.mds@tmd.ac.jp
Instructors	Kaori Iida	Professor, Research Center for Industry Alliances, TMDU	
	Hiroshi Kitaoka	Director, The 33rd Board of Trial and Appeal, Japan Patent Office	
	Kazunari Sugimitsu	Professor, K.I.T. Toranomon Graduate School / patent attorney	
	Naoya Ichimura	Professor, K.I.T. Toranomon Graduate School / lawyer	
	Toshimichi Ishijima	Secretary General, Japan Academic Association For Copyright Clearance	

## 2. Classroom/Lab

Next Page

## 3. Course Purpose and Outline

### Course Purpose

Students will acquire the necessary basic knowledge of Intellectual Property to engage in research activities and business.

### Outline

Giving lectures on the essence of Intellectual Property such as patents and copyrights which are required in research activities and business settings. In addition, these lectures will help students to develop a deep understanding of Intellectual Property through case studies of Intellectual Property Strategy on research activities and business settings.

## 4. Course Objective(s)

The goal is to provide students with lectures to acquire the basic knowledge in “patent” and “copyright” and also the basic skill of patent search.

## 5. Format

Giving lectures for the basic knowledge, practices and case studies on Intellectual Property will help students to gain a better understanding of Intellectual Property.

## 6. Course Description and Timetable

Next Page

## 7. Grading System

Participation (60%), question and answer (20%), and quiz (20%).

**8 . Prerequisite Reading**

None.

**9 . Reference Materials**

None.

**1 0 . Important Course Requirements**

None.

**1 1 . Availability in English**

None.

**1 2 . Office hours**

Weekdays only. Advanced appointments are required. Contact to Katsuyuki Takeuchi in Career Development Office, e-mail: takeuchi.k.mds@tmd.ac.jp

**1 3 . Note(s) to students**

We will inform the students who registered these lectures as soon as the date, time and venue have been decided upon conclusively.

The 4th course, “The patent search for researchers (practice)” will be held at PC room 1 in Library (M&D Tower 4F).

## Schedule

No.	Day Time	Topics Venue	Instructor
1	November 9,2018 18:00~19:30	Introduction to Intellectual Property (The purpose of Intellectual Property Management in Academic Research)  (Lecture room 4,9F,M&D tower)	Kaori Iida
2	November 14,2018 19:00~20:30	Patent System I  (Lecture room 4,9F,M&D tower)	Hiroshi Kitaoka
3	November 16,2018 19:00~20:30	Patent System II  (Lecture room 4,9F,M&D tower)	Hiroshi Kitaoka
4	November 21,2018 19:00~20:30	Patent Search for Researchers (practice) PC room 1 in Library (M&D Tower 4F)	Hiroshi Kitaoka
5	November 28,2018 18:00~19:30	Business and Intellectual Property I  (Lecture room 4,9F,M&D tower)	Kazunari Sugimitsu
6	November 28,2018 19:40~21:30	Business and Intellectual Property II  (Lecture room 4,9F,M&D tower)	Kazunari Sugimitsu
7	December 4,2018 18:00~19:30	Basic of Copyright  (Lecture room 4,9F,M&D tower)	Naoya Ichimura
8	December 4,2018 19:40~21:30	Writing Papers and Copyright  (Lecture room 4,9F,M&D tower)	Naoya Ichimura, Toshimichi Ishijima

# English Conversation and Debate

(code:6400 1<sup>st</sup> year 1units)

2018

updated March 2018

## 1. Course Director and Instructor(s)

	Name	Department	Contact
Director	Ito Nobutoshi	Structural Biology, Professor	03-5803-4594 <a href="mailto:ito.str@tmd.ac.jp">ito.str@tmd.ac.jp</a>
Instructor	Janelle Moross	Institute of Global Affairs, Associate Prof.	03-5803-4686 <a href="mailto:jmoross.isc@tmd.ac.jp">jmoross.isc@tmd.ac.jp</a>
Instructor	Ash Warren	Institute of Global Affairs, Adjunct Lecturer	03-5803-4964 <a href="mailto:global.adm@tmd.ac.jp">global.adm@tmd.ac.jp</a>

## 2. Classroom/lab

G-lab, M & D Tower, 8th floor

## 3. Enrollment Capacity

20

## 4. Course Purpose and Outline

English proficiency is essential as a common world language for not only communication but also information dissemination in state-of-the art medical and dental research. In order to become leaders in the international arena, we will use critical thinking skills to discuss current topics, practice the basic skills required to have conversations, and to explain your research/ study area.

## 5. Course Objectives

At the end of the course, students will be able to:

- 1) Carry on discussions concerning current health science topics and own research area with more confidence
- 2) Use the Opinion-Reason-Evidence format for expressing ideas more clearly

## 6. Format

Mainly group discussion and listening exercises. Writing chances are available for those who are interested.

## 7. Course Description and Timetable

No.	Date Time	Topic Venue	Instructor
1	5/1 (T) 15:20-16:50	<b>Overview of class/ Group work basics</b> G-lab, M & D Tower, 8th floor	Janelle Moross Ash Warren
2	5/8 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
3	5/15 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
4	5/22 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
5	5/29 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> ☆ 実習室, Building 1, 6th floor	"
6	6/5 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> ☆ 実習室, Building 1, 6th floor	"

7	6/12 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
8	6/19 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
9	6/26 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
10	7/3 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
11	7/10 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
12	7/17 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
13	11/6 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
14	11/13 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> ☆ 実習室, Building 1, 6th floor	"
15	11/20 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
16	11/27 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
17	12/4 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
18	12/11 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
19	12/18 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
20	1/8 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
21	1/15 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> ☆ 実習室, Building 1, 6th floor	"
22	1/22 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
23	1/29 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"
24	2/5 (T) 15:20-16:50	<b>Discussion/Listening/Writing</b> G-lab, M & D Tower, 8th floor	"

### 8. Grading System/ Attendance

Based on class participation (100%). Students must attend the first session on 2018/5/1 and at least 7 other sessions, total 8 sessions, in order to be eligible to pass this course. Those who do not meet these requirements and do not officially drop the course will receive a failing grade.

### 9. Prerequisite Reading

When reading materials are distributed or specified in advance, participants are expected to read those materials beforehand and be prepared for class discussion. Reading, listening or light research will be required before each session. Details will be given in class and uploaded to WebClass.

### 10. Reference Materials

To be uploaded to WebClass before class, when relevant.

### 11. Important Course Requirements

Students taking the course for credit will be expected to arrive to class on time, participate actively and vocally during class discussions, and complete any homework and in-class assignments on time.

**12. Availability in English**

Direction, class group work and all communications are in English.

**13. Office Hours**

Please contact course director to make an appointment.

**14. Note to Students**

All sessions are conducted in English.

**15. TOEFL iBT Practice Test**

All enrollees of this course will be eligible to take the iBT practice test administered here at TMDU in spring and summer. Cost of this practice test will be the student's responsibility, around 4,000 yen. Contact the Global Advancement Administrative Unit, [global.adm@tmd.ac.jp](mailto:global.adm@tmd.ac.jp), for further details.

# Presentation in English

(Code: 6401 1st year 1 units)

Not offerd

# Biomedical Science

(Code: 6402 1st year 2units)

## 1. Instructor (s)

Fumitoshi Ishino E-mail: fishino.epgn@mri.tmd.ac.jp  
Hiroshi Shibuya E-mail: shibuya.mcb@mri.tmd.ac.jp  
Toshiyasu Goto E-mail: goto.mcb@mri.tmd.ac.jp  
Hiroshi Nishina E-mail: nishina.dbio@mri.tmd.ac.jp  
Takashi Koda E-mail: tkohda.epgn@mri.tmd.ac.jp  
Hidehito Huroyanagi E-mail: kuroyana.end@tmd.ac.jp  
Koh Nakayama E-mail: nakayama.mtt@mri.tmd.ac.jp  
Akira Nakanishi E-mail: nakanishi.mgen@mri.tmd.ac.jp  
Noriko Sato E-mail: nsato.epi@mri.tmd.ac.jp  
Ji-Yang Wang E-mail: jywang.imm@mri.tmd.ac.jp  
Kenkichi Masutomi E-mail: kmasutom@ncc.go.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

The Bioscience I Program offers lectures on several important topics in Molecular Biology, Genetics, Epigenetics, Developmental Biology and Engineering, Cell Biology and Biochemistry. The major purpose of the program is to obtain the latest information on these fields of science and to train scientific mind as well as logical thinking skills necessary to become independent researchers.

### Outline

Molecular mechanisms on several fundamental biological phenomena related to embryonic development, cell differentiation and immune system are introduced and several human diseases due to breakdown of normal regulation, such as genomic imprinting diseases, cancers, immunodeficiency and allergy, will be discussed.

## 4. Course Objective(s)

Introduce useful information from the latest biology to basic medicine to attendants.

## 5. Format

Lecture, discussion and presentation

## 6. Course Description and Timetable

Next Page

## 7. Grading System

Attendance to lectures (80 %) and reports (20 %) are evaluated.

## 8. Prerequisite Reading

Basic knowledge on genetics, biochemistry and immunology is required (preferable) .

## 9. Reference Materials

C. David Allis et al. "EPIGENETICS", Cold Spring Harbor Laboratory Press  
Peter Parham, "The immune system" (Third edition), Garland Science  
Molecular Cell Biology Eighth Edition, Harvey Lodish et al, ISBN-13: 978-1-4641-8339-3

## 10. Important Course Requirements

Nothing

### 10.1. Availability in English

When an international student registers this subject for credits, this course is taught in English.

### 10.2. Office hours

Questions on lectures are welcomed as needed.

### 10.3. Note(s) to students

Nothing

#### Schedule

No	Day Time	Topics Venue	Instructor
1	June 1, 2018 13:00-15:15	Genetics and epigenetics (Lecture room 4, 9F, M&D tower)	F. Ishino
2	June 8, 2018 13:00-15:15	Epigenetics and mammalian (Lecture room 4, 9F, M&D tower)	T. Koda
3	June 15, 2018 13:00-15:15	IgM, complement and IgM Fc receptor in humoral immune (Lecture room 4, 9F, M&D tower)	Ji-Yang Wang
4	June 22, 2018 13:00-15:15	Cellular signaling in development (Lecture room 4, 9F, M&D tower)	H. Shibuya and T. Gotoh
5	June 29, 2018 13:00-15:15	Telomere biology and carcinogenesis (Lecture room 4, 9F, M&D tower)	K. Masutomi
6	July 6, 2018 13:00-15:15	Post-transcriptional Regulation of Gene Expression (Lecture room 4, 9F, M&D tower)	H. Kuroyanagi
7	July 13, 2018 13:00-15:15	What is tumor microenvironment? (Lecture room 4, 9F, M&D tower)	K. Nakayama
8	July 20, 2018 13:00-15:15	Molecular mechanisms of carcinogenesis (Lecture room 4, 9F, M&D tower)	A. Nakanishi
9	August 31, 2018 13:00-15:15	Developmental origin of health and disease (DOHaD) (Lecture room 4, 9F, M&D tower)	N. Sato
10	September 7, 2018 13:00-15:15	Liver formation and diseases (Lecture room 4, 9F, M&D tower)	H. Nishina

# Advanced Biofunctional Molecules

(Code: 6403 1st year 1unit)

## 1. Instructor (s)

Hiroyuki Kagechika E-mail kage.chem@tmd.ac.jp  
Takamitsu Hosoya E-mail thosoya.cb@tmd.ac.jp  
Nobutoshi Ito E-mail ito.str@tmd.ac.jp  
Tomoya Hirano E-mail hira.chem@tmd.ac.jp  
Teikichi Ikura E-mail ikura.str@tmd.ac.jp  
Yoshitake Nishiyama E-mail nishiyama.cb@tmd.ac.jp  
Shuichi Mori E-mail s-mori.chem@tmd.ac.jp  
Mari Yuasa E-mail myuasa.chem@tmd.ac.jp  
Nobutaka Numamoto E-mail numoto.str@mri.tmd.ac.jp  
Hiroyuki Masuno E-mail masuno.chem@tmd.ac.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Fundamental knowledge and technology on the functional molecules and the recent topics on their applications will be educated.

### Outline

Various topics related to the functional molecules in the fields of medicinal chemistry, chemical biology, and materials sciences will be discussed, including the presentation by the students. There is some experimental practice.

## 4. Course Objective(s)

Chemical knowledge and technology is significant in various fields including chemical biology, sensing biology, medicinal chemistry, and materials sciences. This course deals with fundamentals and applications of biofunctional molecules.

## 5. Format

This course includes seminar-type lectures, including the presentation by the students.

## 6. Course Description and Timetable

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## 7. Grading System

Attendance (50%) and Presentation or Report (50%)

## 8. Prerequisite Reading

Fundamental organic chemistry and biochemistry should be reviewed. The books listed in #9 are useful for understanding the topics in this course.

## 9. Reference Materials

The Practice of Medicinal Chemistry (C. G. Wermuth, D. Aldous, P. Raboisson, D. Rognan eds, Academic Press); Chemical Biology (L. Schreiber, T. Kapoor, G. Wess Eds, WILEY-VCH); The Nuclear Receptors FactsBook (Laudet, V & Gronemeyer, H., Academic Press).

### 10. Important Course Requirements

Nothing

### 11. Availability in English

When an international student registers this subject for credits, this course is taught in English.

### 12. Office hours

Questions on lectures are welcomed as needed.

### 13. Note(s) to students

Nothing

#### Schedule

No	Day Time	Topics Venue	Instructor
1	April 14, 2018 10:00-12:15	Recent topics on biofunctional molecules 1 (Seminar room2 at 1F,Building22)	H Kagechika,T Hirano,N Ito,Y Nishiyama
2	May 12, 2018 10:00-12:15	Recent topics on biofunctional molecules 2 (Seminar room2 at 1F,Building22)	H Kagechika,S Mori,T Hosoya,N Numamoto
3	June 2, 2018 10:00-12:15	Recent topics on biofunctional molecules 3 (Seminar room2 at 1F,Building22)	H Kagechika,M Yuasa,T Ikura,H Masuno
4	July 7, 2018 10:00-12:15	Recent topics on biofunctional molecules 4 (Seminar room2 at 1F,Building22)	H Kagechika,T Hirano,N Ito,Y Nishiyama
5	July 14, 2018 10:00-12:15	Recent topics on biofunctional molecules 5 (Seminar room2 at 1F,Building22)	H Kagechika,S Mori,T Hosoya,M yuasa

# Development of Functional Molecules

(Code: 6404 1st year 1unit)

## 1. Instructor (s)

Takamitsu Hosoya E-mail thosoya.cb@tmd.ac.jp  
Hiroyuki Kagechika E-mail kage.chem@tmd.ac.jp  
Hirokazu Tamamura E-mail tamamura.mr@tmd.ac.jp  
Tomoya Hirano E-mail hira.chem@tmd.ac.jp  
Wataru Nomura E-mail nomura.mr@tmd.ac.jp  
Suguru Yoshida E-mail s-yoshida.cb@tmd.ac.jp  
Yoshitake Nishiyama E-mail nishiyama.cb@tmd.ac.jp  
Shuichi Mori E-mail s-mori.chem@tmd.ac.jp  
Mari Yuasa E-mail myuasa.chem@tmd.ac.jp  
Takuya Kobayakawa tkobmr@tmd.ac.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Fundamental knowledge and recent technology on the development (molecular design, synthesis and functional analysis) of functional molecules will be educated.

### Outline

Logical design, synthesis, and analysis for development of functional molecules will be learned, including the presentation by the students.

## 4. Course Objective(s)

Chemical knowledge and technology is significant in various fields including chemical biology, sensing biology, medicinal chemistry, and materials sciences. This course deals with fundamentals on development of functional molecules based on organic chemistry.

## 5. Format

This course includes seminar-type lectures about organic chemistry.

## 6. Course Description and Timetable

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## 7. Grading System

Attendance (50%) and Presentation (50%)

## 8. Prerequisite Reading

Fundamental organic chemistry should be reviewed. The books listed in #9 are useful for understanding the topics in this course.

## 9. Reference Materials

Advanced Organic Chemistry (Francis A. Carey, Richard J. Sundberg, Springer) .

### 10. Important Course Requirements

Nothing

#### 11. Availability in English

When an international student registers this subject for credits, this course is taught in

#### 12. Office hours

Questions on lectures are welcomed as needed.

#### 13. Note(s) to students

Nothing

#### Schedule

No	Day Time	Topics Venue	Instructor
1	June 9, 2018 15:00-17:15	Development of Functional Molecules 1 (Seminar room2 at 1F, Building 22)	T Hosoya S Yoshida Y Nishiyama
2	June 23, 2018 15:00-17:15	Development of Functional Molecules 2 (Seminar room2 at 1F, Building 22)	T Hosoya S Yoshida Y Nishiyama
3	July 7, 2018 15:00-17:15	Development of Functional Molecules 3 (Seminar room2 at 1F, Building 22)	T Hosoya S Yoshida Y Nishiyama
4	October 20, 2018 15:00-17:15	Development of Functional Molecules 4 (Seminar room2 at 1F, Building 22)	H Tamamura W Nomura T Kobayakawa
5	November 17, 2018 15:00-17:15	Development of Functional Molecules 5 (Seminar room2 at 1F, Building 22)	H Kagechika S Mori T Hirano

# Resonstitution Materials Science

(Code: 6405 1st year 1 unit)

## 1. Instructors:

Takao Hanawa E-mail hanawa.met@tmd.ac.jp  
Yusuke Tsutsumi E-mail tsutsumi.met@tmd.ac.jp

## 2. Classroom /Lab

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## 3. Course Purpose and Outline

### Course Purpose

This course gives the understanding of the usage of metallic biomaterials. Design, fabrication process, evaluation of metallic biomaterials are also lectured and discussed.

### Outline

This course deals with fundamental characteristics of metals. Design of metallic materials for bio-functionalization and its application are introduced through recent textbooks and papers.

## 4. Course Objectives

This course deals with fundamental characteristics of metals. Design of metallic materials for bio-functionalization and its application are introduced through recent textbooks and papers.

## 5. Format

Lectures by instructors, Presentation by students, and Discussion

## 6. Course Description and Timetable

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## 7. Grading System

Grading is judged from participation and examination during lectures.  
Participation: 60%, Examination: 40%.

## 8. Prerequisite Reading

Review of basic chemistry and physical chemistry and preparation of metallurgical engineering are desirable.

## 9. Reference Materials

Textbooks, references, and papers are suggested during lectures.

## 10. Important Course Requirements

Difficulty and problem in your research must be extracted and prepare to discuss on them are desirable.

**1 1. Availability in English**

When an international student registers this subject for credits, this course is taught in English.

**1 2. Office hours**

Questions on lectures are welcomed as needed.

**1 3. Note(s) to students**

None

**Schedule**

No	Day Time	Topics Venue	Instructor
1	June 18, 2018 18:00-20:15	Outline of materials engineering and metals (Seminar room3 at 8F,Building22)	Takao Hanawa
2	June 19, 2018 18:00-20:15	Phase and crystal structure (Seminar room3 at 8F,Building22)	Takao Hanawa
3	June 20, 2018 18:00-20:15	Process and mechanical property (Seminar room3 at 8F,Building22)	Takao Hanawa
4	June 25, 2018 18:00-20:15	Surface and interface of metallic (Seminar room3 at 8F,Building22)	Yusuke Tsutsumi
5	June 26, 2018 18:00-20:15	Biosafety, biocompatibility, and surface modification (Seminar room3 at 8F,Building22)	Yusuke Tsutsumi

# Tissue Regenerative Bioceramic Materials Science

(Code: 6406 1st year 1 unit)

## 1. Instructors:

Kimihiro Yamashita E-mail yama-k.bcr@tmd.ac.jp

Miho Nakamura E-mail miho.bcr@tmd.ac.jp

Naohiro Horiuchi E-mail nhori.bcr@tmd.ac.jp

## 2. Classroom /Lab

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## 3. Course Purpose and Outline

### Course Purpose

This course gives the understanding of the usage of bioceramic materials and bioengineering in clinical field. Fabrication and design process of medical devices are also lectured.

### Outline

This course deals with fundamental characteristics of biomedical ceramic materials and devices. Designing medical devices for realizing novel function and their application are introduced through recent outcome from advanced research field.

## 4. Course Objectives

This course deals with fundamental characteristics of biomedical ceramic materials and devices. Designing medical devices for realizing novel function and their application are introduced through recent outcome from advanced research field.

## 5. Format

Lectures by instructors, Presentation by students, and Discussion

## 6. Course Description and Timetable

Next Page

## 7. Grading System

Grading is judged from participation and examination during lectures.

Participation: 60%, Examination: 40%.

## 8. Prerequisite Reading

none

## 9. Reference Materials

Textbooks, references, and papers are suggested during lectures.

## 10. Important Course Requirements

none

**1 1. Availability in English**

When an international student registers this subject for credits, this course is taught in English.

**1 2. Office hours**

Questions on lectures are welcomed as needed.

**1 3. Note(s) to students**

none

## Schedule

No	Day Time	Topics Venue	Instructor
1	July 9, 2018 18:00-20:15	Overview of Bioceramic Materials and (Seminar room3 at 8F,Building22)	K. Yamashita
2	July 17, 2018 18:00-20:15	Material-Processing of Bioceramics (Seminar room3 at 8F,Building22)	N. Horiuchi
3	July 18, 2018 18:00-20:15	Fundamental Materials Science of (Seminar room3 at 8F,Building22)	N. Horiuchi
4	July 24, 2018 18:00-20:15	Biocompatibility of Bioceramics (Seminar room3 at 8F,Building22)	M. Nakamura
5	July 25, 2018 18:00-20:15	Tissue Reconstruction by Bioceramics (Seminar room3 at 8F,Building22)	M. Nakamura

# Organic Biomaterials Science

(Code: 6407 1st year 1unit)

## 1. Instructor (s)

Nobuhiko Yui E-mail yui.org@tmd.ac.jp  
Atsushi Tamura E-mail tamura.org@tmd.ac.jp  
Yoshinori Arisaka E-mail arisaka.org@tmd.ac.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

To offer lectures on several important aspects in supramolecular organic biomaterials, from basis to possible applications. The major purpose of the program is to train scientific mind as well as logical thinking required for independent researchers.

### Outline

Systematic studies on biological responses to organic biomaterials from supramolecular point of views are introduced in order to help scientific logical thinking, and design strategies of future biomaterials will be discussed.

## 4. Course Objective(s)

Introduce useful information on organic biomaterials from basis to possible applications to attendants.

## 5. Format

Lecture, discussion and presentation

## 6. Course Description and Timetable

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## 7. Grading System

Attendance to lectures (50 %) and question during the class (50 %) are evaluated.

## 8. Prerequisite Reading

Previous credits on Advanced Biomaterials Science and Applied Biomaterials Science or the equal academic level is required (preferable) .

## 9. Reference Materials

Advice appropriately.

## 10. Important Course Requirements

Nothing

## 11. Availability in English

When an international student registers this subject for credits, this course is taught in English.

**1 2. Office hours**

Questions on lectures are welcomed as needed.

**1 3. Note(s) to students**

Nothing

**Schedule**

No	Day Time	Topics Venue	Instructor
1	May 7, 2018 18:00-20:15	Basis of organic biomaterials (Seminar room3 at 8F,Building22)	Nobuhiko Yui
2	May 9, 2018 18:00-20:15	Interaction of organic biomaterials with living body (Seminar room3 at 8F,Building22)	Nobuhiko Yui
3	May 10, 2018 18:00-20:15	Synthesis and processing of organic biomaterials (Seminar room3 at 8F,Building22)	Atsushi Tamura
4	May 14, 2018 18:00-20:15	Organic biomaterials for advanced medicine 1 (Seminar room3 at 8F,Building22)	Atsushi Tamura
5	May 17, 2018 18:00-20:15	Organic biomaterials for advanced medicine 2 (Seminar room3 at 8F,Building22)	Yoshinori Arisaka

# Medical Materials Engineering

(Code: 6408 1st year 1unit)

## 1. Instructor (s)

Akio Kishida E-mail kishida.mbme@tmd.ac.jp  
Tsuyoshi Kimura E-mail kimurat.mbme@tmd.ac.jp  
Yoshihide Hashimoto E-mail hasimoto.atrm@tmd.ac.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

This course gives the understanding of the usage of biomaterials in clinical field.  
Fabrication and design process of medical devices are also lectured

### Outline

This course deals with fundamental characteristics of medical materials and devices.  
Designing medical devices for realizing novel function and their application are introduced through recent outcome from advanced research field.

## 4. Course Objective(s)

The goal of this course is to understand how novel medical devices should be developed.

## 5. Format

Lecture, discussion and presentation

## 6. Course Description and Timetable

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## 7. Grading System

Attendance to lectures (80 %) and reports (20 %) are evaluated.

## 8. Prerequisite Reading

Basic knowledge on Materials, Physio-Chemistry and immunology is required

## 9. Reference Materials

B. Ratner et al. "Biomaterials Science"3rd Ed, Academic Press  
R.P. Lanza et al. "Principles of Tissue Engineering"2nd Ed, Academic Press

## 10. Important Course Requirements

Nothing

### 1 1. Availability in English

When an international student registers this subject for credits, this course is taught in English.

### 1 2. Office hours

Questions on lectures are welcomed as needed.

### 1 3. Note(s) to students

Nothing

Schedule

No	Day Time	Topics Venue	Instructor
1	May 7, 2018 14:00-16:15	Planning for development of biomaterials (Seminar room3 at 8F,Building22)	Akio Kishida
2	May 14, 2018 14:00-16:15	Artificial and Natural biomaterials (Seminar room3 at 8F,Building22)	Akio Kishida
3	May 21, 2018 14:00-16:15	Tissue-engineered materials (Seminar room3 at 8F,Building22)	Yoshihide Hashimoto
4	May 28, 2018 14:00-16:15	Biological response for biomaterials (Seminar room3 at 8F,Building22)	Tsuyoshi Kimura
5	June 4, 2018 14:00-16:15	Medical device regulation (Seminar room3 at 8F,Building22)	Tsuyoshi Kimura

# Advanced Control on Medical System

(Code: 6409 1st year 1unit)

## 1. Instructor (s)

Kenji Kawashima E-mail:kkawa.bmc@tmd.ac.jp  
Tetsurou Miyazaki E-mail:tmiyazaki.bmc@tmd.ac.jp  
Takahiro Kanno E-mail:kanno.bmc@tmd.ac.jp  
Toshihiro Kawase

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

In the fields of medical treatment, nursing, and welfare, the use of surgical robots and power assist systems are effective. The purpose of this course is to acquire the knowledge of control engineering, which is essential technology for medical systems. This lecture also introduces the research activities of robots in the fields.

### Outline

Learn basic control engineering to actuate medical and nursing care robots. This lecture also provides recent topics of surgical assist robots and power assist systems.

## 4. Course Objective(s)

Learn basic of control technologies for the development of medical systems.

## 5. Format

Lecture and discussion

## 6. Course Description and Timetable

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## 7. Grading System

Attendance to lectures (50 %) and examination (50 %) are evaluated.

## 8. Prerequisite Reading

Instruct at the first lecture if necessary

## 9. Reference Materials

Richard C. Dorf et al. "Modern Control Systems", Prentice-Hall Inc.

## 10. Important Course Requirements

Nothing

## 11. Availability in English

When an international student registers this subject for credits, this course is taught in English.

## 1 2. Office hours

Questions on lectures are welcomed as needed.

## 1 3. Note(s) to students

Nothing

### Schedule

No	Day Time	Topics Venue	Instructor
1	June 11, 2018 14:00-16:15	Control engineering of medical systems 1 (Seminar room3 at 8F,Building22)	K.Kawashima
2	June 18, 2018 14:00-16:15	Control engineering of medical systems 2 (Seminar room3 at 8F,Building22)	K.Kawashima
3	June 25, 2018 14:00-16:15	Control of rehablitaion robots (Seminar room3 at 8F,Building22)	T.Kawase
4	July 2, 2018 14:00-16:15	Control of power assist systems (Seminar room3 at 8F,Building22)	T.Miyazaki
5	July 9, 2018 14:00-16:15	Control of surgical assist robots (Seminar room3 at 8F,Building22)	T.Kanno

# RIKEN Molecular and Chemical Somatology

(Code: 6410 1st year 2units)

## 1. Instructor (s)

Motomasa Tanaka E-mail: motomasa@brain.riken.jp  
Ichiro Taniuchi E-mail: Ichiro Taniuchi  
Pradipta Ambara E-mail: arpradipta@riken.jp  
Sanae Sekihara E-mail: sanae.sekihara@riken.jp  
Akiko Tane E-mail: akiko.tane@riken.jp  
Ryo Endo E-mail: ryo-endo@brain.riken.jp  
Nobuhiko Miyasaka E-mail: miyasaka@brain.riken.jp  
Yutaka Furutani E-mail: yfurutani@riken.jp  
Tetsuya Koide E-mail: tkoide@brain.riken.jp  
Kelvin Hui Kai-Wan

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

We aim to understand the basis of Structural Biology, Molecular Immunology, and Molecular Neuropathology, as well as their applications to Medicine and Biology by dealing with a variety of molecules that regulate cellular functions including proteins, sugars and hormones.

### Outline

Molecular and Chemical Somatology is an interdisciplinary fields to understand the basis of Structural Biology, Molecular Immunology, and Molecular Neuropathology, as well as their applications to Medicine and Biology by dealing with a variety of molecules that regulate cellular functions including proteins, sugars, and hormones. Students will listen to lectures and discuss about the outlines and/or the latest topics on discovery, structure, synthesis, biology, and management of these key molecules/factors, and deepen their understanding of this new research field.

## 4. Course Objective(s)

Students will listen to lectures and discuss about the latest topics from each instructor.

## 5. Format

Lectures by instructors, Presentation by students, and Discussion

## 6. Course Description and Timetable

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## 7. Grading System

Attendance (40%) and Report (60%)

## 8. Prerequisite Reading

None

## 9. Reference Materials

Introduction to Glycobiology Third Edition (Maureen E. Taylor and Kurt Drickamer, Oxford University Press), Essentials of Glycobiology, 2nd edition (Ajit Varki, Richard D Cummings, Jeffrey D Esko, Hudson H Freeze, Pamela Stanley, Carolyn R Bertozzi, Gerald W Hart, and Marilyn E Etzler, Cold Spring Harbor Laboratory Press), Fundamentals of Protein Structure and Function (Buxbaum and Engelbert, Springer), Neuroscience: Exploring the Brain 4th Edition (Mark F. Bear, Barry Connors and Mike Paradiso, Wolters Kluwer)

### 1 0. Important Course Requirements

All the lectures will be held at RIKEN.

### 1 1. Availability in English

When an international student registers this subject for credits, this course is taught in English.

### 1 2. Office hours

3:00-5:00 pm, every Tuesday to:

Dr. Motomasa Tanaka, Team Leader of RIKEN Brain Science Institute

### 1 3. Note(s) to students

Nothing

#### Schedule

No	Day Time	Topics Venue	Instructor
1	June 28, 2018 9:45-12:00	Molecular Neuropathology (Rm424/426, Main Res bldg, RIKEN Wako)	M Tanaka
2	June 28, 2018 13:00-15:15	Labeling / Bioconjugation in general (Rm S310, Biosci bldg, RIKEN Wako)	Pradipta Ambara
3	July 5, 2018 14:00-16:15	Glycobiology/Structural Glycobiology I (Rm S310, Biosci bldg, RIKEN Wako)	Kelvin Hui Kai-Wan
4	July 26, 2018 14:00-16:15	Functional molecules involved in innate immunity and homeostasis (Rm424/426, Main Res bldg, RIKEN)	S Sekihara
5	August 30, 2018 13:00-15:15	Immune Molecular Regulation-1 (6F Conference Room, IMS, RIKEN Yokohama)	I Taniuchi
6	August 30, 2018 15:30-17:45	Immune Molecular Regulation-2 (6F Conference Room, IMS, RIKEN Yokohama)	A Tane
7	September 6, 2018 14:00-16:15	Molecular Neurobiology (Rm424/426, Main Res bldg, RIKEN Wako)	R Endo
8	September 13, 2018 13:00-15:15	Molecular Basis of Chemical Senses (Rm424/426, Main Res bldg, RIKEN Wako)	N Miyasaka
9	September 13, 2018 15:30-17:45	Cell adhesion molecules (Rm424/426, Main Res bldg, RIKEN Wako)	Y Furutani
10	September 27, 2018 14:15-16:30	Molecular Neuroethology (Rm424/426, Main Res bldg, RIKEN Wako)	T Koide

# Integrative Biomedical Sciences for Preemptive Medicine I

(Code: 6415 1st year 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	tsunoda.mesm@mri.tmd.ac.jp
Instructors	Toshihiro Tanaka	Professor, Department of Human Genetics and Disease Diversity, TMDU	
	Kinya Ishikawa	Professor, Center for Personalized Medicine for Healthy Aging, TMDU	
	Fumihiko Takeuchi	Head, Section of Gene Therapeutics, Department of Gene Diagnostics and Therapeutics, Research Institute, National Center for Global Health and Medicine	
	Koji Mitsubayashi	Professor, Department of Biomedical Devices and Instrumentation, TMDU	
	Kayo Waki	Associate Professor, Department of Ubiquitous Health Informatics, Graduate School of Medicine, the University of Tokyo	
	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	
	Sinya Kuroda	Professor, Department of Biophysics and Biochemistry, Graduate School of Science, University of Tokyo	
	Masayuki Yoshida	Professor, Department of Life Sciences and Bioethics, TMDU	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

To understand the basic concepts of integrative biomedical sciences for preemptive medicine, a learning system for preemptive medicine that enables prevention of diseases by collecting omics information such as genome information, information about environmental factors, clinical information and lifestyle information, discovering the factors and mechanism involved in diseases including cancer and lifestyle-related diseases, developing the predictive models and instructing/intervening in individuals.

### Outline

To understand the following topics: the biological process from the healthy state to disease onset, the basic relationship between the genetic factors and environmental factors/epigenetics, the basic concepts regarding acquiring methods of omics and biological information, the method to estimate the risk of developing diseases, the basic method for instruction or intervention, ethics and genetic counseling.

## 4. Course Objective(s)

This course will provide a broad-based education that helps to develop a comprehensive overview of the field of Integrative Biomedical Sciences for Preemptive Medicine.

## 5. Format

The leading experts in Integrative Biomedical Sciences for Preemptive Medicine will be invited and the course will focus on student participation and discussion.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (50%), question and answer (20%), and reports (30%).

**8. Prerequisite Reading**

None.

**9. Reference Materials**

None.

**10. Important Course Requirements**

None.

**11. Availability in English**

Same classes are offered in English on different schedules.

**12. Office hours**

Weekdays only: Students must e-mail Tatsuhiko Tsunoda in advance in order to make an appointment.

**13. Note(s) to students**

This is compulsory elective course for Integrative Biomedical Sciences Programs for Preemptive Medicine students. Enrollment will be limited, with priority given to the course students.

**Schedule**

No	Day Time	Topics Venue	Instructor
1	April 17,2018 17:30~19:00	Concepts of preemptive medicine and individualized medicine, the process from the healthy state to disease onset, and instruction/intervention	Kinya Ishikawa
		(Active Learning Room, M&D Tower 4F)	
2	April 19,2018 17:30~19:00	Establishment of biobanks for preemptive medicine and omics profiling, study tour around biobanks	Toshihiro Tanaka
		(Active Learning Room, M&D Tower 4F)	
3	May 15,2018 15:30~17:00	Ethics of medical research involving human subjects such as preemptive medical research and genetic counseling	Masayuki Yoshida
		(Common use Lecture Room2, M&D Tower 2F)	
4	June 19,2018 15:30~17:00	Trans-omics analysis to explore the biological phenomena across omics	Sinya Kuroda
		(Active Learning Room, M&D Tower 4F)	
5	July 10,2018 18:00~19:30	Data science of multifactorial diseases through omics analysis	Fumihiko Takeuchi
		(Active Learning Room, M&D Tower 4F)	
6	July 12,2018 13:00~14:30	The basics of biological information monitoring devices	Koji Mitsubayashi
		(Active Learning Room, M&D Tower 4F)	
7	July 19,2018 16:20~17:50	Signal processing and knowledge creation technology for the devices to monitor biological information such as information about diabetes	Kayo Waki
		(Active Learning Room, M&D Tower 4F)	
8	July 26,2018 10:00~11:30	The basics to develop the health management algorithm based on the omics data	Tatsuhiko Tsunoda
		(Active Learning Room, M&D Tower 4F)	

# Integrative Biomedical Sciences for Preemptive Medicine I

(Code: 6425 1st year 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	tsunoda.mesm@mri.tmd.ac.jp
Instructors	Toshihiro Tanaka	Professor, Department of Human Genetics and Disease Diversity, TMDU	
	Kinya Ishikawa	Professor, Department of Personalized Genomic Medicine for Health, TMDU	
	Keiko Nakamura	Professor, Department of Global Health Entrepreneurship, TMDU	
	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	
	Fuyuki Miya	Junior Associate Professor, Department of Medical Science Mathematics, TMDU	
	Jou Nishino	Assistant Professor, Department of Medical Science Mathematics, TMDU	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

To understand the basic concepts of integrative biomedical sciences for preemptive medicine, a learning system for preemptive medicine that enables prevention of diseases by collecting omics information such as genome information, information about environmental factors, clinical information and lifestyle information, discovering the factors and mechanism involved in diseases including cancer and lifestyle-related diseases, developing the predictive models and instructing/intervening in individuals.

### Outline

To understand the following topics: the biological process from the healthy state to disease onset, the basic relationship between the genetic factors and environmental factors/epigenetics, the basic concepts regarding acquiring methods of omics and biological information, the method to estimate the risk of developing diseases, the basic method for instruction or intervention, ethics and genetic counseling.

## 4. Course Objective(s)

This course will provide a broad-based education that helps to develop a comprehensive overview of the field of Integrative Biomedical Sciences for Preemptive Medicine.

## 5. Format

The leading experts in Integrative Biomedical Sciences for Preemptive Medicine will be invited and the course will focus on student participation and discussion.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (50%), question and answer (20%), and reports (30%).

## 8. Prerequisite Reading

None.

## 9. Reference Materials

None.

## 10. Important Course Requirements

None.

### 11. Availability in English

Lectures and all communications are in English.

### 12. Office hours

Weekdays only: Students must e-mail Tatsuhiko Tsunoda in advance in order to make an appointment.

### 13. Note(s) to students

This is compulsory elective course for Integrative Biomedical Sciences Programs for Preemptive Medicine students. Enrollment will be limited, with priority given to the course students.

#### Schedule

No	Day Time	Topics Venue	Instructor
1	December 3, 2018 10:00~11:30	Introduction	Tatsuhiko Tsunoda
		(Active Learning Room, M&D Tower 4F)	
2	December 6, 2018 14:30~16:00	Establishment of biobanks for preemptive medicine and omics profiling, study tour around biobanks  (Lecture room 4, M&D Tower 9F)	Toshihiro Tanaka
3	December 7, 2018 14:30~16:00	Concepts of preemptive medicine and individualized medicine, the process from the healthy state to disease onset, and instruction/intervention	Kinya Ishikawa
		(Active Learning Room, M&D Tower 4F)	
4	December 10, 2018 14:30~16:00	presentation by the students and discussion  (Lecture room 4, M&D Tower 9F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
5	December 10, 2018 16:10~17:40	Use of data science and information technology to advance global public health  (Lecture room 4, M&D Tower 9F)	Keiko Nakamura
6	December 12, 2018 14:30~16:00	presentation by the students and discussion  (Lecture room 4, M&D Tower 9F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
7	December 13, 2018 10:00~11:30	presentation by the students and discussion  (Lecture room 4, M&D Tower 9F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
8	December 17, 2018 14:30~16:00	presentation by the students and discussion	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
		(Active Learning Room, M&D Tower 4F)	

# Integrative Biomedical Sciences for Preemptive Medicine II

(Code: 6416 1st year 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	tsunoda.mesm@mri.tmd.ac.jp
Instructors	Hiroshi Tanaka	Specially Appointed Professor, Medical Data Sciences Office, TMDU	
	Norihiro Kato	Director, Department of Gene Diagnostics and Therapeutics Research Institute, National Center for Global Health and Medicine	
	Seiichi Mori	Project Leader, Project for Development of Innovative Research on Cancer Therapeutics, Cancer Genomics Senior Staff Scientist Cancer Precision Medicine Center, Cancer Institute	
	Minoru Tozuka	Professor, Department of Analytical Laboratory Chemistry, TMDU	
	Jun Uda	Professor, Graduate School of Health Care Sciences, Jikei Institute	
	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	
	Naoyuki Kamatani	Chairman of StaGen Co. Ltd	
	Kinya Ishikawa	Professor, Center for Personalized Medicine for Healthy Aging, TMDU	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

To widely understand the applications for integrative biomedical sciences for preemptive medicine, a learning system for preemptive medicine that enables prevention of diseases by collecting omics information such as genome information, information about environmental factors, clinical information and lifestyle information, discovering the factors and mechanism involved in diseases such as cancer and lifestyle related diseases, developing the predictive models and instructing/intervening in individuals.

### Outline

To learn the following case examples, instruction, and intervention: utilization of the practical health/medical information to promote preemptive medicine and individualized medicine, advanced omics experiment/analysis methods using the next-generation sequencers, topics about the development story of biological information sensing such as wearable mobile, utilization of analytical technologies including AI.

## 4. Course Objective(s)

This course will provide a broad-based education that helps to develop a comprehensive overview of the field of disease prevention sciences.

## 5. Format

The leading experts in Integrative Biomedical Sciences for Preemptive Medicine will be invited and the course will focus on student participation and discussion.

## 6. Course Description and Timetable

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**7. Grading System**

Participation (50%), question and answer (20%), and reports (30%).

**8. Prerequisite Reading**

None.

**9. Reference Materials**

None.

**10. Important Course Requirements**

None.

**11. Availability in English**

Same classes are offered in English on different schedules.

**12. Office hours**

Weekdays only: Students must e-mail Tatsuhiko Tsunoda in advance in order to make an appointment.

**13. Note(s) to students**

This is compulsory elective course for Integrative Biomedical Sciences Programs for Preemptive Medicine students. Enrollment will be limited, with priority given to the course students.

We will inform the students who registered these lectures as soon as the date, time and venue have been decided upon conclusively.

**Schedule**

No.	Day	Topics	Instructor
1	October 1, 2018 18:00~19:30	Concepts of preemptive medicine and individualized medicine, and the global trend of omics analysis (Active Learning Room, M&D Tower 4F)	Hiroshi Tanaka
2	October 11, 2018 18:00~19:30	Global biobank cohorts and omics (Active Learning Room, M&D Tower 4F)	Norihiro Kato
3	October 22, 2018 19:40~21:10	Current status of utilization of database in cancer genome researches (Active Learning Room, M&D Tower 4F)	Seiichi Mori
4	November 5, 2018 19:40~21:10	Application of biological information monitoring devices and development of advanced technology (Active Learning Room, M&D Tower 4F)	Minoru Tozuka
5	November 19, 2018 18:00~19:30	Healthcare delivery methods in the era of community comprehensive care system (Active Learning Room, M&D Tower 4F)	Jun Uda
6	November 26, 2018 19:40~21:10	Application examples of establishment of omics based disease prediction algorithm (Active Learning Room, M&D Tower 4F)	Tatsuhiko Tsunoda
7	December 3, 2018 19:40~21:10	Development of health management algorithm and application of AI to medical science (Active Learning Room, M&D Tower 4F)	Naoyuki Kamatani
8	December 17, 2018 19:40~21:10	Case examples managed by the Center for Personalized Medicine for Healthy Aging, Tokyo Medical and Dental University (Active Learning Room, M&D Tower 4F)	Kinya Ishikawa

# Integrative Biomedical Sciences for Preemptive Medicine II

(Code: 6426 1st year 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Tatsuhiko Tsunoda	Professor, Department of MedicalScience Mathematics,TMDU	tsunoda.mesm@mri.tmd.ac.jp
Instructors	Hiroshi Tanaka	Specially Appointed Professor, Medical Data Sciences Office,TMDU	
	Minoru Tozuka	Professor, Department of Analytical Laboratory Chemistry,TMDU	
	Masayuki Yoshida	Professor, Department of Life Sciences and Bioethics,TMDU	
	Tatsuhiko Tsunoda	Professor, Department of MedicalScience Mathematics,TMDU	
	Fuyuki Miya	Junior Associate Professor, Department of MedicalScience Mathematics,TMDU	
	Jou Nishino	Assistant Professor, Department of MedicalScience Mathematics,TMDU	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

To widely understand the applications for integrative biomedical sciences for preemptive medicine, a learning system for preemptive medicine that enables prevention of diseases by collecting omics information such as genome information, information about environmental factors, clinical information and lifestyle information, discovering the factors and mechanism involved in diseases such as cancer and lifestyle related diseases, developing the predictive models and instructing/intervening in individuals.

### Outline

To learn the following case examples, instruction, and intervention: utilization of the practical health/medical information to promote preemptive medicine and individualized medicine, advanced omics experiment/analysis methods using the next-generation sequencers, topics about the development story of biological information sensing such as wearable mobile, utilization of analytical technologies including AI.

## 4. Course Objective(s)

This course will provide a broad-based education that helps to develop a comprehensive overview of the field of disease prevention sciences.

## 5. Format

The leading experts in Integrative Biomedical Sciences for Preemptive Medicine will be invited and the course will focus on student participation and discussion.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (50%), question and answer (20%), and reports (30%).

**8. Prerequisite Reading**

None.

**9. Reference Materials**

None.

**10. Important Course Requirements**

None.

**11. Availability in English**

Lectures and all communications are in English.

**12. Office hours**

Weekdays only: Students must e-mail Tatsuhiko Tsunoda in advance in order to make an appointment.

**13. Note(s) to students**

This is compulsory elective course for Integrative Biomedical Sciences Programs for Preemptive Medicine students. Enrollment will be limited, with priority given to the course students.

We will inform the students who registered these lectures as soon as the date, time and venue have been decided upon conclusively.

**Schedule**

No.	Day	Topics	Instructor
1	December 17, 2018 16:10~17:40	Concepts of preemptive medicine and individualized medicine, and the global trend of omics analysis (Active Learning Room, M&D Tower 4F)	Hiroshi Tanaka
2	December 20, 2018 18:00~19:30	Application of biological information monitoring devices and development of advanced technology ((Lecture room 4, M&D Tower 9F)	Minoru Tozuka
3	December 26, 2018 16:00~17:30	presentation by the sutudents and discussion ((Lecture room 4, M&D Tower 9F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
4	January 10, 2019 13:30~15:00	presentation by the sutudents and discussion (Active Learning Room, M&D Tower 4F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
5	January 11, 2019 16:00~17:30	presentation by the sutudents and discussion (Active Learning Room, M&D Tower 4F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
6	January 17, 2019 13:30~15:00	presentation by the sutudents and discussion (Active Learning Room, M&D Tower 4F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
7	January 21, 2019 16:00~17:30	presentation by the sutudents and discussion (Active Learning Room, M&D Tower 4F)	Tatsuhiko Tsunoda Fuyuki Miya Jou Nishino
8	January 22, 2019 18:00~19:30	Ethics of medical research involving human subjects such as preemptive medical research and genetic counseling (Active Learning Room, M&D Tower 4F)	Masayuki Yoshida

# Data Science I

(Code: 6310 1st year units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	tsunoda.mesm@mri.tmd.ac.jp
Instructors	Shingo Tsuji	Specially Appointed Assistant Professor, Laboratories for Systems Biology and Medicine Research Center for Advanced Science and Technology, The University of Tokyo	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Learning fundamental statistics and programming skills.

### Outline

In order to cultivate the basic capabilities of a data scientist, students will gain a general understanding of analytical methods, from statistical fundamentals to machine learning, and learn how to put those methods into practice.

## 4. Course Objective(s)

This course will provide an outline of data analytical techniques from the examination of clinical statistics to the recent field of big data handling. From data acquisition and analysis, to dealing with issues, students will become acquainted with the entire data life cycle.

## 5. Format

Concentrated lessons will be held on Saturdays. Since it is a participation-centered course, attendance is mandatory.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (50%), question and answer (20%), and reports (30%).

## 8. Prerequisite Reading

None.

## 9. Reference Materials

None.

## 10. Important Course Requirements

None.

## 11. Availability in English

Some classes are offered in English on different schedules.

## 1 2. Office hours

Weekdays only: Students must e-mail Tatsuhiko Tsunoda in advance in order to make an appointment.

## 1 3. Note(s) to students

This is compulsory elective course for Integrative Biomedical Sciences Programs for Preemptive Medicine students. Enrollment will be limited, with priority given to the course students.

We will inform the students who registered these lectures as soon as the date, time and venue have been decided upon conclusively.

### Schedule

No.	Day Time	Topics Venue	Instructor
1	Aug 18,2018 13:00~14:30	introduction to python (PC room 1 in Library,M&D Tower 4F)	Shingo Tsuji
2	Aug 18,2018 14:40~16:10	python programming style guides (PC room 1 in Library,M&D Tower 4F)	
3	Aug 25,2018 13:00~14:30	python standard modules (PC room 1 in Library,M&D Tower 4F)	
4	Aug 25,2018 14:40~16:10	introduction to data science with python (PC room 1 in Library,M&D Tower 4F)	
5	Sep 1,2018 13:00~14:30	data visualization with python (PC room 1 in Library,M&D Tower 4F)	
6	Sep 1,2018 14:40~16:10	data analysis exercise with python (PC room 1 in Library,M&D Tower 4F)	
7	Sep 15,2018 13:00~14:30	machine learning with python Part 1. (PC room 1 in Library,M&D Tower 4F)	
8	Sep 15,2018 14:40~16:10	machine learning with python Part 2. (PC room 1 in Library,M&D Tower 4F)	

# Data Science I

(Code: 6315 1st year 1 units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	tsunoda.mesm@mri.tmd.ac.jp
Instructors	Takeshi Hase	Specially Appointed Associate Professor, Medical Data Sciences Office, TMDU	
	Kaoru Mogushi	Senior Lecturer, Graduate School of Medicine, Juntendo University	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Learning fundamental statistics and programming skills.

### Outline

In order to cultivate the basic capabilities of a data scientist, students will gain a general understanding of analytical methods, from statistical fundamentals to machine learning, and learn how to put those methods into practice.

## 4. Course Objective(s)

This course will provide an outline of data analytical techniques from the examination of clinical statistics to the recent field of big data handling. From data acquisition and analysis, to dealing with issues, students will become acquainted with the entire data life cycle.

## 5. Format

Concentrated lessons will be held on Saturdays. Since it is a participation-centered course, attendance is mandatory.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (50%), question and answer (20%), and reports (30%).

## 8. Prerequisite Reading

None.

## 9. Reference Materials

None.

## 10. Important Course Requirements

None.

## 11. Availability in English

Some classes are offered in English on different schedules.

## 1 2. Office hours

Weekdays only: Students must e-mail Tatsuhiko Tsunoda in advance in order to make an appointment.

## 1 3. Note(s) to students

This is compulsory elective course for Integrative Biomedical Sciences Programs for Preemptive Medicine students. Enrollment will be limited, with priority given to the course students.

### Schedule

No	Day Time	Topics Venue	Instructor
1	May 12,2018 13:15~14:45	Basic operation of R language (PC room 1 in Library,M&D Tower 4F )	Kaoru Mogushi
2	May 12,2018 14:55~16:25	Data handling and visualization (PC room 1 in Library,M&D Tower 4F )	
3	May 19,2018 13:15~14:45	statistical analytics (1) (PC room 1 in Library,M&D Tower 4F )	
4	May 19,2018 14:55~16:25	statistical analytics (2) (PC room 1 in Library,M&D Tower 4F )	
5	May 26,2018 13:15~14:45	Unsupervised learning (PC room 1 in Library,M&D Tower 4F )	Takeshi Hase
6	May 26,2018 14:55~16:25	Supervised learning (classification) (PC room 1 in Library,M&D Tower 4F )	
7	June 2,2018 13:15~14:45	Supervised learning (regression) (PC room 1 in Library,M&D Tower 4F )	
8	June 2,2018 14:55~16:25	Feature engineering (PC room 1 in Library,M&D Tower 4F )	

# Data Science II

(Code: 6320 1st year 1units)

## 1. Instructors:

	Name	Course/ Title	Contact Information
Chief Instructor	Tatsuhiko Tsunoda	Professor, Department of Medical Science Mathematics, TMDU	tsunoda.mesm@mri.tmd.ac.jp
Instructors	Kazuki Yoshizoe	RIKEN Center for Advanced Intelligence Project (AIP), Unit Leader	
	Yasuo Tabei	RIKEN Center for Advanced Intelligence Project (AIP), Unit Leader	
	Yoichiro Yamamoto	RIKEN Center for Advanced Intelligence Project (AIP), Unit Leader	
	Eiryō Kawakami	RIKEN, Medical Sciences Innovation Hub Program (MIH), Unit Leader	
	Yoshihiro Yamanishi	Professor, Department of Bioscience and Bioinformatics, Kyushu Institute of Technology	
	Takashi Ishida	Associate professor, Department of Computer Science, School of Computing, Tokyo Institute of Technology	
	Koichi Takeda	Professor, Graduate School of Informatics, Nagoya University	
	Kotonari Aoki	Department Manager, Real World Data Science Dept. Chugai Pharmaceutical Co., Ltd.	

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Learning how to utilize data and data science analytical methods.

### Outline

In order to cultivate the basic capabilities of a data scientist, students will gain a general understanding of statistical analytical methods and machine learning methods and learn how to put those methods into practice.

## 4. Course Objective(s)

This course will provide an outline of statistical analytical techniques and machine learning methods from the examination of clinical statistics to the recent field of real world data handling. From data acquisition and analysis, to dealing with the many real issues in Data Science, students will become acquainted with the entire data life cycle.

## 5. Format

Leading experts in the Data Science field will be invited, and the course will focus on student participation and discussion.

## 6. Course Description and Timetable

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## 7. Grading System

Participation (50%), question and answer (20%), and reports (30%).

**8. Prerequisite Reading**

None.

**9. Reference Materials**

None.

**10. Important Course Requirements**

None.

**11. Availability in English**

NA

**12. Office hours**

Weekdays only: Students must e-mail Tatsuhiko Tsunoda in advance in order to make an appointment.

**13. Note(s) to students**

This is compulsory elective course for Integrative Biomedical Sciences Programs for Preemptive Medicine students. Enrollment will be limited, with priority given to the course students.

We will inform the students who registered these lectures as soon as the date, time and venue have been decided upon conclusively.

**Schedule**

No.	Day Time	Topics Venue	Instructor
1	October 4, 2018 19:40~21:10	Deep Learning and search algorithm and their applications to computer GO (Active Learning Room, M&D Tower 4F)	Kazuki Yoshizoe
2	October 18, 2018 19:40~21:10	Artificial intelligence technology based on data compression (Active Learning Room, M&D Tower 4F)	Yasuo Tabei
3	October 26, 2018 18:00~19:30	Cellular image analysis based on artificial intelligence ~ Current status and prospect of future of medical application of AI technology ~ (Active Learning Room, M&D Tower 4F)	Yoichiro Yamamoto
4	October 29, 2018 19:40~21:10	Data driven analysis for biomedical study (Active Learning Room, M&D Tower 4F)	Eiryō Kawakami
5	November 2, 2018 16:20~17:50	Machine learning and data driven drug repositioning for drug design (Active Learning Room, M&D Tower 4F)	Yoshihiro Yamanishi
6	November 12, 2018 19:40~21:10	Trends in machine learning application of computer-aided drug design (Active Learning Room, M&D Tower 4F)	Takashi Ishida
7	December 7, 2018 19:40~21:10	Natural language processing (Active Learning Room, M&D Tower 4F)	Koichi Takeda
8	December 20, 2018 19:40~21:10	Modern statistics for medicine (Active Learning Room, M&D Tower 4F)	Kotonari Aoki

# Epidemiology

(Code: 8607 1st year 2units)

## 1. Instructor(s)

	Name	Department
Chief Instructor	Takeo Fujiwara	Professor, Department of Global Health Promotion
Instructors	Yoshihiro okubo	Chief Physician, Department of Preventive Medicine, National Cerebral and Cardiovascular Center
	Masashi Kizuki	Lecturer, Department of Global Health Promotion
	Ayako Morita	Assistant Professor, Department of Global Health Promotion
	Yukako Tani	Research Fellow, Department of Global Health Promotion

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

This course introduces the principles and methods used in epidemiologic research.

### Outline

This course is a lesson to learn the basics of the Clinical Statistics and Bioinformatics Graduate Program of the Integrative Biomedical Sciences Programs for Preemptive Medicine aiming at the training of personnel who can promote precision medicine.

Epidemiology is defined as the study of the causes and distribution of health-related states or events in specified populations, and the application of this knowledge to control those health problems.

Throughout the course we will focus on conceptual and practical issues in the design, conduct, and analysis of epidemiologic studies for description and causal inference.

## 4. Course Objective(s)

By the end of this course, students will be able to:

- Describe and calculate measures of disease frequency and measures of effect.
- Explain main types of epidemiologic study, and discuss appropriate design to use in a given situation.
- Explain potential biases in epidemiologic study and how to deal with these biases, and control confounding by stratifying data.
- Explain how epidemiology can be applied to evaluate health policy, investigate infectious diseases and genetic factors with examples.

## 5. Format

This course will consist of lectures and case-based class activities. Students will be required to write a final report.

## 6. Course Description and Timetable

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## 7. Grading System

Grades will be based on the following elements:

- Participation 20%
- In class quizzes 30%
- Final paper 50%

## 8. Prerequisite Reading

Reading materials will be available online at the course webpage. Students are expected to have worked through the materials before attending the corresponding class.

## 9. Reference Materials

Gordis L. Epidemiology: with student consult. 5th edition. Philadelphia: Elsevier; 2013

### 1 0. Important Course Requirements

Chief instructor's permission is required before registering to the course.

### 1 1. Availability in English

All classes are taught in English.

### 1 2. Office hours

Please contact Prof. Fujiwara at fujiwara.hlth@tmd.ac.jp

### 1 3. Note(s) to students

#### Schedule

No	Day Time	Topics (Chapter of Gordis, 2013) Venue	Instructor
1	May 28, 2018 8:50-10:20	<u>Lecture:</u> The approach and evolution of epidemiology; and Measures of disease frequency (G-Lab, M&D Tower 8F)	Takeo Fujiwara
2	May 28, 2018 10:30-12:00		
3	May 28, 2018 13:00-14:30	<u>Case and group activity:</u> The approach and evolution of epidemiology; and Measures of disease frequency (G-Lab, M&D Tower 8F)	Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani Yoshihiro Kokubo
4	May 28, 2018 14:40-16:10		
5	May 29, 2018 8:50-10:20	<u>Lecture:</u> Types of epidemiologic studies; and Ethics in research involving human participants (G-Lab, M&D Tower 8F)	Takeo Fujiwara
6	May 29, 2018 10:30-12:00		
7	May 29, 2018 13:00-14:30	<u>Case and group activity:</u> Types of epidemiologic studies; and Ethics in research involving human participants (G-Lab, M&D Tower 8F)	Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani Yoshihiro Kokubo
8	May 29, 2018 14:40-16:10		
9	May 31, 2018 8:50-10:20	<u>Lecture:</u> Measures of effect; and Causal inference (G-Lab, M&D Tower 8F)	Yoshihiro Kokubo
10	May 31, 2018 10:30-12:00		
11	May 31, 2018 13:00-14:30	<u>Case and group activity:</u> Measures of effect; and Causal inference (G-Lab, M&D Tower 8F)	Yoshihiro Kokubo Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani
12	May 31, 2018 14:40-16:10		
13	June 1, 2018 8:50-10:20	<u>Lecture:</u> Evaluation of health policy; Screening; Infectious disease epidemiology; and Genetic epidemiology (G-Lab, M&D Tower 8F)	Yoshihiro Kokubo
14	June 1, 2018 10:30-12:00		
15	June 1, 2018 13:00-14:30	<u>Case and group activity:</u> Evaluation of health policy; Screening; Infectious disease epidemiology; and Genetic epidemiology (G-Lab, M&D Tower 8F)	Yoshihiro Kokubo Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani
16	June 1, 2018 14:40-16:10		

# Clinical Biostatistics and Statistical Genetics

(Code: 8608 1st year 2units)

## 1. Instructor(s)

	Name	Department
Chief Instructor	Takeo Fujiwara	Professor, Department of Global Health Promotion
Instructors	Masashi Kizuki	Lecturer, Department of Global Health Promotion
	Ayako Morita	Assistant Professor, Department of Global Health Promotion
	Yukako Tani	Research Fellow, Department of Global Health Promotion

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

This course introduces the basic techniques important for analyzing data from epidemiologic, biomedical and other public health related research. Statistical reasoning will be emphasized through problem solving and practical applications.

### Outline

This course is a lesson to learn the basics of the Clinical Statistics and Bioinformatics Graduate Program of the Integrative Biomedical Sciences Programs for Preemptive Medicine aiming at the training of personnel who can promote precision medicine.

Clinical Biostatistics and Statistical Genetics is the application of statistical methods to data in biological, biomedical and health sciences. It is a key technique for the collection, analysis, and presentation of data especially in quantitative studies including epidemiological studies.

Throughout the seminar, we will review the broad field of statistical data analysis and the range of issues that arise when analyzing health data. We will read and discuss selected chapters from a textbook and apply statistical methods to wide range of quantitative study questions.

## 4. Course Objective(s)

By the end of this course, students will be able to:

- Learn to acquire clinical data.
- Learn to build algorithm for healthcare.
- Conduct basic statistical techniques both by hand and using a statistical software, and present results using publication quality tables.
- Describe results of statistical analysis using standard statistical expressions.

## 5. Format

This course will consist of lectures and optional laboratory sessions. There will be daily homework assignments and examination on the final day.

## 6. Course Description and Timetable

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## 7. Grading System

Grades will be based on the following elements:

- Participation 20%
- Homework exercise 30%
- Final examination 50%

## 8. Prerequisite Reading

Reading materials will be available online at the course webpage. Students are expected to have worked through the materials before attending the corresponding class.

## 9. Reference Materials

- Pagano M, Gauvreau K. Principles of Biostatistics. 2nd ed. Belmont: Brooks/Cole; 2000.
- Rosner B. Fundamentals of Biostatistics. 8th ed. Brooks/Cole; 2015.

## 10. Important Course Requirements

Chief instructor's permission is required before registering to the course.

**1 1 . Availability in English**

All classes are taught in English.

**1 2 . Office hours**

Please contact Prof. Fujiwara at fujiwara.hlth@tmd.ac.jp

**1 3 . Note(s) to students**

This course uses the Stata statistical software. Stata is available for each student during the course. Students are expected to perform basic algebra, including logarithms and exponentials, by hand or using a calculator.

## Schedule

No	Day Time	Topics (Chapter of Pagano and Gauvreau, 2000)	Instructor
1	April 16, 2018 8:50-10:20	<u>Lecture:</u> Data presentation; Numerical summary measures (G-Lab, M&D Tower 8F)	Masashi Kizuki
2	April 16, 2018 10:30-12:00		
3	April 17, 2018 13:00-14:30	<u>Lecture:</u> Probability and diagnostic tests; Theoretical probability distributions (G-Lab, M&D Tower 8F)	Masashi Kizuki
4	April 17, 2018 14:40-16:10		
5	April 18, 2018 8:50-10:20	<u>Lecture:</u> Sampling distribution of the mean; Confidence intervals (G-Lab, M&D Tower 8F)	Takeo Fujiwara
6	April 18, 2018 10:30-12:00		
optional	April 18, 2018 13:00-14:30	<u>Laboratory session</u>  (Library PC Room, M&D Tower 4F)	Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani
optional	April 18, 2018 14:40-16:10		
7	April 19, 2018 8:50-10:20	<u>Lecture:</u> Hypothesis testing; Comparison of two means (G-Lab, M&D Tower 8F)	Takeo Fujiwara
8	April 19, 2018 10:30-12:00		
optional	April 19, 2018 13:00-14:30	<u>Laboratory session</u>  (Library PC Room, M&D Tower 4F)	Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani
optional	April 19, 2018 14:40-16:10		
9	April 23, 2018 8:50-10:20	<u>Lecture:</u> Analysis of Variance; Nonparametric methods (G-Lab, M&D Tower 8F)	Masashi Kizuki
10	April 23, 2018 10:30-12:00		
optional	April 23, 2018 13:00-14:30	<u>Laboratory session</u>  (Library PC Room, M&D Tower 4F)	Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani
optional	April 23, 2018 14:40-16:10		
11	April 24, 2018 8:50-10:20	<u>Lecture:</u> Inference on proportions; Contingency tables; Multiple 2 by 2 tables (G-Lab, M&D Tower 8F)	Masashi Kizuki
12	April 24, 2018 10:30-12:00		
optional	April 24, 2018 13:00-14:30	<u>Laboratory session</u>  (Library PC Room, M&D Tower 4F)	Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani
optional	April 24, 2018 14:40-16:10		
13	April 26, 2018 8:50-10:20	<u>Lecture:</u> Correlation; Simple linear regression; Multiple regression (G-Lab, M&D Tower 8F)	Takeo Fujiwara
14	April 26, 2018 10:30-12:00		
optional	April 26, 2018 13:00-14:30	<u>Laboratory session</u>  (Library PC Room, M&D Tower 4F)	Takeo Fujiwara Masashi Kizuki Ayako Morita Yukako Tani
optional	April 26, 2018 14:40-16:10		
15	April 27, 2018 13:00-14:30	<u>Lecture:</u> Logistic regression (G-Lab, M&D Tower 8F)	Takeo Fujiwara
16	April 27, 2018 14:40-16:10	Final Exam (G-Lab, M&D Tower 8F)	Takeo Fujiwara

# Advanced Biosensing Devices

(Code: 6418 1st year 1unit)

## 1. Instructor (s)

Kohji Mitsubayashi E-mail:m.bdi@tmd.ac.jp

Yuji Miyahara E-mail:miyahara.bsr@tmd.ac.jp

Akira Matsumoto E-mail:matsumoto.bsr@tmd.ac.jp

Tatsuro Goda E-mail:goda.bsr@tmd.ac.jp

Koji Toma E-mail:toma.bdi@tmd.ac.jp

(Osamu Niwa)

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

This program offers lectures on several important topics in Sensing devices, Biochemistry, Recognition materials, MEMS and Optics for Biosensing in the medical and dental fields. The major purpose of the program is to obtain the latest information and to train scientific mind as well as logical thinking skills necessary to become independent researchers.

### Outline

Several types of the advanced biosensing devices and technologies are introduced and some potential applications in the medical and dental fields will be discussed.

## 4. Course Objective(s)

Introduce useful information from the basic biosensors to latest biochemical sensing devices in the medical and dental fields to attendants.

## 5. Format

Lecture, discussion and presentation

## 6. Course Description and Timetable

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## 7. Grading System

Grading is given by taking all activities of the students into account such as participation of lecture class and discussion (50%), quality of discussion and presentation (30%), as well as willingness and understanding of discussion (20%).

## 8. Prerequisite Reading

Any students who prepare for this course, they can refer to the following books and paper.

## 9. Reference Materials

K.Mitsubayashi, Volatile Biomarker Analysis and Advanced Gas-sensing Instrument, CMC, 2017

K.Mitsubayashi, et.al., Sensors for Everyday Life, Springer, 2016

Y. Horiike, Y. Miyahara, Biochips and Biosensors, Kyouritsu Publishing Co., 2006

## 10. Important Course Requirements

Nothing

### 11. Availability in English

When an international student registers this subject for credits, this course is taught in English.

### 12. Office hours

Questions on lectures are welcomed as needed.

### 13. Note(s) to students

Nothing

#### Schedule

No	Day Time	Topics Venue	Instructor
1	May 9, 2018 13:00-15:15	Spatiotemporal Biosensing in the gas phase (Seminar room3 at 8F, Building22)	Kohji Mitsubayashi Koji Toma
2	May 16, 2018 13:00-15:15	Material technology for realizing high performance biosensors (Seminar room3 at 8F, Building22)	Adjunct instructor (Osamu Niwa)
3	May 23, 2018 13:00-15:15	DNA analysis based on MEMS technology (Seminar room3 at 8F, Building22)	Yuji Miyahara
4	May 30, 2018 13:00-15:15	Biosensing-synchronized therapeutic technologies (Seminar room3 at 8F, Building22)	Akira Matsumoto
5	June 6, 2018 13:00-15:15	Functional interface for biosensing (Seminar room3 at 8F, Building22)	Tatsuro Goda

# Advanced Medical Device and System

(Code: 6419 1st year 1unit)

## 1. Instructor (s)

Kenji Kawashima E-mail:kkawa.bmc@tmd.ac.jp

Yoshikazu Nakazima E-mail:nakajima.bmi@tmd.ac.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

The course will introduce the latest research topics and development of medical devices and systems to assist surgery that integrate IoT or AI. The students will acquire the basic knowledge to promote the development of medical devices and systems.

### Outline

Introduce latest research and development of medical devices and systems such as real time image measurement device, image analysis technology with AI, and assist robot for surgery.

## 4. Course Objective(s)

The aim of the course is to understand the basic knowledge to promote the development of medical devices and systems integrated IoT and AI.

## 5. Format

Lecture and discussion

## 6. Course Description and Timetable

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## 7. Grading System

Attendance to lectures (60 %) and reports (40 %) are evaluated.

## 8. Prerequisite Reading

Instruct at the first lecture if necessary

## 9. Reference Materials

C. David Allis et al. "EPIGENETICS", Cold Spring Harbor Laboratory Press  
Peter Parham, "The immune system" (Third edition), Garland Science

## 1 0. Important Course Requirements

Nothing

## 1 1. Availability in English

When an international student registers this subject for credits, this course is taught in English.

## 1 2. Office hours

Questions on lectures are welcomed as needed.

## 1 3. Note(s) to students

Nothing

### Schedule

No	Day Time	Topics Venue	Instructor
1	July 23, 2018 14:00-16:15	Regulatory science for medical devices (Seminar room3 at 8F,Building22)	K.Kawashima
2	July 30, 2018 14:00-16:15	Surgical robot for minimally invasive (Seminar room3 at 8F,Building22)	K.Kawashima
3	August 13, 2018 14:00-16:15	Medical devices and systems for robotic surgery (Seminar room3 at 8F,Building22)	K.Kawashima
4	August 20, 2018 14:00-16:15	Principle of intra-operative imaging/measuring (Seminar room3 at 8F,Building22)	Y.Nakazima
5	August 27, 2018 14:00-16:15	Surgery assistance system with intra- operative imaging and AI analysis (Seminar room3 at 8F,Building22)	Y.Nakazima

# Wearable & IoT Devices and Applications

(Code: 6420 1st year 1unit)

## 1. Instructor (s)

Kohji Mitsubayashi E-mail:m.bdi@tmd.ac.jp

Takahiro Arakawa E-mail: arakawa.bdi@tmd.ac.jp

(Hiroaki Kikuchi)

(Hiroshi Nakajima)

(Yuko Ueno)

(Takuya Kishimoto)

(Keiji Takeuchi)

## 2. Classroom/Lab

Next Page

## 3. Course Purpose and Outline

### Course Purpose

The program offers lectures on several important topics in Sensing devices & instruments, IoT technologies & Security and Energy harvesting devices in the medical and dental fields. The major purpose of the program is to obtain the latest information and to train scientific mind as well as logical thinking skills necessary to become independent researchers.

### Outline

Several types of the advanced wearable IoT devices and technologies are introduced and some potential applications in the medical and dental fields will be discussed.

## 4. Course Objective (s)

Introduce useful information from the basic wearable sensors to latest IoT devices in the medical and dental fields to attendants.

## 5. Format

Lecture, discussion and presentation

## 6. Course Description and Timetable

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## 7. Grading System

Grading is given by taking all activities of the students into account such as participation of lecture class and discussion (50%), quality of discussion and presentation (30%), as well as willingness and understanding of discussion (20%).

## 8. Prerequisite Reading

Any students who prepare for this course, they can refer to the following books and paper.

## 9. Reference Materials

Human Sensing for Smart Life Car (Ed. K. Mitsubayashi), 2014  
K.Mitsubayashi, et.al., Healthcare Sensor Networks, CRC Press, 2011  
K.Mitsubayashi,et.al.,Sensors for Everyday Life, Springer, 2016

## 10. Important Course Requirements

Nothing

## 11. Availability in English

When an international student registers this subject for credits, this course is taught in English.

## 12. Office hours

Questions on lectures are welcomed as needed.

## 13. Note(s) to students

Nothing

### Schedule

No	Day Time	Topics Venue	Instructor
1	June 5, 2018 13:00-15:15	Wearable biosensors & Gas-imaging cam (Seminar room3 at 8F,Building22)	Koji Mitsubayashi Takahiro Arakawa
2	June 20, 2018 13:00-15:15	Utilization of wearable bioelectrode "hitoe" in IoT society (Seminar room3 at 8F,Building22)	Adjunct instructor (Hiroshi Nakajima, Yuko Ueno)
3	June 27, 2018 13:00-15:15	Security issues in IoT devices (Seminar room3 at 8F,Building22)	Adjunct instructor (Hiroaki Kikuchi)
4	July 4, 2018 13:00-15:15	Medical needs based development of medical imaging devices and utilization of IoT (Seminar room3 at 8F,Building22)	Adjunct instructor (Takuya Kishimoto)
5	July 11, 2018 13:00-15:15	Design and implementation of power supply technology for wearable and implant equipment (Seminar room3 at 8F,Building22)	Adjunct instructor (Keiji Takeuchi)

# Molecular Pathophysiology

(Code: 6422 1st year 1unit)

## 1. Instructor (s)

Takeshi Tsubata E-mail:tsubata.imm@mri.tmd.ac.jp

Koichi Tanaka E-mail:tanaka.aud@mri.tmd.ac.jp

Hirofumi Arakawa E-mail:harakawa@ncc.go.jp

Yumiko Oishi

Jun Takeuchi E-mail:juntakeuchi.bip@mri.tmd.ac.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

The purpose of this course is to obtain overview of the current progress in the research on molecular pathophysiology of the diseases based on the basic biosciences including molecular biology, genome science and epigenetics, and also practical approach to the development of prevention and therapies of the diseases.

### Outline

This course offers lectures on molecular pathophysiology of the diseases such as cancer, metabolic diseases, immunological and neurological diseases and congenital diseases based on basic biosciences including molecular biology, genome science and epigenetics.

Development of the novel and rational prevention and therapies according to the molecular physiology will also be discussed.

## 4. Course Objective(s)

To obtain overview of the molecular pathophysiology of cancer, metabolic diseases, autoimmune and neurological diseases, and congenital heart diseases, and to discuss development of rational prevention and therapies of these diseases. Introduce useful information from the latest biology to basic medicine to attendants.

## 5. Format

Lecture, discussion and presentation

## 6. Course Description and Timetable

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## 7. Grading System

Participation to lectures is evaluated.

## 8. Prerequisite Reading

Basic knowledge on molecular biology, biochemistry neuroscience and immunology is required.

## 9. Reference Materials

Peter Parham, "The immune system" (Third edition), Garland Science

Mark F. Bear, Barry W. Connors and Michael A. Paradiso, Neuroscience: Exploring the Brain. Lippincott Williams & Wilkins.

Tsubata T "B cell tolerance and autoimmunity" F1000Research 6 (F1000 Faculty Rev.): 391, 2017.

## 10. Important Course Requirements

Basic knowledge on molecular biology, biochemistry neuroscience and immunology is required.

### 11. Availability in English

When an international student registers this course for credits, this course is done in English.

### 12. Office hours

notified upon request

### 13. Note(s) to students

Nothing

#### Schedule

No	Day Time	Topics Venue	Instructor
1	May 10, 2018 13:00-15:15	Molecular pathophysiology of autoimmune diseases (Lecture room 4, 9F, M&D tower)	T.Tsubata
2	May 11, 2018 13:00-15:15	Molecular pathophysiology of neuropsychiatric diseases (Lecture room 4, 9F, M&D tower)	K.Tanaka
3	May 17, 2018 13:00-15:15	Cancer biology and pathology: Lessons from p53 (Lecture room 4, 9F, M&D tower)	H.Arakawa
4	May 18, 2018 13:00-15:15	Molecular pathophysiology of congenital heart diseases (Lecture room 4, 9F, M&D tower)	J.Takeuchi
5	May 25, 2018 13:00-15:15	Molecular pathophysiology of metabolic syndrome and atherosclerosis (Lecture room 4, 9F, M&D tower)	Y.Oishi

# Advanced Chemical Biology

(Code: 6423 1st year 1unit)

## 1. Instructor (s)

Hirokazu Tamamura E-mail tamamura.mr@tmd.ac.jp  
Nobutoshi Ito E-mail ito.str@tmd.ac.jp  
Wataru Nomura E-mail nomura.mr@tmd.ac.jp  
Suguru Yoshida E-mail s-yoshida.cb@tmd.ac.jp  
Nobutaka Numamoto E-mail numoto.str@mri.tmd.ac.jp  
Yoshitake Nishiyama E-mail nishiyama.cb@tmd.ac.jp  
Shuichi Mori E-mail s-mori.chem@tmd.ac.jp  
Mari Yuasa E-mail myuasa.chem@tmd.ac.jp  
Takuya Kobayakawa E-mail tkobmr@tmd.ac.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

Fundamental knowledge and technology on the development of chemical biology used in several research fields (life science, analytical chemistry, organic chemistry, material science, etc) and the recent topics on their advanced researches will be educated.

### Outline

Various basic methods required for chemical biology researches will be discussed based on recent advanced results.

## 4. Course Objective(s)

Chemical biology is a research field, in which biological phenomena are analyzed and regulated, and is complicatedly correlated to several research fields such as medicinal chemistry and nanotechnologies. This course deals with their up-to-date advanced research tendencies.

## 5. Format

This course includes seminar-type lectures, exercises about organic chemistry, and practices about chemical biology techniques.

## 6. Course Description and Timetable

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## 7. Grading System

Attendance (50%) and Presentation (50%)

## 8. Prerequisite Reading

Fundamental organic chemistry should be reviewed. The books listed in #9 are useful for understanding the topics in this course.

## 9. Reference Materials

Chemical Biology (L. Schreiber, T. Kapoor, G. Weiss Eds, WILEY-VCH); PROTEIN TARGETING WITH SMALL MOLECULES - Chemical Biology Techniques and Applications (Wiley)

## 10. Important Course Requirements

Nothing

## 11. Availability in English

When an international student registers this subject for credits, this course is taught in English.

## 12. Office hours

Questions on lectures are welcomed as needed.

## 13. Note(s) to students

Nothing

### Schedule

No	Day Time	Topics Venue	Instructor
1	June 16, 2018 14:00-16:15	Advanced Chemical Biology Research 1 (Seminar room2 at 1F,Building22)	H Tamamura,N Ito,M Yuasa,T Kobayakawa
2	June 23, 2018 12:40-14:55	Advanced Chemical Biology Research 2 (Seminar room2 at 1F,Building22)	H Tamamura,W Nomura,S mori,N Numamoto
3	June 30, 2018 14:00-16:15	Advanced Chemical Biology Research 3 (Seminar room2 at 1F,Building22)	H Tamamura,N Ito,S Yoshida,T Kobayakawa
4	July 7, 2018 12:40-14:55	Advanced Chemical Biology Research 4 (Seminar room2 at 1F,Building22)	H Tamamura,W Nomura,S mori,Y Nishiyama
5	July 14, 2018 14:00-16:15	Advanced Chemical Biology Research 5 (Seminar room2 at 1F,Building22)	H Tamamura,S Yoshida,M Yuasa,T Kobayakawa

# Molecular and Chemical Somatology

(Code: 6424 1st year 1unit)

## 1. Instructor (s)

Soichi Kojima E-mail: skojima@riken.jp  
Nobumoto Watanabe E-mail: nwatanab@riken.jp  
Mikiko Sodeoka E-mail: sodeoka@riken.jp  
Takeshi Nakano E-mail: tnakano@riken.jp  
Xian-Yang QIN E-mail: xyqin@riken.jp  
Kosuke Dodo E-mail: dodo@riken.jp

## 2. Classroom/Lab

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## 3. Course Purpose and Outline

### Course Purpose

We aim to understand basis of Bioorganic Chemistry, Chemical Biology as well as their applications to Medicine and Biology by dealing with variety of molecules that regulate cellular functions including low molecular organic compounds, proteins, and hormones.

### Outline

Molecular and Chemical Somatology is an interdisciplinary fields to understand basis of Bioorganic Chemistry, Chemical Biology as well as their applications to Medicine and Biology by dealing with variety of molecules that regulate cellular functions including low molecular organic compounds, proteins, and hormones. Students will hear and discuss about outlines and/or latest topics on discovery, structure, synthesis, biology, and management of these key molecules/factors, and deepen their understanding this new study field.

## 4. Course Objective (s)

Students will hear and discuss about latest topics from each instructor.

## 5. Format

Lectures by instructors, Presentation by students, and Discussion

## 6. Course Description and Timetable

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## 7. Grading System

Attendance (40%) and Report (60%)

## 8. Prerequisite Reading

None

## 9. Reference Materials

Chemical Biology (L. Schreiber, T. Kapoor, G. Wess Eds., WILEY-VCH), PROTEIN TARGETING WITH SMALL MOLECULES - Chemical Biology Techniques and Applications (H. Osada Ed, Wiley)

### 10. Important Course Requirements

All the lectures will be held at RIKEN.

#### 11. Availability in English

When an international student registers this subject for credits, this course is taught in English.

#### 12. Office hours

3:00-5:00 pm, every Tuesday to:

Dr. Soichi Kojima, Chief Instructor of Molecular and Chemical Somatology

#### 13. Note(s) to students

Nothing

#### Schedule

No	Day Time	Topics Venue	Instructor
1	May 10, 2018 14:00-16:15	Molecular and Chemical Somatology Review (Rm424/426, Main Res bldg, RIKEN Wako)	S Kojima
2	May 31, 2018 13:00-15:15	Chemical biology for anticancer drug development (Rm S310, Biosci bldg, RIKEN Wako)	N Watanabe
3	May 31, 2018 15:30-17:45	Plant Chemical Biology (Rm S310, Biosci bldg, RIKEN Wako)	T Nakano
4	June 7, 2018 13:00-15:15	Systems biology of small molecules (Rm424/426, Main Res bldg, RIKEN Wako)	Xian-Yang Qin
5	June 21, 2018 14:00-16:15	Development of Novel Methodologies for Chemical Biology (Rm S310, Biosci bldg, RIKEN Wako)	M Sodeoka K Dodo

# Oral Pathology

Lecture	(code: 8 0 1 1	1st year	:6units)
Practice	(code: 8 0 1 2	1st~2nd year	:4units)
Lab	(code: 8 0 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Tohru Ikeda, Junior Associate Professor: Kei Sakamoto, Assistant Professor: Kou Kayamori

## 2. Classroom/Lab

Conference Room, Dept of Oral Pathology, Build No.1 East, 4th floor / 1st Lab, Dept of Oral Pathology, Build No.1 East, 4th floor

## 3. Course Purpose and Outline

Pathogenesis of diseases are reflected in genes, proteins, tissues, organs and/or whole body. Purpose of this course is to understand the mechanism of these pathological changes and to acquire techniques to analyze them.

## 4. Course Objective(s)

Graduate students of this course acquire basic knowledges of pathogenesis of diseases. On the basis of the knowledges, the graduate students learn theoretical and practical ways to analyze oral diseases.

## 5. Format

Lecture, microscopy reading and discussion.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Through a critical reading of scientific papers, students learn pathogenesis of diseases, way of analyses and subjects that should be clarified in the field. In addition, students learn scientific way of thinking to draw conclusions from results.

Available programs:

Oct 4-Feb 7, every Thursday, 13:00-18:00

### Practice

On the basis of knowledges obtained from the lecture, students practice basic methods of genetic, biochemical, cell biological and clinicopathological analyses.

Available programs:

Apr 10-Jul 17, Oct 2-Jan 15, every Tuesday, 16:00-18:00

### Lab

Students learn analytical techniques through laboratory works and evaluate the data to draw conclusions. Students who have an aim to be qualified as oral pathologists further learn histopathological diagnosis of oral lesions and pathologic autopsy.

Available programs:

Apr 13-Jul 27, Oct 5-Jan 25, every Friday, 13:00-17:00

## 7. Grading System

Comprehensive assessment based on participation and activity in lectures, practice and discussion.

## 8. Prerequisite Reading

None required.

**9. Reference Materials**

Provided on request.

**10. Important Course Requirements**

None

**11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

**12. Office Hour**

Tohru Ikeda, tohrupth.mpa@tmd.ac.jp   Kei Sakamoto, s-kei.mpa@tmd.ac.jp   Kou Kayamori, kayamori.mpa@tmd.ac.jp  
Wed 10:30-12:00

**13. Note(s) to students**

None

# Bacterial Pathogenesis

Lecture	(code: 8 0 2 1	1st year	:6units)
Practice	(code: 8 0 2 2	1st~2nd year	:4units)
Lab	(code: 8 0 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Toshihiko Suzuki

## 2. Classroom/Lab

M&D Tower, 8F Seminar room 10, Staff room of department

## 3. Course Purpose and Outline

The purpose of the program of Bacterial Pathogenesis is to provide the updated information related to bacterial infection, host responses and the development of infectious diseases. Also, indigenous microflora-mediated homeostasis and pathogenesis are introduced.

## 4. Course Objective(s)

The goal of the program is to acquire knowledge including not only the mechanism to cause infectious diseases, bacterial infection system and immune responses against pathogen infection, but also to design the experiments and analysis using scientific methods.

## 5. Format

A small group

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

To understand infection system by pathogenic bacteria, it requires overviewing from both pathogens and hosts at the molecular level. In this lecture, the molecular mechanisms of bacterial infection and host immune responses will be introduced. Also, recent topics on advanced medicines including infectious diseases, immunology and ecology of indigenous microflora are discussed.

Available programs:

Every other Friday from 17:00 to 19:00, November to February

Special Lecture: scheduled twice in July and October in 2018

### Practice

By reading and introducing the updated scientific papers in turns, students will learn critical thinking in discussion, summarizing, writing and presentation skills through discussion in Journal Club and Research Conference.

Available programs:

Journal Club and Research Conference: Every other Friday from 17:00 ~19:00

### Lab

The students will perform experiments related bacterial infection, innate immune responses using several methods. These include bacterial culture, genetics, development of cell culture, in vivo studies using animal. Students will complete their own project.

Available programs:

Participation in research group voluntary

## **7. Grading System**

Evaluation is based on attendance for lecture and practice, and contents of laboratory research.

## **8. Prerequisite Reading**

Prior to a lecture, practice and lab, confirm lecture contents and learn necessary knowledge by reference books beforehand.

## **9. Reference Materials**

No particular books are designated. Papers and references are guided for each research subject.

## **10. Important Course Requirements**

Nothing particular.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

17:00~19:00. Contact in advance is needed to Prof. Toshihiko Suzuki (suzuki.bact@tmd.ac.jp).

## **13. Note(s) to students**

Nothing particular.

# Molecular Immunology

Lecture	(code: 8 0 3 1	1st year	:6units)
Practice	(code: 8 0 3 2	1st~2nd year	:4units)
Lab	(code: 8 0 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Miyuki AZUMA, Associate Professor Shigenori NAGAI, Assistant Professor Tatsukuni OHNO  
Contact person: Department of Molecular Immunology Miyuki AZUMA E-mail: miyuki.mim@tmd.ac.jp

## 2. Classroom/Lab

Lecture and Practice: M&D tower, 6F Seminar room 11

## 3. Course Purpose and Outline

To understand how immune systems contribute to healthy and disease status and also to learn how to control immune-mediated diseases.

## 4. Course Objective(s)

To explain systemic and organ-specific immune responses and to bring ideas how to control immune diseases

## 5. Format

Presentation by a small group and comprehensive discussion

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Every Monday from January 7 to March 11, 17:00 -19:00

Select several immunology reviews in 2018 immunology topics, read by a small group, and then present and discuss by all class

Available programs:

Special Lecture 2 times (during the above lecture period)

Journal Club Odd Week Saturday 15:30-17:30

### Practice

To understand basic and update technology of immunological research and to try to make own study plan

Available programs:

Lecture Monday from January 7 to March 11, 17:00 -19:00, Special Lecture 2 times during the lecture period

Journal Club Odd Week Saturday 15:30-17:30

### Lab

To acquire fundamental techniques for immunological research.

To make own study plan and to practice own study

Available programs:

Lecture Monday from January 7 to March 11, 17:00 -19:00, Special Lecture 2 times during the lecture period

Journal Club Odd Week Saturday 15:30-17:30

## **7. Grading System**

Comprehensive assessment (presentation, discussion, research content, conference/meeting participation)

## **8. Prerequisite Reading**

must review the things that you have learned in undergraduate Immunology classes

## **9. Reference Materials**

Cellular and Molecular Immunology (Seventh Edition) Elsevier Saunders

## **10. Important Course Requirements**

All lecture, presentation and discussion are provided in English.

## **11. Lectures in English**

All lectures are conducted in English.

## **12. Office Hour**

17:00–19:00 Miyuki AZUMA    miyuki.mim@tmd.ac.jp    Shigenori NAGAI    nagai.mim@tmd.ac.jp    Tatsukuni OHNO  
tohno.mim@tmd.ac.jp

## **13. Note(s) to students**

None

# Advanced Biomaterials

Lecture	(code: 8 0 4 1	1st year	:6units)
Practice	(code: 8 0 4 2	1st~2nd year	:4units)
Lab	(code: 8 0 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Motohiro UO, Assistant Professor: Takahiro WADA  
Contact person: Motohiro UO E-mail: uo.abm@tmd.ac.jp

## 2. Classroom/Lab

Please contact the faculty adviser before attending class.

## 3. Course Purpose and Outline

Study about the progress and the various properties advanced biomaterials and dental materials.  
In addition, study about the measurement and analysis methods of advanced biomaterials and dental materials.

## 4. Course Objective(s)

Acquire the knowledge about the biomedical and dental materials

## 5. Format

All coerces are basically few people education system for providing free discussion.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Upon successful completion of the course, the student will be able to:

1. Describe the basic classification of dental materials
2. Understand basic characteristics of recent dental materials
3. Explain current scientific theory regarding evaluating mechanical properties
4. Discuss characteristics of recent representative oral biomaterials and equipment.

Available programs:

Lecture Thursday morning, 10:30 am – 12 am (expected: May, June and July)

Special Lecture As needed (announced if necessary)

### Practice

Goals/Outline:

Students will be able to explain their research results using PowerPoint.

Students will be able to display their research results as a poster presentation.

Student will be able to discuss their findings with other students.

Available programs:

As needed

## **Lab**

Goals/Outline:

Students should measure basic mechanical properties using testing machine.

Students should determine several hardness values of dental materials.

Student should analyze crystalline component using X-ray diffractometer

Student should analyze atomic vibration using Fourier-transfer-infrared-scropy.

Available programs:

Participation in a research group As needed

## **7. Grading System**

Comprehensive assessment based on participation, report for lecture, activity for the academic meeting.

## **8. Prerequisite Reading**

Prerequisite reading will be requested, if necessary

## **9. Reference Materials**

Phillip's Science of Dental Materials 11th ed. (Annusavice K, Saunders, 2003)

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

uo.abm@tmd.ac.jp

## **13. Note(s) to students**

None

# Diagnostic Oral Pathology

Lecture	(code :	1st year	:6units)
Practice	(code :	1st~2nd yea	:4units)
Lab	(code :	2nd~3rd yea	:8units)

1. Instructor(s)

2. Classroom/Lab

Not offered

# Oral Radiation Oncology

Lecture	(code: 8 0 8 1	1st year	:6units)
Practice	(code: 8 0 8 2	1st~2nd year	:4units)
Lab	(code: 8 0 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Masahiko MIURA  
Contact person Masahiko MIURA E-mail masa.mdth@tmd.ac.jp

## 2. Classroom/Lab

Make sure by contacting me before each lecture or seminar

## 3. Course Purpose and Outline

To understand cutting edge of radiation biology and radiation oncology

## 4. Course Objective(s)

To understand the concept and reserch trend of translational reserch regading radiation oncology

## 5. Format

To give lectures and practice to a small number of students.  
To cultivate ability to extract problems and constitute your own idea through discussions.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Oral Radiation Oncology is a branch of radiation oncology dealing with basic radiobiology, translational research, and radiotherapy for oral cancer. Main objective of this branch in the graduate course is to provide opportunities to study biological strategies for radiosensitization, development of radiosensitizers, molecular mechanisms of tumor radioresistance, the state of the art technology of radiotherapy, and basis of individualized radiotherapy depending on each student's research projects.

Available programs:

Lecture Oct. 16- Dec. 25, 2018 on every Tuesday 12:00pm-14:00pm  
Molecular Biology for Radiation Oncology  
Journal Club every other Tuesday  
Research in Progress every other Tuesday  
Special Lecture 1 week (around the end of Sep.)  
at TMDU Yushima Campus  
Training Program for Specialists in Cancer: Radiation Biology Course

### Practice

Goals/Outline:

The outline of Practice is to diagnose varying types of the primary and locoregional sites of oral cancer and to learn how to treat them by radiotherapeutic modalities including 3D-conformal radiotherapy, brachytherapy, and multidisciplinary treatments.

Available programs:

Clinical Conference On every Friday 18:30–19:30

## **Lab**

Goals/Outline:

The outline is to learn basic techniques required for our research themes (tissue culture techniques, X-ray irradiation, radiation dosimetry, Western blotting, gene transfer, real time imaging using fluorescent proteins, etc.)

Available programs:

Participate in each research group

## **7. Grading System**

Totally evaluate students' achievements based on the presence to lectures or seminars, presentation in seminars, reports regarding their research, and presentation in academic meetings, etc.

## **8. Prerequisite Reading**

Read the reference material described below and grasp the outline

## **9. Reference Materials**

"Radiobiology for the Radiologist 7th ed" Lippincott Williams & Wilkins, Eric J Hall and Amato J Giaccia eds.

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Prof. Masahiko MIURA : Mon through Fri 16:00–18:00 masa.mdth@tmd.ac.jp

## **13. Note(s) to students**

None

# Oral and Maxillofacial Surgery

Lecture	(code: 8 0 9 1	1st year	:6units)
Practice	(code: 8 0 9 2	1st~2nd year	:4units)
Lab	(code: 8 0 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor : Hiroyuki Harada,

Associate Professor : Eriko Marukawa

Contact person: Oral and Maxillofacial Surgery Hiroyuki Harada E-mail hiro-harada.osur@tmd.ac.jp

## 2. Classroom/Lab

Conference room of the Department of Oral and Maxillofacial Surgery (Faculty Building of University Hospital of Dentistry, 9th floor). However, please confirm the location in advance with the instructor.

## 3. Course Purpose and Outline

Course Purpose and Outline is designed for clarifying the cause of the oral and maxillofacial diseases and developing a new treatment from clinical viewpoint.

## 4. Course Objective(s)

Course objective is to understand the cause and treatment of malformation, facial deformity, mucosal disease, and neoplasm arising in oral and maxillofacial region.

## 5. Format

Small groups with maximum opportunity for discussion.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The program is designed for understanding the broad knowledge and basic skills which are important for diagnosis, treatment, prognosis and prevention of oral and maxillofacial diseases.

Available programs:

Lecture June. 19- July. 3, 2018 on every Tuesday . 9:00 to 12:00

Special Lecture As needed

Seminar As needed

Staff conference Every Thursday 18:00 to 20:00

### Practice

Goals/Outline:

The program is designed for understanding the clinical, imaging and pathological features which are important for diagnosis of oral and maxillofacial diseases. And the program is designed for determining the optimal treatments considering cosmesis and functions and practicing them in both outpatient and inpatient clinics.

Available programs:

Conference for new patients Every Tuesday 17:00 to 18:00, Every Thursday 17:00 to 18:00

Special clinic and conference for oral cancer Every Tuesday 13:30 to 16:00, Every Friday 11:00 to 15:00

Conference for oral cancer with radiologists, oncologists, and prosthodontists Every Friday 18:00 to 20:00

Conference for facial deformities Second and third Friday of every month 15:00 to 16:00

Preoperative conference Every Thursday 17:00 to 18:00

## **Lab**

### Goals/Outline:

Participate in research in the following fields, and learn the basic methods and skills for experimentation.

### Available programs:

1. Molecular biological research related to invasion and metastasis of oral cancer.
2. Research related to dysfunction and QOL following oral cancer surgery.
3. Research related to distraction osteogenesis.
4. Research related to mandibular reconstruction through tissue engineering.
5. Research related to cleft palate and cleft lip bone grafting.

## **7. Grading System**

Evaluation is based on participation (attendance) in lectures, practices and labs and on acquisition of skills and knowledge, and it is added to an evaluation when there is a presentation at the academic meeting.

## **8. Prerequisite Reading**

It is necessary to learn the basic knowledge, medical examination and technique of oral and maxillofacial surgery

## **9. Reference Materials**

Andersson Lars: ORAL AND MAXILLOFACIAL SURGERY, BLACKWELL PUBLISHING 2010 (ISBN:9781405171199)  
京都大学大学院医学研究科外科学講座「外科研修マニュアル」南江堂  
野間康弘、瀬戸皖一「標準口腔外科学」医学書院

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Every Tuesday 16:00-17:00. Professor. Harada Hiroyuki , Dep of Oral and Maxillofacial Surgery.

## **13. Note(s) to students**

None

# Oral and Maxillofacial Radiology

Lecture	(code: 8 1 0 1	1st year	:6units)
Practice	(code: 8 1 0 2	1st~2nd year	:4units)
Lab	(code: 8 1 0 3	2nd~3rd year	:8units)

Professor: Tohru Kurabayashi    Associate Professor: Hiroshi Watanabe  
Junior Associate Professor: Naoto Ohbayashi, Norio Yoshino  
Assistant Professor: Shin Nakamura  
Contact person: Tohru Kurabayashi    E-mail kura.orad@tmd.ac.jp

## 2. Classroom/Lab

Laboratories of Oral and Maxillofacial Radiology (Dental building, 12th floor)

## 3. Course Purpose and Outline

To obtain enough knowledge for safe and effective use of ionizing radiation in dentistry

## 4. Course Objective(s)

To understand the characteristics of advanced imaging modalities and how to interpret their images

## 5. Format

The format depends on the instructor who teaches the students.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Main objective is to provide students opportunity to study advanced imaging modalities including digital imaging, cone-beam CT, multi-detector row CT and MRI.

Available programs:

Lecture June. 28- July. 19, 2018 on every Thursday, 16:00-17:00 (It may be changed due to instructors' schedules )

Journal Club Thursday, 17:00-18:00

Film Conference Wednesday, 8:20- 8:50

### Practice

Goals/Outline:

The goal of the practice is mainly to obtain the professional skills of interpreting both conventional and sectional images of dento-maxillo-facial region.

Available programs:

Clinical training (Observation): Monday, 16:00-17:00

### Lab

Goals/Outline:

The main objective is to learn how to plan clinical research concerning imaging diagnosis and analyze the data.

Available programs:

Students can participate in any research group in Oral and Maxillofacial Radiology.:Monday, 16:00-17:00

**7. Grading System**

The attitude and the presentation skill of the students in each program will be evaluated.

**8. Prerequisite Reading**

Participants should have enough knowledge of radiology of the undergraduate level.

**9. Reference Materials**

Oral Radiology 7th ed., Mosby/Elsevier

**10. Important Course Requirements**

None

**11. Lectures in English**

Lectures will be partially conducted in English.

**12. Office Hour**

At any time, E-mail address: kura.orad@tmd.ac.jp

**13. Note(s) to students**

Students who chose this course are asked to send email to the above address before May 12th.

# Anesthesiology and Clinical Physiology

Lecture	(code: 8 1 1 1	1st year	:6units)
Practice	(code: 8 1 1 2	1st~2nd year	:4units)
Lab	(code: 8 1 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Professor and Chair Haruhisa Fukayama E-mail fukayama.anph@tmd.ac.jp

## 2. Classroom/Lab

Learners must confirm the venues before attending the seminar, conferences and lectures, because the different places may be used

## 3. Course Purpose and Outline

Learners will have knowledge concerning systemic management of dental patients, they are local anesthesia, general anesthesia, sedation, safe management of the dental patients. Also what is called dental anesthesiology will be endorsed. For these purposes basic life sciences such as physiology and biochemistry are focused in the field.

## 4. Course Objective(s)

Physical evaluations, such as diagnostic methods, laboratory examinations, medical interviews and their practical methods are the main points. From what are derived from the information, proper tactics will be chosen for systemic management. Also emergency cases can be managed after the program.

## 5. Format

Learners will be able to attend the seminars, clinical conferences and special lectures available at any time. Seminar attendants will present and discuss about their own research process. Clinical conference attendants will be trained in clinical settings in assigned days.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Learners will consider generally the basic knowledge of local anesthesia, general anesthesia, psycho-sedation, and systemic management in dentistry, and establish the basements of specialists in anesthesiology and clinical physiology. Learners will acquire the pharmacological action and action mechanism through discussion, clinical settings and research works. The aims of this course are to clarify the neuro-physiological pain mechanisms and their modulation ways, and to develop the new pain control methods and new local anesthetic methods. The other aims are to investigate the pain relative intrinsic biologically active substance and to clarify the occurrence mechanism of refractory pain diseases using molecular biology methods, and finally to establish the new treatment methods.

Available programs:

Lecture Nov. 6- Dec. 25, 2018 Every Tuesday 8:50-12:00  
Progress Meeting Every Monday 18:00-19:00

### Practice

Goals/Outline:

Learners will acquire the physiological and pharmacological basic knowledge and methods in dental clinical settings of local anesthesia, general anesthesia and psycho-sedations, and also learn pathology of pain diseases.

Available programs:

Presentation of research Every Mon day 17:00–17:30  
Clinical practice assigned

## **Lab**

Goals/Outline:

The aims of the course are to establish and develop the non-invasive percutaneous and per mucosal drug delivery, and also clarify the pain occurrence mechanism and develop their managements. The reaction to the pain of living body will be studied.

Available programs:

Learners are available to join the following research groups.

- 1) Research of mechanism in Diffuse Noxious Inhibitory Controls
- 2) Research in Drug delivery system

## **7. Grading System**

Learners are generally assessed in the base of their attitudes to the lecture, seminar, and discussion including their attendance. Research protocols and relationships of research conferences are also evaluated by repetitions of the related academic conferences.

## **8. Prerequisite Reading**

Learners should have the knowledge of basic dentistry including skill because anesthesiology for dentistry will be presented. Any introductive textbook can be recommended regarding anesthesiology for dentistry.

## **9. Reference Materials**

Principles and Practice of Anesthesiology, Second Ed, Longnecker et al Mosby

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Appoitment needed using fukayama.anph@tmd.ac.jp (usually after 5pm)

## **13. Note(s) to students**

None

# Orofacial Pain Management

Lecture	(code: 8 1 2 1	1st year	:6units)
Practice	(code: 8 1 2 2	1st~2nd year	:4units)
Lab	(code: 8 1 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Prof. Shimada Masahiko

Contact person: Prof. Shimada Masahiko E-mail mshimada.ofpm@tmd.ac.jp

## 2. Classroom/Lab

Confirm it to the charge contact person.

## 3. Course Purpose and Outline

The Course purpose is to study the basis of the diagnosis and treatment of the disease with a pain, abnormal sensation, sensory paralysis, motor paralysis and temporomandibular disorders in the orofacial area, and some statistic methods necessary to factor analysis in multifactorial disease.

## 4. Course Objective(s)

Main objective of orofacial pain management in the postgraduate course is to study on the basis of the diagnosis and treatment of the disease with a pain, abnormal sensation, sensory paralysis, abnormal movement, motor paralysis and temporomandibular disorders in the orofacial area, in particular, mechanism of pain, neuropathic pain, so on.

## 5. Format

It is basically assumed the few people system. The place for debating is installed as much as possible to improve the interrelation with the student.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Main objective of orofacial pain management in the postgraduate course is to lectures on the basis of the diagnosis and treatment of the disease with a pain, abnormal sensation, sensory paralysis, abnormal movement, motor paralysis and temporomandibular disorders in the orofacial area, in particular, mechanism of pain, neuropathic pain, temporomandibular disorders, so on.

Available programs:

Lecture 17:00~19:00, on Wednesday, Oct. to Dec., 3-4 times

Special Lecture A special lecture has been held on Friday 17:15~19:15 December.

Journal Club The fourth Wednesday every month, 18:00~19:00

Oriental oral medicine Seminar The fourth Wednesday every month, 18:00~19:00

### Practice

Goals/Outline:

The purpose of practice is to study the basis of the diagnosis and treatment of the disease with a pain, abnormal sensation, sensory paralysis, motor paralysis and temporomandibular disorders in the orofacial area.

Available programs:

Clinical Conference has been held the fourth Wednesday every month, 18:00~19:00

Clinical training has been performed on Monday, Tuesday, Thursday, Friday, 9:00~12:00

## **Lab**

### Goals/Outline:

The main goal is to plan the design of Experiment concerning pain and abnormal sensation, and to understand an importance of statistical methods for clinical study, and to select an appropriate method and use it on own study.

### Available programs:

Participation in the research group would be possible at any time.

## **7. Grading System**

An integrated evaluation is done based on the participation situation to the lecture and research content.

## **8. Prerequisite Reading**

Preparation for a class is to read the Orofacial Pain Textbooks and Papers

## **9. Reference Materials**

Orofacial Pain From Basic Science to Clinical Management, 2th Edition, Barry, J. Sessle et al.  
Quintessence Publishing Co, Inc

## **10. Important Course Requirements**

Reading of Orofacial Pain Textbooks and Papers in advance is Important Course requirements

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Information: Masahiko Shimada, E-mail [mshimada.ofpm@tmd.ac.jp](mailto:mshimada.ofpm@tmd.ac.jp)

## **13. Note(s) to students**

None

# Pediatric Dentistry

Lecture	(code: 8 1 3 1	1st year	:6units)
Practice	(code: 8 1 3 2	1st~2nd year	:4units)
Lab	(code: 8 1 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor: MIYASHIN Michiyo

Contact person: MIYASHIN Michiyo E-mail : miyashin.dohs@tmd.ac.jp

## 2. Classroom/Lab

Unfixed. The students are advised to make a contact with the instructor in advance.

## 3. Course Purpose and Outline

In this course, students will search the oro-facial functions, being developed and acquired from newborn period to childhood as well as growth and development of the surrounding tissues and organs in this region. Students will also investigate pathogenesis and pathophysiology of the diseases that disturb development and acquisition of these functions.

This course aims to develop theory and methodology not only for the developmental guidance of the oro-facial functions but also for diagnosis, prevention and treatment of related diseases and malfunctions.

## 4. Course Objective(s)

After completion of this course, the students will be able to;

- 1) explain the oro-facial functions, such as sucking, mastication, swallowing, and articulation, as well as growth and development of the surrounding tissues and organs in this region.
- 2) explain pathogenesis and pathophysiology of the diseases that disturb development and acquisition of these functions.
- 3) analyze the oro-facial functions and growth and development of children to develop theory and methodology for the developmental guidance.
- 4) analyze pathogenesis and pathophysiology of the diseases that disturb development and acquisition of these functions to develop new methods for the treatment and prevention of the diseases.

## 5. Format

Seminar style

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

This lecture will guide students to understand the oro-facial functions, such as sucking, mastication, swallowing, and articulation, being developed and acquired from newborn period to childhood as well as growth and development of the surrounding tissues and organs in this region. Students are also taught pathogenesis and pathophysiology of the diseases that disturb development and acquisition of these functions. Students will study theory and methodology not only for the developmental guidance of the oro-facial functions but also for diagnosis, prevention and treatment of related diseases and malfunctions.

Available programs:

Lecture : Oct.26 - Mar. 15 Every Friday 17:00~18:00

Special lecture : At anytime, Friday 17:00~18:00

Seminar : Monday to Thursday 17:00~18:00

Paper reading : Friday 16:00~16:50

## **Practice**

Goals/outline:

The comprehensive dental practice for child patients will guide student to understand the developmental processes of the oro-facial functions, and to study the outline of the method for diagnosis, prevention and treatment of the related diseases and malfunctions. The practice will also provide students to learn theory and method for the developmental guidance of these functions in the clinical viewpoints.

Available programs:

Clinical conference : Friday 18:00~18:30

## **Lab**

Goals/outline:

The students will analyze the developmental processes of the oro-facial functions as well as the growth processes of the related organs by the morphological, physiological and biological aspects to develop the method for the developmental guidance of these functions. The students also analyze pathogenesis and pathophysiology of the diseases that disturb development and acquirement of these functions to develop new methods for the treatment and prevention of the diseases.

Available programs:

The students can join any research groups at any time.

## **7. Grading System**

Be assessed by the attendance/activities in the class and the research planning of each student. Any research report or paper presentation in a meeting will also be used for the comprehensive assessment and grading.

## **8. Prerequisite Reading**

The students need to read the text books prior to the lectures. The presentation file using in the lecture will be distributed in each lecture. Please join in the discussion actively on every lecture.

## **9. Reference Materials**

Dean, JA, Avery, DR and McDonald, RE "Dentistry for the Children and Adolescent", Mosby Elsevier, 2011  
Pinkham, JR "Pediatric Dentistry Infancy Through Adolescence 4th Ed.", Elsevier Saunders, 2005

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Please make contact by E-mail.

E-mail access to: miyashin.dohs@tmd.ac.jp

## **13. Note(s) to students**

None

# Orthodontic Science

Lecture	(code: 8 1 4 1	1st year	:6units)
Practice	(code: 8 1 4 2	1st~2nd year	:4units)
Lab	(code: 8 1 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Takashi Ono, Professor and Chairman

## 2. Classroom/Lab

Contact to the person in charge beforehand.

## 3. Course Purpose and Outline

Orthodontic Science is one of the dental sciences which propose to control teeth, periodontium, and craniofacial growth and development in equilibrium with the whole body, and also deals with the prevention and/or treatment of malocclusion and related disorders, by which the alteration of maxillofacial function with aging could be kept to the most suitable condition.

The purpose of this course is for a doctoral student to master basic and the clinical method for orthodontic research, and to be able to be accepted papers. Moreover, the purpose of this course is to educate orthodontists who have knowledge and clinical technique about basic and clinical orthodontic science.

- 1) To explain the unhealthy physiological condition of malocclusion and deepen the scientific basis for orthodontic treatment.
- 2) To understand the biological reaction and adaptation of occlusal tissues to mechanical stresses such as occlusal force or orthodontic force, and also the changes with aging.
- 3) To explain the art for controlling the morphologic and functional problems of occlusion in orthodontic treatment, from the view points of biomaterials and biomechanics.
- 4) To enlighten the social dentistry for the needs and demands of orthodontic treatment.

## 4. Course Objective(s)

- 1) To acquire suitable and sufficient learning and thinking ability about orthodontic study and reach the capability and knowledge to promote each subject of research logically
- 2) To acquire sufficient knowledge to apply for the certified doctor of Japan Orthodontic Society, and clinical experience by obtaining suitable and sufficient learning and experience about orthodontic treatment

## 5. Format

Generally in a small class.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Available programs:

Lecture Apr. 17- Feb. 19 every Tuesday, 9:30-12:00

Special Lecture as needed

Seminar as needed

### Practice

Goals/Outline:

To understand the alteration of occlusal function and morphology, and to explain the pathological condition of malocclusion from the viewpoint of physiology, biomechanics, biology and sociology.

Available programs:

Training for clinical examination as needed

Clinical practice (see patients) 4.5 hour/week

Clinical study by observation (treatments, diagnoses) every Tuesday and Friday, 9:00–12:00

Clinical Conference as needed

Training for diagnosis and treatment planning (basic skill, typodont) as needed

Seminar for Sociology as needed

Department Seminar every Wednesday and Friday, 17:00–19:00

## **Lab**

Goals/Outline:

To understand the procedure of biological reaction and adaptation of occlusal system to the orthodontic stimuli, including the influence of aging, and to provide the control of the surroundings of the occlusal system.

Available programs:

Progress meeting as needed

Research seminar as needed

## **7. Grading System**

Students will be judged and evaluated comprehensively according to the participation in discussion, argument, exercise, research practice, presentation and speech. In addition, students will be evaluated comprehensively based on the details of research, the grade of the involvement in the various researches or research meetings and the number of presentation in an academic society.

## **8. Prerequisite Reading**

Prepare in advance when a reference book or paper is instructed.

## **9. Reference Materials**

Contemporary Orthodontics 5th edition, Proffit WR, Elsevier Mosby, 2013, ISBN: 9780323083171

Other reference book and papers will be instructed each time.

## **10. Important Course Requirements**

Please offer in advance when inevitably absent.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person: Takashi Ono, Orthodontic Science, Monday and Wednesday 16:00–17:00 E-mail t.ono.orts@tmd.ac.jp

## **13. Note(s) to students**

The final evaluation will be held in the end of every year to acknowledge the promotion or graduation.

# Cariology and Operative Dentistry

Lecture	(code: 8 1 5 1	1st year	:6units)
Practice	(code: 8 1 5 2	1st~2nd year	:4units)
Lab	(code: 8 1 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Junji Tagami, Associate professor Masayuki Otsuki  
Lecturer: Toru Nikaido, Masatoshi Nakajima  
Assistant professor :Takako Yoshikawa, Go Inoue, Keiichi Hosaka, Tomohiro Takagaki, Rena Takahashi, Naoko Matsui  
Project Assistant Professor Noriko Hiraishi  
Contact person: Masayuki Otsuki E-mail otsuki.ope@tmd.ac.jp

## 2. Classroom/Lab

Please ask a contact person.

## 3. Course Purpose and Outline

To learn about diagnosis, prevention and treatment of dental caries and other diseases of dental hard tissues and the related dental materials and devices and to learn research methods of these fields.

## 4. Course Objective(s)

To be able to explain diseases of dental hard tissues  
To be able to explain prevention and treatment of diseases of dental hard tissues  
To be able to explain materials and devices for prevention and treatment of dental hard tissues  
To be able to explain and perform the research for those fields

## 5. Format

Practice and Lab are organized in small group.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The goal of this course is to acquire the knowledge about the dental caries including diagnosis, prevention, treatment and restorative materials and to integrate it based on operative dentistry.

Available programs:

Lecture at 17:40-19:00 on Wednesday in April - December  
Special Lecture at 15:00pm-17:00 on Wednesday in January - March  
English will be used in all lectures  
Seminar at 17:00pm on Monday - Friday

### Practice

Goals/Outline:

The goal of this course is to understand basic and clinical research about cariology and operative dentistry and to form a research project of own research.

Available programs:

group discussion at 17:00pm on Monday - Friday  
practice of presentation Befor several weeks of presentation, at 17:00pm on Wednesday

## **Lab**

Goals/Outline:

The goal of this course is to master the experimental technique to perform own project.

Available programs:

participation in each research project group

## **7. Grading System**

Scored by attendance, examination and presentation

## **8. Prerequisite Reading**

Related articles and textbook should be read before lecture.

## **9. Reference Materials**

Fundamentals of Operative Dentistry, Summitt JB et.al.

Art & Science of Operative Dentistry, Roberson TM et. Al.

## **10. Important Course Requirements**

The score is evaluated based on attendance of the lecture, examination, presentation and publication of research.

## **11. Lectures in English**

English is used in all lectures.

## **12. Office Hour**

17:00– Monday – Friday

## **13. Note(s) to students**

To take Lecture is required for participation in Practice and Lab.

# Fixed Prosthodontics

Lecture	(code: 8 1 6 1	1st year	:6units)
Practice	(code: 8 1 6 2	1st~2nd year	:4units)
Lab	(code: 8 1 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Hiroyuki Miura Associate Professor: Keiichi Yoshida  
Lecturer: Daizo Okada ,Wataru Komada  
Assistant Professor: Chiharu Shin, Shiho Otake, Satoshi Omori, Reina Nemoto  
Adjunct instructor: Keiichi Sasaki, Kazuhiko Suese, Tomohiko Ishigami, Mikio Kimura  
Contact person: Daizo Okada E-mail d.okada.fpro@tmd.ac.jp

## 2. Classroom/Lab

Refer to contact person

## 3. Course Purpose and Outline

Based on up-to-date latest research, Students learn and discuss the crown restoration adapted to the stomatognathic function and the biocompatible materials in this course.

## 4. Course Objective(s)

Acquisition of the crown restoration adapted to the stomatognathic function  
Understanding of latest biomaterials in the crown restoration

## 5. Format

Small group instruction

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Integrated learning of matters related to recover and maintain proper eating functions.

Commentary from a biological standpoint on the methods for recovering from functional and cosmetic disturbances of oral and maxillofacial area caused by defect and loss of teeth

Available programs:

Lecture every Wednesday (17:30 ~19:00) (Oct.17th to Dec.12th)

Special Lecture at anytime

Seminar at anytime

Journal Club every Thursday (17:00 ~18:00)

### Practice

Goals/Outline:

Learning of mandibular movements and reproducibility of mandibular movements on the articulator

Learning of mechanism of semi-adjustable articulator and its effect on occlusal surface configuration of prosthetics

Available programs:

training seminars for new recruits at anytime

## **Lab**

Goals/Outline:

Learning of objective diagnosis method of oral functions

Learning of experimental methodology for measurements of mandibular movements, and masticatory efficiency and functional testing of occlusal functions (tooth contact, tooth displacement, occlusal force)

Available programs:

Participation in a research group at anytime

## **7. Grading System**

The attitude toward the lecture, practical works, exercise and research training and the participation situations, such as announcements or presentations, are comprehensively evaluated. In addition, synthetic evaluation is performed based on the details of research or the level of involvement to the researches.

## **8. Prerequisite Reading**

In the case of handouts were distributed beforehand, these documents read thoroughly

## **9. Reference Materials**

Refer to the handouts distributed

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Daizo Okada 17:00-18:00 every Tuesday (E-mail [d.okada.fpro@tmd.ac.jp](mailto:d.okada.fpro@tmd.ac.jp))

## **13. Note(s) to students**

None

# Pulp Biology and Endodontics

Lecture	(code: 8 1 7 1	1st year	:6units)
Practice	(code: 8 1 7 2	1st~2nd year	:4units)
Lab	(code: 8 1 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Takashi Okiji

Associate Professor: Mitsuhiro Sunakawa

Junior Associate Professor: Hideharu Ikeda, Nobuyuki Kawashima

Assistant Professor: Arata Ebihara, Hiroyuki Matsumoto, Tomoatsu Kaneko, Satoshi Watanabe, Jun Kawamura

Lecturer: Yoshitsugu Terauchi, Satomi Takahashi, Yousuke Hayashi

## 2. Classroom/Lab

The lectures are presented in 3rd Lecture Room on the 2nd floor of Building 7 (Faculty of Dentistry and Animal Research Center Building). The venues for the other programs will be announced during the lecture course.

## 3. Course Purpose and Outline

This course aims to provide students with current knowledge about (i) pathobiology of pulpal and periradicular diseases, (ii) pulp regeneration and (iii) advanced strategies for endodontic diagnosis and treatment, in order to improve students' clinical problem-solving ability.

## 4. Course Objective(s)

After completing this course, the student should be able to describe (i) pathobiological mechanisms involved in pulpal and periradicular diseases, (ii) principles and current research status of dental pulp regeneration, and (iii) current diagnostic and treatment measures in endodontics.

## 5. Format

Sufficient question and discussion time is allocated for the student to actively engage in the above programs.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

The lectures deal with current knowledge on (i) immunological and pathophysiological mechanisms involved in the development of pulpal and periradicular diseases, (ii) principles and current research status of dental pulp regeneration, and (iii) clinical topics in endodontics, such as diagnostic imaging, vital pulp therapy and application of lasers.

Available programs:

Lecture Every Friday from December to February 10:00~12:00

Special Lecture Thursday from December to February (details will be announced)

Journal Club Every Thursday 17:00~18:00

### Practice

All students are asked to exercise endodontic problem-solving of various clinical cases, including diagnosis and management of dental pain, preservation of the tooth pulp, strategies to deal with the complex root canal system, and surgical endodontics.

Available programs:

Clinical Conference Every Thursday 18:00~19:00

## **Lab**

Students can participate in research programs, such as laser application to endodontics and immunohistochemistry.

Available programs:

Participation in a research group as needed

## **7. Grading System**

Grade-point evaluation (4, 3, 2, 1, 0) is made for each student at the end of the course, based on the efforts made by the student toward the lecture, practice and lab.

## **8. Prerequisite Reading**

Students should confirm the basic knowledge prior to each class, referring to related papers and references shown below.

## **9. Reference Materials**

1. Seltzer and Bender's Dental Pulp. ed. by Hargreaves KM, Goodis H & Tay FR, 2nd ed., Quintessence Publishing, 2012.
2. Pathways of the Pulp. ed. by Cohen S, Hargreaves KM, Keiser K, 11th ed., Mosby, 2016.
3. Essential Endodontology. ed. by Ørstavik D & Pitt Ford T, Blackwell-Munksgaard, 2nd ed., 2008.

## **10. Important Course Requirements**

Lectures may be held as live TV lectures linked to foreign universities.

## **11. Lectures in English**

All lectures are conducted in English.

## **12. Office Hour**

Contact to Prof. Okiji (E-mail: t.okiji.endo@tmd.ac.jp)

## **13. Note(s) to students**

# Removable Partial Prosthodontics

Lecture	(code: 8 1 8 1	1st year	:6units)
Practice	(code: 8 1 8 2	1st~2nd year	:4units)
Lab	(code: 8 1 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Noriyuki WAKABAYASHI (Professor), E-mail: wakabayashi.rpro@tmd.ac.jp

## 2. Classroom/Lab

Dental Building North, 11F

Removable Partial Prosthodontics Meeting Room

Verifying the lecture room is necessary according to the program executed.

<http://www.tmd.ac.jp/pro/PostGrad/PostGrad.html>

## 3. Course Purpose and Outline

The purpose of the Removable Partial Prosthodontics course is to provide advanced knowledge in specialty of Prosthodontics and related research. The postgraduate students who are enrolled concurrently in wide range of oral health sciences are welcomed to our class.

## 4. Course Objective(s)

The course objectives are to gain fundamental knowledge about the Prosthodontics research methodology and its updated trend that are benefit for individual research directions.

## 5. Format

Every candidate has to address his or her opinion freely to the others.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Aims/outline:

Professor and associate professors of Removable Partial Prosthodontics provides lectures on their specialty research areas in Prosthodontics. Following lecture titles outline the content of this special course; "Two points of research view for tooth loss", "Clinical evaluation of masticatory performance", "Clinical research design", "Biomaterials research in Prosthodontics", "Introduction to stress analysis" and "Measurement and analysis of jaw movement".

Goals/Objectives:

The program objectives are to provide our concept for Prosthodontics research and to equip students to critically analyze individual research directions.

Available programs:

Lecture Removable Partial Prosthodontics

Lecturers Noriyuki Wakabayashi, Kenji Fueki, Takeshi Ueno

Term Every Monday: 1.Oct – 29.Oct. 2018. (5 lectures)

Time 17:30–19:30

Lecture Room: Meeting room of Removable Partial Prosthodontics, 11th floor, Room 1103, Dental Building Northth.

<http://www.tmd.ac.jp/pro/Address/Address.html>

Special Lecture on “Prosthodontics for disabled elderly”

Lecturer Kazuhiro Hori

Term 1.Feb. 2019

Time 17:00–18:30

Lecture Room: Prosthodontics Demonstration Room, Dental Building (Building 7) Third floor.

Building 7 is connected to the Dental Building on the 3rd floor ([http://www.tmd.ac.jp/pro/70\\_5609076b09397/index.html](http://www.tmd.ac.jp/pro/70_5609076b09397/index.html)).

Special Lecture on “Jawbone reconstruction in view from prosthodontics”

Lecturer Hideharu Hibi

Term 2.Feb. 2018

Time 17:00–18:30

Lecture Room: Prosthodontics Demonstration Room, Dental Building (Building 7) Third floor.

Building 7 is connected to the Dental Building on the 3rd floor ([http://www.tmd.ac.jp/pro/70\\_5609076b09397/index.html](http://www.tmd.ac.jp/pro/70_5609076b09397/index.html)).

## Practice

Practices on clinical diagnosis, decision-making, and prosthodontic treatment procedures.

Available programs:

A yearly removable prosthodontics practice course is provided every month for junior post graduate students. Verifying the schedule at the website below is necessary according to the program executed.

<http://www.tmd.ac.jp/pro/education/ContinuingEd/ContinuingEd.html>

## Lab

Practice on research methods, presentation, and scientific writing by hands-on instructions.

Available programs:

Advanced course of prosthodontics research for postgraduate students, six sessions per year. Verifying the schedule at the website below is necessary according to the program executed. <http://www.tmd.ac.jp/pro/PostGrad/PostGrad.html>

## 7. Grading System

Comprehensive assessment is planned based on the presence, practice and labo-work and the completion of the theme.

At least 5 presences of all 7 lectures above are necessary to finish this course.

## 8. Prerequisite Reading

Visit our website for latest published articles:

<http://www.tmd.ac.jp/pro/Research/Research.html>

## 9. Reference Materials

Designing Clinical Research: Hulley et al., 4th edit, 2013, Lippincott Williams & Wilkins

Brunette. Critical Thinking: Understanding and Evaluating Dental Research, Second Edition, 2007, Quintessence

See our website for definitive lecture title, schedule and place a few weeks before each lecture.

## 11.Lectures in English

Lectures will be partially conducted in English.

## 12. Office Hour

Anytime for Professors (Wakabayashi, Fueki, Ueno), only on lecture site for visiting Professors (Hori and Hibi).

## 13. Note(s) to students

Notice to our website for change of schedule and lecture hall.

<http://www.tmd.ac.jp/pro/PostGrad/PostGrad.html>

# Oral Implantology and Regenerative Dental Medicine

Lecture	(code: 8 1 9 1	1st year	:6units)
Practice	(code: 8 1 9 2	1st~2nd year	:4units)
Lab	(code: 8 1 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Shohei Kasugai TEL 03-5803-5934 E-mail kas.mfc@tmd.ac.jp

## 2. Classroom/Lab

1st Lecture Room (Building 1 West, 7F), Dental Implant Clinic (Dental Hospital, 7th floor), Center for Experimental Animals

## 3. Course Purpose and Outline

Goals/outline:

Prosthetic treatments with dental implants (dental implant treatment) for edentulous patients have been effective and predictable. The students will be able to learn the characteristics of dental implant treatments and dental implant materials and renew knowledge concerning all steps in dental implant treatment including clinical examinations, treatment planning, implant surgery, prosthodontics procedures and maintenance.

In dental implant treatment bone augmentation and soft tissue management are frequently required. In this course, regenerative treatments, which relate to dental implant treatment, will be presented and discussed. Especially, future possibility of regenerative medicine in dental field will be discussed.

The purposes of this course are to understand current dental implant treatment and the related regenerative dental medicine and to predict the future directions of researches in this field.

## 4. Course Objective(s)

The objectives of this program is to be possible to explain the scientific background of merit and demerit of modern implant treatment and the detail of the related augmentation techniques of soft and hard tissues.

## 5. Format

Lectures by the instructors and presentations by the participants regarding the given subjects

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lectures

The purpose of this program to understand the current dental implant treatment, clinical applications and resresearches of the related tissue regenerations.

Available programs:

Lecture (Latter Semester): Oct. 18- Mar. 14 Thursday 18:30 - 20:30

Seminar and Journal Club ①Tuesday 7:30 - 8:30, Monday 18:00 -19:00 ②Friday (2nd, 4th) 8:00 - 9:00

### Practice

Goals/Outline:

The purpose of this program is to understand the points in all steps of dental implant treatment: Clinical examinations, treatment planning, surgery, prosthetic procedures and maintenance. Several clinical cases will presented and treatment planning of these cases will be discussed.

Available programs:

Clinical Conferences Monday - Thursday 17:30-18:30, Friday 18:00 -19:00

## **Lab**

### Goals/Outline:

The purposes of this course are to clarify current clinical problems in dental implant treatment and to learn basic concept of planning researches to solve these problems. The researches, which are currently conducted by students in Department of Oral Implantology and Regenerative Dental Medicine, will be presented. The participants of this course will have chances to see animal experiments concerning dental implants and the related regenerative medicine.

### Available programs:

to be announced

## **7. Grading System**

Based on attendance and attitude. Furthermore, publications in scientific journals and presentations in scientific meetings will be considered.

## **8. Prerequisite Reading**

Knowledges in cell biology, biological material science, oral anatomy, physiology, pharmacology, radiology, internal medicine, oral surgery, periodontology, prosthodontics are required for this program. Read the textbooks of these subjects. Please be able to make a presentation of your related or interested studies published in international journals briefly (1~2min).

## **9. Reference Materials**

- Clinical Periodontology and Implant Dentistry.Jan Lindhe/Wiley-Blackwell
- Dental Implant Prosthetics.Carl E.misch/Publisher:Elsevier MOSBY

## **10. Important Course Requirements**

None

## **11.Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Department of Oral Implantology and Regenerative Dental Medicine  
Shohei Kasugai  
Phone 03-5803-5934  
Email:kas.mfc@tmd.ac.jp

## **13. Note(s) to students**

Lecture and journal club are in English. Students having interests in this field are welcome. Students are encouraged to participate in discussions actively.

# Plastic and Reconstructive Surgery

Lecture	(code: 7 0 1 1	1st year	:6units)
Practice	(code: 7 0 1 2	1st~2nd year	:4units)
Lab	(code: 7 0 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Junior associate professor Hikoki Moki

Contact person: Hiroki Mori, Junior associate professor E-mail moriplas@tmd.ac.jp

## 2. Classroom/Lab

Confirm to the instructor in charge before lecture.

## 3. Course Purpose and Outline

In the plastic surgery, a thinking process to choose surgical procedure is more important than surgery itself. In this course, we lecture on the preoperative treatment, process to choose operative procedures, and postoperative treatment.

## 4. Course Objective(s)

Understanding process to choose surgical procedures and practicing them

## 5. Format

Small-group session is adopted in order for intense discussion.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals:

To recognize meaning and necessity of plastic surgery, and to understand objective disorders and treatments for them.

Outline:

Explaining concepts of 4 major objectives of plastic surgery, 1: Congenital anomaly, 2: Traumatic deformity, 3: Deformity after tumor resection and 4: Aesthetic surgery. Furthermore, explaining basic techniques (excision & suture, skin graft, flap transfer and other tissue transplantation) and advanced techniques (microsurgery and craniofacial surgery) as therapeutic modality for objective disorders.

Available programs:

Lecture Every Wednesday 8:00~9:30

Research meeting Tuesday 20:00~20:30

Journal Club Tuesday 20:30~21:00

### Practice

Goals:

To decide a suitable treatment for each disorder, to handle surgical instruments and sutures correctly and to explain selected therapeutic procedures logically and perform them.

Outline:

Deciding a therapeutic strategy for each case in preoperative conference, and participating in operations.

Available programs:

Seminar Every Tuesday 18:30~20:00 Preoperative case conference Every Tuesday 18:00~18:30

Meeting about the operative procedures Every Tuesday 18:00~18:30

Ward round Monday to Friday 9:00~12:30, 17:00~18:00

Operation Monday to Friday 9:00~17:00

## Lab

### Goals:

Revealing disease mechanism of objective disorders of plastic surgery, and developing new therapeutic approaches based on experimental results.

### Outline:

Acquiring techniques for experimentation and analyzing obtained experimental data.

Participation in a research group As needed

Experimentation of plastic surgery

#### Contents

- 1) Microsurgery, vascularized free tissue transfer, neurorrhaphy
- 2) Culture of keratinocyte, fibroblast, and melanocyte
- 3) Various immunostaining, insitu hybridization, mRNA expression analysis
- 4) Evaluation of blood supply to various flaps using indocyanine green.
- 5) Coculture study of keratinocytes and dorsal-root-ganglion-derived cells
- 6) Objective assessment of facial paralysis, and selection of optimal reconstructive procedure

### Available programs:

Meeting about the operative procedures Every Tuesday 18:00~18:30

Research meeting Tuesday 20:00~20:30

Electromyogram Friday 9:00~12:00

## 7. Grading System

Grade is given mainly based on the presentation of progress status and attitude to lectures. The publications of research outcome are also evaluated.

## 8. Prerequisite Reading

Lecture: Participating after reading relevant part of the reference book.

Practice: Before practice, think about optimal operative procedures by yourself.

## 9. Reference Materials

- 1) Grabb & Smith Grabb and Smith's Plastic Surgery (7 HAR/PSC)  
Thorne, Charles H., M.D. (EDT)/ Chung, Kevin C., M.D. (EDT)/ Gosain, A
- 2) Plastic Surgery, 3rd ed., in 6 vols. With Expert Consult Premium Edition P.C.Neligan(ed.)
- 3) Essentials of Plastic Surgery, Second Edition Jeffrey E. Janis ed.

## 10. Important Course Requirements

Lecture and practice can become meaningful by prior and post self-learning. Japanese medical license is necessary to participate in an operation or clinical study.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Monday to Friday 9:00-17:00

Contact person: Hiroki Mori, junior associate professor E-mail moriplas@tmd.ac.jp

## 13. Note(s) to students

It is advisable that journal club and research conference are held within 5 persons, although the number is not strictly limited.

# Head and Neck Surgery

Lecture	(code: 7 0 2 1	1st year	:6units)
Practice	(code: 7 0 2 2	1st~2nd year	:4units)
Lab	(code: 7 0 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Takahiro Asakage  
Junior associate Professor: Yousuke Ariizumi  
Contact person: Yosuke Ariizumi  
Department of Head and Neck Surgery  
E-mail: ariizumi.hns@tmd.ac.jp

## 2. Classroom/Lab

Depend on the programme.

## 3. Course Purpose and Outline

Develop excellent human resources of head and neck surgeon.  
For the purpose, it is needed to understand anatomy, pathology, the way of diagnosis, and treatment strategy.  
In addition, research about new clinical technique or clinical anatomy.

## 4. Course Objective(s)

- ① Understand clinical feature of head and neck tumor.
- ② Acquire diagnosis skills of head and neck tumor.
- ③ Be able to select the suitable treatment method.
- ④ Research and development for new knowledge about head and neck anatomy or treatment

## 5. Format

The format comprises a small number of students.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

We mainly deal with head and neck tumours. Lectures are focused on the clinical characteristics and pathogenesis of these head and neck tumours. Furthermore, various treatment strategies for these tumours are shown.

Available programs:

Lecture: as needed

Special Lecture: as needed

Seminar: monthly, as needed

Journal Club: every Tuesday, 8:20-9:00

### Practice

Goals/Outline:

There are three goals:

- First, to master the diagnostic techniques for head and neck tumours, by means of physical and endoscopic examinations.
- Second, to understand the findings of imaging utilities, such as X-ray, CT, MRI and US.
- Third, to properly select the appropriate treatments for head and neck tumours in consideration of function and appearance.

Available programs:

Conferences:

Outpatients with head and neck tumours: every Thursday 17:30-18:30

Inpatients with head and neck tumours (joint with plastic surgeon and neurosurgeon, as needed): every Tuesday 18:30-20:00

The patients who receive radiation therapy (joint with radiologists): biweekly Thursday 18:00-18:30

Ward rounds: every Tuesday 9:00-11:00

## **Lab**

Goals/Outline:

(1) Anatomy of the skull base.

(2) Development of new surgical techniques in cancer treatment.

(3) Clinical application of new devices in endoscopic examination.

(4) Surgical treatment of paediatric head and neck tumours.

Available programs:

Participation in each study group: as needed

## **7. Grading System**

The evaluation of results is based on contents of reports, presentations at conference and original articles.

## **8. Prerequisite Reading**

The knowledge about general otorhinolaryngology and surgical oncology are required.

## **9. Reference Materials**

not available.

## **10. Important Course Requirements**

nothing in particular

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:00~17:00

## **13. Note(s) to students**

# Radiation Therapeutics and Oncology

Lecture	(code: 7 0 3 1	1st year	:6units)
Practice	(code: 7 0 3 2	1st~2nd year	:4units)
Lab	(code: 7 0 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Ryoichi Yoshimura, Junior Associate Professor: Kazuma Toda, Assistant Professor: Keiko Nakagawa  
Contact person: Ryoichi Yoshimura, E-mail ysmrmrad@tmd.ac.jp

## 2. Classroom/Lab

Check for charge instructors beforehand, because it's different depending on programs.

## 3. Course Purpose and Outline

To understand the influence of radiation on the body or tumor and the optimal radiation therapy.

## 4. Course Objective(s)

- ① Explain about external beam radiotherapy, brachytherapy, and radiopharmaceutical therapy
- ② Explain about the multimodal therapy including radiation therapy.
- ③ Propose the optimal radiation therapy plan according to each malignant tumor.

## 5. Format

Small number system is employed.  
A chance of discussion is held aggressively.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/Outline

Postgraduate courses are made to study clinical radiation medicine to become specialist in oncology

Available programs:

Lecture June, 2016. Minimal Invasive Treatment for Cancer. II: Multidisciplinary Treatment

October, 2016. Radiation Oncology

### Practice

Goals/Outline:

Students of our section are expected to obtain a doctorate degree by presenting thesis

Available programs:

Morning conference (Mon.~Fri. 8:20~8:40)

Radiation therapy planning conference (Thu. 17:00~)

Clinical conference in the area of radiation oncology

### Lab

Goals/Outline:

Postgraduate courses are made to do retrospective study analyzing the effect of radiation therapy and prognostic factors, and to do planning of the prospective study based on the result of the retrospective study.

Available programs:

Participation in a research group

**7. Grading System**

Estimated overall based on the participation situation to the lectures and the practices and the study contents.

**8. Prerequisite Reading**

Understand the base of radiation biology and physics.

**9. Reference Materials**

None

**10. Important Course Requirements**

None

**11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

**12. Office Hour**

Ryoichi Yoshimura E-mail ysmrmrad@tmd.ac.jp

**13. Note(s) to students**

None

# Maxillofacial Anatomy

Lecture	(code: 8 2 1 1	1st year	:6units)
Practice	(code: 8 2 1 2	1st~2nd year	:4units)
Lab	(code: 8 2 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Shunichi Shibata

Reserch Associate: Shun-ichi Shikano, Part-time Lecturer: Rei Sato

Contact person: Shunichi Shibata E-mail sshibata.mfa@tmd.ac.jp

## 2. Classroom/Lab

Maxillofacial Anatomy (6th floor, in MD tower)

## 3. Course Purpose and Outline

In order to take ability of assess biological phenomena from the viewpoints of morphology, we teach various structures in maxillofacial regions from the standpoints of gross anatomy, histology, and molecular biology. In addition,we teach methodology of organ/tissue culture, light and electron microscopy, and molecular biology.

## 4. Course Objective(s)

1) To explain the structural features and developmental process of maxilla and mandible. 2) To explain structural features and developmental process of teeth. 3) To explain the strucure and developmental process of temporomandibular joints including articular disc and condylar caertilage. 4) To understand the process of making samples of light and electron microscopy. 5) To understand the methods of organ culture of tooth germ, bone and caretilage. 6) To explain the principles of immunohistochemistry and in situ hybridization.

## 5. Format

Teachers present their own experimental data, and discuss topics presented.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To obtain the ability of appreciating various biological reactions morphologically, lecturers explain the function of various oral organs from the viewpoints of morphology. Further, lecturers explain their structural features using light and electron microscopy.

Available programs:

Lecture Oct. 11- Dec. 20 Thursday 13:00-15:00

Seminar (1) Wednesday 9:30-11:00 or 10:30-12:00

### Practice

Goals/Outline:

Learn how to make samples for histological observations, execute practical procedures, and observe samples practically. Next, investigate references related to findings obtained and make a discussion, then present their data.

Available programs:

Seminar (2) Wednesday 13:00-14:30

## **Lab**

Goals/Outline:

Plan experimental system to investigate development, growth, and regeneration of oral tissues (tooth germ, periodontal tissues, jaw bone etc.), the execute it. To evaluate results, various techniques including making histological sections, staining, and taking pictures should be mastered.

Available programs:

Seminar (3) First Tuesday 9:00–10:30

## **7. Grading System**

Evaluate is based on attendance for lecture and practice, and contents of studies including discussion on topics presented.

## **8. Prerequisite Reading**

Confirm contents of schedule which is distributed before lectures and check structures features of corresponding organ/tissue by leaning textbooks/reference books.

## **9. Reference Materials**

1)Wakita M et al. ed "Oral Histology and Embryology"(ISHIYAKU PUBLISHERS, inc) 2)Wakita M et al. ed "Oral Anatomy"(ISHIYAKU PUBLISHERS, inc) 3) ) Sperber GH著 Craniofacial Embryogenetics and Development 2nd ed. People's medical publishing house - USA

## **10. Important Course Requirements**

none

## **11.Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Maxillofacial Anatomy Shunichi Shibata Mondy–Friday 9:00–12:00 E–mail sshibata.mfa@tmd.ac.jp

## **13. Note(s) to students**

Correspond to contact person before you take a course.

# Cognitive Neurobiology

Lecture	(code: 8 2 2 1	1st year	:6units)
Practice	(code: 8 2 2 2	1st~2nd year	:4units)
Lab	(code: 8 2 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Narumi Katsuyama\* Assistant Professor E-mail katz.cnb@tmd.ac.jp  
Nobuo Usui Assistant Professor E-mail usui.cnb@tmd.ac.jp  
\*: Contact person

## 2. Classroom/Lab

Please contact the instructor (\*) in advance.

## 3. Course Purpose and Outline

To understand complex brain functions, both basic knowledge in the textbooks and advanced knowledge associated with specific research topics are important. Lectures and practice are designed to help students understand how higher brain functions, such as motor, visual, and sensory functions, are represented in neuronal activities in the cerebral cortex.

## 4. Course Objective(s)

The aim of this course is to understand the basic knowledge and concepts for cortical mechanisms underlying higher brain functions through the lectures and practice.

## 5. Format

In a small group (up to 4) for technical reasons.

## 6. Course Description and Timetable

Check with the lecturer in charge for the program which is not specifically scheduled.

### Lecture

1. Lecture: basic training of the data collection and analysis for functional magnetic resonance imaging (fMRI) technique.
2. Special lecture: frontiers of researches on higher brain functions by invited speakers.

Available programs:

Lecture: December 4th – 6th, 2018, 17:30 – 19:30

Special Lecture: 4 lectures in the 2nd semester (to be announced)

### Practice

Practice covers fMRI, psychophysical experiments and others.

Available programs:

There are several on-going research programs. Applicants will choose one/some in consultation with instructors.

### Lab

Students can attend to one of the following research projects.

Available programs:

On-going research themes include (1) motor control by cerebral cortex, (2) visual depth perception, (3) cortical representation of body images. They are studied by using psychophysical and fMRI experiments with humans, and electrophysiological and behavioral experiments with non-human primates.

## **7. Grading System**

Evaluation is to be made based on the attendance rate, the contents of discussion, and reports submitted. When students are involved in research practice, presentation in meetings and symposia is also be evaluated.

## **8. Prerequisite Reading**

Reading textbooks for neuroscience in advance is desirable (ex. Physiology of Behavior, 11 th Ed. by N. R. Carlson, Pearson Education, Inc, 2013).

## **9. Reference Materials**

Related handouts and monographs will be given in the lectures.

## **10. Important Course Requirements**

none

## **11. Lectures in English**

All lectures are conducted in Japanese.

## **12. Office Hour**

Contact person; Narumi Katsuyama, Ph.D., E-mail [katz.cnb@tmd.ac.jp](mailto:katz.cnb@tmd.ac.jp)

## **13. Note(s) to students**

# Molecular Craniofacial Embryology

Lecture	(code: 8 2 3 1	1st year	:6units)
Practice	(code: 8 2 3 2	1st~2nd year	:4units)
Lab	(code: 8 2 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Sachiko Iseki, Associate professor: Masaaki Ikeda, Assistant professor: Masaki Takechi  
Part-time lecturers: Shumpei Yamada, Youichirou Ninomiya, Toshiko Furutera  
Contact person: Sachiko Iseki E-mail: s.iseki.emb@tmd.ac.jp

## 2. Classroom/Lab

Venue depends on each program, students are requested to contact the instructors for each program.

## 3. Course Purpose and Outline

Understanding of basic molecular mechanisms of craniofacial development and tissue regeneration

## 4. Course Objective(s)

Achievement of understanding in methods and strategy to study molecular craniofacial embryology and tissue regeneration

## 5. Format

Lectures and practices are held to a group of small number of students. Since laboratory works are carried out individually, it is advised to contact each instructor about the detail.

## 6. Course Description and Timetable

Confirm with the instructor in charge for the program.

### Lecture

Goals/Outlines: To provide students with understanding the basics of molecular mechanisms of craniofacial morphogenesis, including craniofacial malformations associated with gene mutations.

Available programs:

Lecture Thursday between May.10 and July.26  
Special Lecture 2 times per year  
Journal Club TBA. Please contact the instructor

### Practice

Goals/Outlines: Instructors and lab members present "Research Progress" including basic methods of experimental developmental biology and recent genetic engineering techniques to study molecular mechanisms of craniofacial morphogenesis and the regeneration as well as craniofacial malformations associated with gene mutations.

Available programs:

Research Progress TBA. Please contact the instructor

### Lab

Goals/Outlines: Laboratory works are carried out to understand molecular mechanisms of craniofacial morphogenesis and the regeneration by using basic and advanced methods of histology, molecular biology and recent genetic engineering techniques. Our current focuses are: midface development, skull bone development and regeneration, tooth root formation.

Available programs:

Participation in a research group

### **7. Grading System**

Evaluation is made based on the attendance to the lectures and on the research reports and/or presentation during the course.

### **8. Prerequisite Reading**

Contact the course organizer

### **9. Reference Materials**

1. Cranofacial Embryogenetics and Development by Geoffrey H. Sperber People's Medical Publishing House USA, Ltd. 2. Developmental Biology Scott F. Gilbert Sinaue 3. Principles of Development by Lewis Wolpert & Cheryll Tickle Oxford University Press

### **10. Important Course Requirements**

Attending the lectures, introducing papers and research presentation

### **11. Lectures in English**

Lectures will be partially conducted in English.

### **12. Office Hour**

Contact: Sachiko Iseki s.iseki.emb@tmd.ac.jp

### **13. Note(s) to students**

None

# Cellular Physiological Chemistry

Lecture	(code: 8 2 4 1	1st year	:6units)
Practice	(code: 8 2 4 2	1st~2nd year	:4units)
Lab	(code: 8 2 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor: Ken-ichi Nakahama  
Part-time Lecturer: Hiroshi Fujita, Yasuki Ishizaki, Masao Saito  
Contact person: Ken-ichi Nakahama E-mail: nakacell@tmd.ac.jp

## 2. Classroom/Lab

Venue depends on each program, students are requested to contact the instructors for each program.

## 3. Course Purpose and Outline

Lecture for the understanding of pathological and physiological conditions by cellular and molecular methods.

## 4. Course Objective(s)

Understanding of pathological and physiological conditions by cellular and molecular methods.

## 5. Format

Lectures and practices are held to a group of small number of students. Since laboratory works are carried out individually, it is advised to contact each instructor about the detail.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Available programs:

Course Lecture: Sep. 11- Dec. 18, Tuesday 9:30~10:30  
Special Lecture: Oct. 25, Nov. 8, 22, Dec. 13 (17:30-19:30)  
Journal Club: Every Tuesday 9:30~10:30  
Meeting: Everyday 9:30~10:00

### Practice

Goals: To understand how to investigate the mechanism of various diseases onset and development.

Outlines: The experimental techniques will be retrieve the goal mentioned above.

Available programs:

Presentation of Research, The first Tuesday of every month 9:30~10:30

### Lab

Goals: To equip the science sense

Outlines: After studying isolation and culture procedure of the cell from a living body, the pathogenic mechanism of various diseases onset and the target of the drugs are analyzed using these cultured cells. Through the reading the journals, planning of an experimental design, method and carrying out research training by themselves are studied and mastering to make an experiment note and an English paper.

Available programs:

Participation in a research group

### **7. Grading System**

Evaluation is made based on the attendance to the lectures and on the research reports and/or presentation during the course. Furthermore, experimental problem-solving skills are evaluated in Lab meeting or the presentation in scientific society

### **8. Prerequisite Reading**

None

### **9. Reference Materials**

None

### **10. Important Course Requirements**

None

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

Wed. Thu. 17:00 – 19:00, Please send E-mail to K. Nakahama beforehand (nakacell@tmd.ac.jp)

### **13. Note(s) to students**

None

# Biodesign

Lecture	(code:	1st year	:6units)
Practice	(code:	1st~2nd year	:4units)
Lab	(code:	2nd~3rd year	:8units)

1. Instructor(s)

2. Classroom/Lab

Not offered

# Maxillofacial Surgery

Lecture	(code: 8 2 7 1	1st year	:6units)
Practice	(code: 8 2 7 2	1st~2nd year	:4units)
Lab	(code: 8 2 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Tetsuya Yoda  
Junior Associate Professor: Satoshi Yamaguchi,  
Assistant Professor: Hiroyuki Yoshitake, Yasuyuki Michi, Kouichi Nakakuki, Keiichi Morita  
Contact person:Satoshi Yamaguchi TEL 5803-5498 E-mail yamachan.mfs@tmd.ac.jp

## 2. Classroom/Lab

Each lecture is given in the different venue. Please ask the instructor and confirm the location of the venue.

- 1) Ward rounds: 8F Ward in Dental Hospital
- 2) Preoperative Conference: 9F Conference Room
- 3) CLP Clinic: 6F
- 4) FD Conference, Tumor Clinic: 6F
- 5) Seminar for Graduate students, Special lecture, Journal Club: at any time.

## 3. Course Purpose and Outline

- To understand the pathological condition and etiology of the disease occurred in the oral and maxillofacial regions.
- To experience the basic skills and knowledges about prevention, diagnosis, and treatment for these diseases.
- To train self-problem solving skills.

## 4. Course Objective(s)

- To explain the etiology and condition about diseases occurred in the oral and maxillofacial regions
- To explain the diagnosis, treatment, and prevention for these diseases
- To select the most suitable treatment strategies for each cases
- To establish the study plan and interpret the data appropriately.
- To explain the preparation and technique of the presentation and article writing.

## 5. Format

In principle, small group system is applied. And independency of the participants is respected.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

This lecture focused on diagnosis, treatment and prevention of congenital and acquired disease in the oral and maxillofacial region. In addition, you can study about recent diagnosis and treatment strategies of this field.

Available programs:

Course Lecture Apr. 17- Jun. 19, Tuesday 8:30~12:00

Special Lecture July, 2016

Seminar for graduate students every 3 or 4 months

Educational lecture for freshmen Apr.-Jun, Evening

Journal Club Friday 17:00~18:00

## Practice

### Goals/Outline:

Goals of this practice are to understand the etiology, diagnosis, choice of examination, laboratory data, and choice of optimum treatment for the diseases in the oral and maxillofacial region including Cleft Lip and palate, Facial Deformity and Oral and Maxillofacial tumor, and so on. Moreover, you can increase the knowledge about surgery using biomaterials and surgical reconstruction with anastomosis technique.

### Available programs:

Conference for new patients Tuesday & Thursday 17:00~18:00  
Ward rounds Friday 13:15~14:00  
Preoperative Conference Friday 14:00~15:00  
Facial Deformity Clinic • Conference Every other week Monday 13:00~15:00 • Friday 15:00~16:00  
Cleft Lip & Palate Clinic • Conference Wednesday 13:00~16:00 • The third week Friday 15:00~16:00  
Tumor Clinic • Conference Monday 13:00~16:00 Friday 9:00~12:00 • 18:30~19:30

## Lab

### Goals/Outline:

Goals of these Labs are to learn the methods for study planning, study performing, evaluation methods, conference presentation and thesis writing.

### Available programs:

1. Clinical study of the Facial deformity and CLP
2. Basic study of the bone regeneration
3. Basic and clinical study of the TMJ disorders.
4. Basic and clinical study of the oral tumors
5. Genetic diagnosis and treatment of the oral cancers

## 7. Grading System

General evaluation is based on the attendance situation for the above-mentioned lectures, practices, and labs. Study content is also a subject for the estimation.

## 8. Prerequisite Reading

Please confirm the date, time, the place and the contents of each lecture and practice beforehand. Please participate in discussion actively.

## 9. Reference Materials

Operative Oral and Maxillofacial Surgery/ John D. Langdon, Peter A. Brennan: Hodder Education, 2011

## 10. Important Course Requirements

None

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Satoshi Yamaguchi TEL 5803-5498 E-mail yamachan.mfs@tmd.ac.jp Mon:13:00~17:00, Fri:10:30~12:00

## 13. Note(s) to students

None

# Maxillofacial Orthognathics

Lecture	(code: 8 2 8 1	1st year	:6units)
Practice	(code: 8 2 8 2	1st~2nd year	:4units)
Lab	(code: 8 2 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Keiji Moriyama Associate Professor Shoichi Suzuki  
Junior Associate Professor Takuya Ogawa  
Assistant Professor Michiko Tsuji, Norihisa Higashihori,  
Jun Miyamoto, Yukiho Kobayashi  
Contact person: Takuya Ogawa E-mail t-ogawa.mort@tmd.ac.jp

## 2. Classroom/Lab

Information will be provided from the instructor beforehand.

## 3. Course Purpose and Outline

The purpose of this program of Maxillofacial Orthognathics is to provide information related to craniofacial growth and development, and stomatognathic function in order to develop basic knowledge and skills for the treatment of the patients with a wide variety of malocclusion. It also provides valuable information of diagnosis, and treatment planning, for orthodontic and orthognathic therapies of the patients with jaw deformities and congenital craniofacial anomalies.

## 4. Course Objective(s)

The objectives of the program are to explain not only the mechanism to cause congenital anomalies and growth abnormalities of the musculoskeletal system in craniofacial region, but also diagnosis and treatment planning.

## 5. Format

a small group

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

This course aims to provide an advanced understanding of the anomalies in craniofacial region caused by prenatal or postnatal growth abnormalities from the aspect of the clinical dentistry. In addition, it provides valuable knowledge on genetic background in various congenital diseases, and the latest information of diagnosis and treatment planning.

Available programs:

Course Lecture Apr. 1st- Mar. 31st - Friday 8:00~9:00  
Special Lecture Jun 1st, Jun 29th Jul 20th, Sep 7th, 17:00~  
Seminar 17:00~19:00 - Fridays

### Practice

Comprehensive care by a team of specialists including maxillofacial surgeons, orthodontists, prosthodontists, speech therapists etc. is needed for the treatment of the patients with cleft lip and palate and other craniofacial anomalies. The Graduate Program provides the clinical education of orthodontics as a part of the multi-disciplinary approach for such patients.

Available programs:

Clinical meetings Schedule will be informed by instructors.  
Research seminar Schedule will be informed by instructors.  
Professor diagnosis Tuesdays and Fridays  
FD conferences 15:00~16:00 - every other Friday  
CLP conferences 15:00~16:00 - Friday

**Lab**

The laboratory research course provides education on basic and clinical sciences of craniofacial growth and development, such as molecular biology and molecular genetics of congenital anomalies. It also includes clinical and epidemiological studies on a wide variety of malocclusion and orthodontic treatment.

Available programs:

Participation in research group voluntary

**7. Grading System**

Grading will be performed based on achievement of the study, as well as a record of attendance to lectures, clinical practice and laboratory research.

**8. Prerequisite Reading**

Prior to a lecture, practice and lab, confirm lecture contents and learn necessary knowledge by reference books beforehand.

**9. Reference Materials**

Contemporary Orthodontics 5th Ed., W.R.Proffit, MOSBY • Orthodontics Current Principles & Techniques 4th Ed., T.M.Grabner, ELSEVIER/MOSBY • Contemporary Treatment of Dentofacial Deformity, W.R.Proffit, MOSBY • Gorlin's Syndrome of the Head and Neck, 5th Ed., Hennekam/Krantz/Allanson, Oxford University • Atlas of Orthodontic Treatment for Patients with Birth Defects, T.Kuroda, Needham Press

**10. Important Course Requirements**

nothing in particular

**11. Lectures in English**

Lectures will be partially conducted in English.

**12. Office Hour**

Contact by email.

**13. Note(s) to students**

None

# Maxillofacial Prosthetics

Lecture	(code: 8 2 9 1	1st year	:6units)
Practice	(code: 8 2 9 2	1st~2nd year	:4units)
Lab	(code: 8 2 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Junior Associate professor Yuka Sumita,  
Assistant professor Mariko Hattori, Takafumi Otomaru

## 2. Classroom/Lab

Lecture: research room of Maxillofacial prosthetics 2nd floor of Building No.10  
Special Lecture: Lecture room No.3, 2F Building No.7  
Practice and Lab: Clinic for maxillofacial prosthetics 6th floor of dental hospital building (Please confirm by e-mail in prior)

## 3. Course Purpose and Outline

Department of Maxillofacial Prosthetic is the special unit of the prosthodontic and/or prosthetic treatment for patients with defects in oral and/or maxillofacial regions.

## 4. Course Objective(s)

The main objective of this course is to provide students with opportunity to gain sound understanding of the restoration of functional and esthetic disorders of oral and/or maxillofacial areas that are caused by congenital developmental or acquired diseases by means of the high-advanced dental and medical cares.

## 5. Format

Lecture and discussion. Every candidate has to address their own opinion freely to the others.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The main objective of this course is to provide students with opportunity to gain sound understanding of the restoration of functional and esthetic disorders of oral and/or maxillofacial areas that are caused by congenital developmental or acquired diseases by means of the high-advanced dental and medical cares.

Available programs:

Lecture: Tuesday 16:00~17:00 and/or Wednesday 17:00~18:00 of May-July  
Special Lecture: Sep.5, Sep.12, Sep.19, Sep.26 (subject to change)  
Seminar: 17:00~18:00 every Wednesday

## **Practice**

Goals/Outline:

In order to master the treatment planning and the prosthetics diagnosis for the maxillofacial patients, join the clinical work at 6F clinic room of dental hospital building, Yushima Campus.

Available programs:

Clinic Observation: 8:50-16:00 Mon-Fri

Professor's diagnosis: 9:00-10:00 every Wednesday

CLP conference: 15:00-16:00 4th Friday

## **Lab**

Goals/Outline:

Our department is the special unit for the prosthetics treatment for patients with congenital or acquired defects in head and neck regions. The main goal of the research is to establish a novel theory and feedback it to the clinic to improve the quality of life of each patient. In this respect, we are focusing on several projects as follows.

1. Diagnosis of functional impairment in patients with a maxillofacial defect
2. Treatments for functional rehabilitation of patients with a maxillofacial defect
3. Evaluation on masticatory function in patients with a maxillofacial defect
4. Speech evaluation in patients with a maxillofacial defect
5. Development of new materials for facial prosthesis

Available programs:

Participation in research group voluntary

## **7. Grading System**

Comprehensive assessment is done including attendance for lectures, practice and lab work.

Attendance 50% , Attitude 30%, Report 20%

## **8. Prerequisite Reading**

Please read textbooks in prior to attend the class.

## **9. Reference Materials**

Maxillofacial Rehabilitation 3rd edition Quintessence book written by John Beumer III

## **10. Important Course Requirements**

Attend the classes 2/3 over.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

08:30-17:00 Mon-Fri

## **13. Note(s) to students**

If necessary, please contact us by e-mail. [yuka.mfp@tmd.ac.jp](mailto:yuka.mfp@tmd.ac.jp)

# Cell Biology

Lecture	(code: 7 0 4 1	1st year	:6units)
Practice	(code: 7 0 4 2	1st~2nd year	:4units)
Lab	(code: 7 0 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Takao Nakata E-mail info.cbio@tmd.ac.jp

## 2. Classroom/Lab

Cell biology laboratory (18F M&D tower)

## 3. Course Purpose and Outline

the course covers introduction to modern cell biology.

## 4. Course Objective(s)

Major discovery of cell biology will be presented and why the discovery was achieved will be discussed.

## 5. Format

Small group (less than 5 participants)

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Principles and techniques of cell biology will be reviewed from historical point of view. Emphases are made on the fine structure of the cells and the power of microscopy.

Available programs:

Special Lecture Fine Structure of the Cells

Seminar Cell Biology Seminar

Journal Club Cell Biology Journal Club (Every Tuesday PM3:00)

### Practice

Goals/Outline

Participants will learn how to design experiments and evaluate the results under the supervision of our staffs, using the data of on-going projects in our lab.

Available programs:

Practice of Cell Biology

### Lab

Goals/Outline:

Basic cell biology techniques will be presented including cell culture, transfection, and light-microscopy

Available programs:

Cell Biology Lab

## 7. Grading System

Students will be graded by their participation (70%) and presentation at the scientific meeting outside the university (30%).

**8. Prerequisite Reading**

nothing special

**9. Reference Materials**

molecular biology of the cell.

**10. Important Course Requirements**

nothing special

**11. Lectures in English**

Lectures will be partially conducted in English.

**12. Office Hour**

10:00–17:00

**13. Note(s) to students**

nothing special

# Medical Biochemistry

Lecture	(code: 7 0 5 1	1st year	:6units)
Practice	(code: 7 0 5 2	1st~2nd year	:4units)
Lab	(code: 7 0 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Yutaka Hata (Full professor) and three assistant professors.  
Contact person: Yutaka Hata E-mail yuhammch@tmd.ac.jp

## 2. Classroom/Lab

To be announced when scheduled.

## 3. Course Purpose and Outline

The key words of our current studies are as follows: ageing, *Caenorhabditis elegans*, cancer, drug development, sarcopenia, signal transduction and tumor suppressor. The details are described as follows. We give lectures about our current studies to graduate students and others, and provide graduate students with the opportunity to participate in them.

## 4. Course Objective(s)

The students are requested through these courses to obtain a comprehensive integrated knowledge of a wide variety of topics, which will be important issues of life science in the next decades.

## 5. Format

Please consult the contact person.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

We are studying the tumor suppressive Hippo pathway and RASSF proteins. They are instrumental in the regulation of cell proliferation, cell polarity, cell differentiation and cell death. They are implicated in various human diseases and could be new therapeutic targets. As TAZ, the co-transcriptional factor which is regulated by the Hippo pathway, plays a pivotal role in the skeletal muscle homeostasis, we are developing TAZ activators as drugs to prevent and treat sarcopenia (skeletal muscle atrophy with ageing). Furthermore, in order to facilitate the evaluation of the candidate drugs, we are aiming to generate the mouse models that mimic human progeria diseases and develop sarcopenia in a short time. We have also launched a project to study frailty (a common geriatric syndrome that causes poor health outcomes in elderly people) in *Caenorhabditis elegans*.

Available programs:

Lecture Thursday 18:00~20:00, Friday 10:00~11:30, Friday 18:00~20:00, and Saturday 10:30~12:00.

Special Lecture To be announced when scheduled.

Seminar To be announced when scheduled.

Journal Club Saturday 9:30~10:30.

Conference To be announced when scheduled.

### Practice

Goals/Outline:

To gain a wide knowledge of cancer biology and epigenetic changes underlying various human diseases through the study on Hippo pathway, RASSF, and stress granules.

Available programs:

Weekly progress report. Thursday 18:00~20:00, Friday 10:00~11:30, Friday 18:00~20:00, and Saturday 10:30~12:00

### **Lab**

Goals/Outline:

To perform biochemical, molecular biological, and cell biological experiments.

Available programs:

Participation in our research.

### **7. Grading System**

The grading is based on the commitment to the research and the seminars.

### **8. Prerequisite Reading**

Please read the standard textbooks, such as "Molecular Biology of the Cell".

### **9. Reference Materials**

Iwasa H, Jiang X, Hata Y. RASSF6; the Putative Tumor Suppressor of the RASSF Family. *Cancers (Basel)*. 9, 2415–2426. 2015  
Kodaka M, Hata Y. The mammalian Hippo pathway: regulation and function of YAP1 and TAZ. *Cell Mol Life Sci*. 72, 285–306. 2015

### **10. Important Course Requirements**

All participants are requested to be punctual.

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

No fixed office hour, but you can get contact with Professor Hata through the e-mail to have an appointment if necessary.

### **13. Note(s) to students**

Please do not fail to get more detailed information in advance before you determine to select this course.

# Joint Surgery and Sports Medicine

Lecture	(code: 7 0 6 1	1st year	:6units)
Practice	(code: 7 0 6 2	1st~2nd year	:4units)
Lab	(code: 7 0 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor Hideyuki Koga E-mail koga.orj@tmd.ac.jp

## 2. Classroom/Lab

Venues are different according to the program.

## 3. Course Purpose and Outline

To understand the anatomy, physiological function, and disease of joint tissue. To understand the process of articular cartilage degeneration and discuss the current topics for joint regeneration therapy. To learn technics for isolation, expansion and differentiation of tissue derived mesenchymal stem cells in adults.

## 4. Course Objective(s)

Clinicals: The goal of this course is to train graduate students in the majority to become established orthopedic surgeons who have expertise in joint related diseases and who have abundant experience to decide the most effective treatment against joint diseases. Science: The goal of this course is to train graduate students to acquire experimental skills related to cell transplantation therapy, such as isolation and maintenance of tissue derived mesenchymal stem cells, basic molecular biological techniques (Q-PCR, Microarray, etc.), histology, and basic cellular biological techniques (Flowcytometry etc.).

## 5. Format

Small group lectures are performed. Round of talks for reports and discussions on research are held as many as possible.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Bone and joint system which support living body consists of bone, cartilage, tendon, ligament, and muscle tissues. These tissues with these own characteristic maintain function from an early development to death. These tissues go through the distinctive process of degeneration and healing against diminished ability to maintain function and injury. Clarification of the background of the tissue degeneration, prevention of these degeneration, treatment procedure, and promotion and control of the healing are studied.

Available programs:

Lecture Every Tuesday 7:30-8:30

Every Thursday 8:00-8:30

Special Lecture As needed

Seminar As needed

Journal Club Every Thursday 7:30-8:00

Every Friday 7:30-8:00

### Practice

Goals/Outline:

The pathology and problems of the representative disease and injuries of bone, cartilage, tendon, ligament, and muscle tissues are studied, and diagnostic technique by physical examination, image studies, and pathology will be acquired. Diagnostic methods, examination procedures, and treatment procedure for bone and joint disease and injuries will be acquired, and therapeutic strategy and practice against bone and joint disease and injuries are studied.

Available programs:

Conference at the hospital ward: every Monday 7:35-8:45  
every Monday 16:00-17:00  
Ward round: every Monday 14:30-16:00  
every Monday 17:00-17:30  
Research progress: every Tuesday 7:30-8:30

## **Lab**

Goals/Outline:

Following studies have been extensively carried out in our laboratory with various biological and molecular biological techniques:

- Establishment of separation and proliferation of mesenchymal stem cells
- Elucidation of biological properties of mesenchymal stem cells
- Development of treatment of joint cartilage injury using mesenchymal stem cells
- Mechanism and treatment of joint pain
- Development of knee and hip arthroplasty which accommodates Japanese
- Promotion of anatomical knee anterior cruciate ligament reconstruction

Available programs:

Participation in a research group: As needed

## **7. Grading System**

Grading is performed in a comprehensive way based on the lecture, practice, and laboratory participation situation, reports about research, and conference presentations.

## **8. Prerequisite Reading**

At least two to three research themes will be picked up for each student. Students will be required to understand the background, purpose, and significance of each research theme and must plan the experiments (staffs will help this process).

## **9. Reference Materials**

For scientific topics, please refer to "Stem Cells, Arthritis and Rheumatology, and Osteoarthritis and Cartilage. For clinical topics, please refer to American Journal of Sports Medicine, Arthroscopy, Clinical Orthopedics and Related Research, Arthroplasty, and KSSTA Journal.

## **10. Important Course Requirements**

Each graduate student will be carefully mentored from staffs and senior students with regard to his/her PhD research themes. All students must join and discuss their research progresses at least once a month.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students are registered.

## **12. Office Hour**

9:00 - 17:00; E-mail to Hideyuki Koga: koga.orj@tmd.ac.jp

## **13. Note(s) to students**

# Biostructural Science

Lecture	(code: 8 3 0 1	1st year	:6units)
Practice	(code: 8 3 0 2	1st~2nd year	:4units)
Lab	(code: 8 3 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor Makoto Tabata

Contact person: Makoto Tabata E-mail tabatamj.bss@tmd.ac.jp

## 2. Classroom/Lab

Lecture: Seminar room in M & D Tower (Room number needs to be confirmed at the Students' Office)

Practice & Lab works: Biostructural Science Laboratory (8th floor, M & D Tower)

## 3. Course Purpose and Outline

Study of Histology, development, comparative morphology and evolution of the hard tissues, i.e. tooth, bone and scales

## 4. Course Objective(s)

You know the distinctive specification of the hard tissue study, and you will be able to choose the suitable methodology for your research.

## 5. Format

Tutor's lecture, student's presentation and discussion by all.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

"Advanced Oral Histology for Clinical Study" Jan - Feb, 18:00-20:00

### Practice

Using available data and published materials, review and evaluate the experimental strategies used in the respective studies and, through group discussions, understand the importance of the choice of proper method and its application.

### Lab

1. Sectioning methods: paraffin, plastic, freeze sections etc.
2. Staining methods: HE, immuno-staining, and in situ hybridization
3. Microscopic observation methods: Bio, polarizing, fluorescence, and electron microscope.

## 7. Grading System

Comprehensive evaluation based on attendance, attitude, and competence.

## **8. Prerequisite Reading**

You need fundamental knowledge of Hard tissue, i.e., the structure, the components, the development of the tooth and bone

## **9. Reference Materials**

"Koku no Hasei to Soshiki" 3ed, Nanzando (2015)

"Ha no Hikaku-kaibougaku" 2ed, Ishiyaku-shuppan (2014)

## **10. Important Course Requirements**

None

## **11. Lectures in English**

All lectures are conducted in Japanese.

## **12. Office Hour**

occasional

## **13. Note(s) to students**

None

# Pharmacology

Lecture	(code: 8 3 1 1	1st year	:6units)
Practice	(code: 8 3 1 2	1st~2nd year	:4units)
Lab	(code: 8 3 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Assistant Professor: Yukihiro Tamura  
Lecturer: Kiichi Nonaka, KHAN Masud, Kenichi Nagano

## 2. Classroom/Lab

Laboratory rooms for the pharmacology (M & D tower, 7th floor, north side)  
Seminar and lecture rooms of M & D tower

## 3. Course Purpose and Outline

Knowledge about hard tissue pharmacology is acquired through experimental studies *in vivo*, discussing the pharmacological actions exerted on bones and teeth.

## 4. Course Objective(s)

The goal of this class is to acquire information about pharmacological and histomorphometric approach, skills for hard tissue processing, and overall knowledge related to bones and teeth, and to be a person who can argue in the interdisciplinary field of studies in English.

## 5. Format

Make small number of member to perform research theme independently.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Make lectures concerning the drugs that affect the formation and resorption process of hard tissues such as bone and teeth and also provide information about the necessary techniques for hard tissue research.

Available programs:

Lecture Course Lecture May 29- Jun. 19 - Tuesday 14:00~16:00

Special Lecture 3 Lectures:

Seminar at any time

Journal Club Every Thursday, 16:00-17:00 (Discussion in English)

### Practice

Goals/Outline:

Make lectures for every topic of the research theme, discuss with them by obtaining the related papers and the research results and know the points and the background of research. Final goal is to make research plan, do experiments, and summarize data by themselves.

Available programs:

Bone club and journal club of each research group. At any time

## **Lab**

Goals/Outline:

Join each research group and know the techniques for hard tissue research. Final goal is to do perform experiments using these techniques and to evaluate the research data.

Available programs:

Join the research group. At any time

## **7. Grading System**

An overall assessment (grading) is performed based on the following points; 1) the participating rate of lectures, special lectures, and seminars, 2) the attitude toward academic meetings, 3) the submission of report on the indicated subjects, 4) frequency of presentation at academic meetings, 5) the behavior in class including the practical training.

## **8. Prerequisite Reading**

Learning fundamentals of Pharmacology and Tissue Engineering is requirement.

## **9. Reference Materials**

Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism. Wiley-Blackwell

## **10. Important Course Requirements**

It is better to make brush-up both the ICT levels for document retrieval and the English conversation skill.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person: Yukihiro Tamura E-mail: [tamu.hpha@tmd.ac.jp](mailto:tamu.hpha@tmd.ac.jp)

## **13. Note(s) to students**

None

# Connective Tissue Regeneration

Lecture	(code: 8 3 2 1	1st year	:6units)
Practice	(code: 8 3 2 2	1st~2nd year	:4units)
Lab	(code: 8 3 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Tamayuki Shinomura, Associate Professor  
Contact person:T. Shinomura E-mail t.shinomura.trg@tmd.ac.jp

## 2. Classroom/Lab

Since a venue depends on the program, please ask a contact person before taking part in the course.

## 3. Course Purpose and Outline

Connective tissues such as cartilage, bone, skin, and so on are characterized by the presence of abundant extracellular matrix. Therefore, their functions are highly dependent on the properties of their extracellular matrix. So, first of all, biochemical and molecular biological properties of extracellular matrix will be explained. Then, on that basis, we will have a better understanding of molecular background of how functional properties of each tissue are raised.

## 4. Course Objective(s)

To understand the properties of connective tissues and their functions, it is essential for us to understand the behavior of extracellular matrix molecules. So, the goal of this course is to give you basic knowledge of extracellular matrix necessary for studying connective tissues and to give you skills that you will need to read any paper related to your own study with ease.

## 5. Format

In an intimate setting, we want to have frank discussions with students as much as possible.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Connective tissues including cartilage, bone, skin, oral tissues, and so on are characterized by the presence of abundant extracellular matrix, ECM. Therefore, to gain a better understanding of these tissues, it is essential for us to know the molecular background of ECM. The lecture will concentrate especially on the molecular properties of cartilage matrix and the regulation of their genes during cartilage tissue formation. In addition to ECM molecules, we will be focused on the transcription factors that control the chondrogenic differentiation and the expression of cartilage characteristic ECM molecules such as type II collagen and aggrecan. After gaining the understanding of molecular mechanisms underlying a cartilage tissue formation, we would like to discuss the challenges for the future in the field of hard tissues regeneration.

Available programs:

Lecture, from Oct. 16 to Nov. 6 ( Tue. 10:00 ~ 12:00)

Special Lecture, on an as-needed basis

Study Session (Molecular Cell Biology and Extracellular Matrix), Every Thursday 13 : 00 - 15 : 00

### Practice

Goals/Outline:

Based on the latest research developments of cartilage, specific and general discussions will be held to invent and to stimulate new research.

Available programs:

Progress meeting (Cartilage), Every Tuesday 10 : 00 - 12 : 00

## **Lab**

### Goals/Outline:

Students can acquire basic technology related to the regulation of gene expression using established chondrogenic cell lines.

### Available programs:

Participation in our research group, on an as-needed basis

## **7. Grading System**

The participation rate in programs will weigh heavily (80%) in grade calculations. The comprehensive evaluation will be conducted based on the active participation in the programs (20%).

## **8. Prerequisite Reading**

You are required to learn a very basic knowledge of glycobiology by yourself using a textbook such as Biochemistry (eds: Lubert Stryer et. al) as a reference.

## **9. Reference Materials**

Biochemistry. 7th ed. (eds: Lubert Stryer et. al) W.H. Freeman and Company, New York, 2012

Molecular Cell Biology. 7th ed. (eds: Harver Lodish et. al) W.H. Freeman and Company, New York, 2013

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Anytime; Contact person: T. Shinomura (Connective Tissue Regeneration) , E-mail t.shinomura.trg@tmd.ac.jp

## **13. Note(s) to students**

None

# Biochemistry

Lecture	(code: 8 3 3 1	1st year	:6units)
Practice	(code: 8 3 3 2	1st~2nd year	:4units)
Lab	(code: 8 3 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Tetsuro Watabe, Professor; Miki Yokoyama, Associate Professor;  
Katarzyna Anna Podyma-Inoue, Assistant Professor; Akira Asari, Part-time Lecturer

## 2. Classroom/Lab

Since a venue depends on the program, please ask a contact person before taking part in the course.

## 3. Course Purpose and Outline

Since cancer is the leading cause of deaths in Japan, we need to develop novel therapeutic strategies. Recent studies have shown that tumor is composed not only of cancer cells but also various types of stromal cells including blood and lymphatic vessels that induce tumor progression and metastasis. In order to explore the mechanisms how these components are involved in the formation and progression of cancer, we aim to understand the physiological and pathological roles of various biomolecules at molecular, biochemical, cellular levels in this class.

## 4. Course Objective(s)

Understand the molecular mechanisms underlying cancer progression  
Understand the mechanisms that govern the formation of blood and lymphatic vessels  
Discuss the heterogeneity within plasma membranes and its physiological significance.  
Discuss the components of extracellular matrix (ECM) with the focus on proteoglycans.

## 5. Format

Small group seminars

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Background, recent progress, physiological importance, experimental approaches and unresolved problems of cancer, vascular formation, membrane structures and proteoglycans in ECM are explained.

Available programs:

Lecture and Journal Club 10:00–12:00 on every Tuesday in May and June

### Practice

Based on the recent progresses on the biomolecules, specific and general discussions will be held to invent and to stimulate new research.

Available programs:

To be announced by the teachers in charge for the program.

## **Lab**

Students are required to present experimental data for discussion, which will be a crucial step to evaluate and improve the research progress.

Available programs:

To be announced by the teachers in charge for the program.

## **7. Grading System**

Attendance to lectures, seminars, laboratory practices is evaluated. In addition, research progress or presentation at the meeting is also evaluated totally.

## **8. Prerequisite Reading**

Please attend a class with some information of your research materials.

## **9. Reference Materials**

Check with the teacher in charge for the program.

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Testuro Watabe (E-mail [t-watabe.bch@tmd.ac.jp](mailto:t-watabe.bch@tmd.ac.jp))

## **13. Note(s) to students**

None

# Cell Signaling

Lecture	(code: 8 3 4 1	1st year	:6units)
Practice	(code: 8 3 4 2	1st~2nd year	:4units)
Lab	(code: 8 3 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Principal investigator (Professor): Tomoki Nakashima  
(Assistant Professor):Mikihito Hayashi, (Assistant Professor):Takahito Ono  
Adjunct Lecturers: Hiroshi Takayanagi (University of Tokyo)  
Contact person: Tomoki Nakashima E-mail naka.csi@tmd.ac.jp

## 2. Classroom/Lab

Please contact the instructor in charge before the course.

## 3. Course Purpose and Outline

Students will learn the basis of the life science by understanding the fundamental mechanism of intracellular signal transduction that regulates a variety of cellular functions including cell survival, death, proliferation and differentiation.

## 4. Course Objective(s)

Students will learn basic molecular biology and genetic engineering techniques by observing and/or performing biochemical experiments using cultured cells and knockout mice.

## 5. Format

Participatory class by a small group.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Students will learn the basis of the life science by understanding the fundamental mechanism of intracellular signal transduction that regulates a variety of cellular functions including cell survival, death, proliferation and differentiation. In addition, students will learn the molecular bases of disease therapies by understanding the abnormalities of intra- and/or intercellular signal transduction pathways underlying pathological conditions.

Available programs:

Lecture May. 16 to Sep. 26 Wednesday 10:00 - 12:00 (at the seminar room on the 8th floor in the M&D tower)  
Special Lecture To be announced

### Practice

Goals/Outline:

Students will experience the experimental and analytical process of advanced science. Under the supervision of staffs, students will join the analysis of data obtained from experiments. Our major research interests include:

1. Signal transduction mechanisms that regulate the differentiation of osteoclast, osteoblast and osteocytes important cell lineages that regulate bone remodeling.
2. Regulation of bone remodeling by molecules in the immune and locomotive systems.
3. Signal transduction in bone destructive diseases and development of clinical applications.

Available programs:

Progress conference To be announced

## **Lab**

Goals/Outline:

Students will learn basic molecular biology and genetic engineering techniques by observing and/or performing biochemical experiments using cultured cells and knockout mice.

Available programs:

Participation in study groups To be announced

## **7. Grading System**

Based on the attendance rate and presentation in lecture and scientific meeting, we perform a general evaluation.

## **8. Prerequisite Reading**

Under the supervision of staffs, students will prepare review presentation of scientific journal.

## **9. Reference Materials**

None

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person: Tomoki Nakashima E-mail naka.csi@tmd.ac.jp

## **13. Note(s) to students**

Limited number: none

Please contact the instructor in charge before the course.

# Periodontology

Lecture	(code: 8 3 6 1	1st year	:6units)
Practice	(code: 8 3 6 2	1st~2nd year	:4units)
Lab	(code: 8 3 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor: Akira Aoki    Junior Associate Professor: Yasuo Takeuchi  
Contact person: Dr. Yasuo Takeuchi    E-mail takeuchi.peri@tmd.ac.jp

## 2. Classroom/Lab

Demonstration room of Hozon-Kyosei at 5th floor of Building No.7

## 3. Course Purpose and Outline

The purpose was to clarify the outcomes and problems of the current periodontal research. For the sake of the purpose, it is necessary to collect the current information of periodontal research, to clarify the problems being wrestled in future, to find out the novel method to be solved and train for making research plan.

## 4. Course Objective(s)

1.To be able to explain the mechanism of the initiation of periodontal disease 2. To be able to explain the association between periodontal and systemic diseases 3. To be able to explain the mechanism of periodontal regeneration and its treatments

## 5. Format

Small class and setting up discussion time as much as possible in order to promote mutual understanding

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To educate etiology of periodontal diseases, host response, oral bacteria, periodontal medicine, regenerative therapy and so on profoundly, and to find a solution through discussion research outcomes as to periodontal destructive process and periodontal treatment modalities

Available programs:

Lecture    April 20 to July 13    every Friday    10:00~12:00

Special Lecture    May 11 and June 29    17:00~19:00

Clinical Conference    every Friday    16:30~17:30

Journal Club    every Friday    17:30~18:30

### Practice

Goals/Outline:

To collect information as to current trend of periodontal research by literature and Internet in addition to discuss and investigate novel research approaches

Available programs:

Journal Club    Friday 17:30~18:30

## **Lab**

Goals/Outline:

To examine model animals and periodontal patients by the methods of microbiology, molecular biology, immunology and so on in order to elucidate etiology and pathology of periodontal diseases

Available programs:

Participation in a research group occasionally

## **7. Grading System**

Grading will be performed by evaluating synthetically using attendance status to lecture, practice and lab and individual research contents

## **8. Prerequisite Reading**

Make sure to collect the novel information of the current periodontal research through Pub Med, Medline and Inter net.

## **9. Reference Materials**

Journal of Periodontology, Journal of Clinical Periodontology, Journal of Periodontal Research, Nature, Nature Medicine, Science

## **10. Important Course Requirements**

Make sure to attend the course as much as possible.

## **11. Lectures in English**

All lectures are conducted in English.

## **12. Office Hour**

Assistant Professor: Yasuo Takeuchi, takeuchi.peri@tmd.ac.jp 17:00-18:30

## **13. Note(s) to students**

All lecture will be given in English.

# Public Health

Lecture	(code: 7 0 7 1	1st year	:6units)
Practice	(code: 7 0 7 2	1st~2nd year	:4units)
Lab	(code: 7 0 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor, Takeo Fujiwara, MD, PhD, MPH  
Lecturer, Masashi Kizuki, MD, MPH, PhD  
Assistant Professor, Ayako Morita, MSc, PhD  
Contact person: Professor Takeo Fujiwara E-mail: fujiwara.hlth@tmd.ac.jp

## 2. Classroom/Lab

Lectures will mainly take place in rooms of the Department of Global Health Promotion. Special lectures will be held in auditoriums. For practices and labs, please confirm venue with the instructors.

## 3. Course Purpose and Outline

The purpose of this course is to develop the knowledge and skills of the participants to prevent diseases. Participants will: understand broad risk factors from individual factors (e.g., genetic factor) and environmental factors, especially social determinants, their interactions; make causal inference applying a life-course perspective on disease onset (e.g., long-term effect of fetus or childhood exposure); perform advanced statistics; acquire attitudes toward social contribution through writing and publishing scientific papers in international journals. The final goal is that the participants are able to plan and implement health policy or program to prevent diseases in a real life setting.

## 4. Course Objective(s)

The participants will be able to:

1. explain the risk of disease.
2. verbalize own research question and develop a hypothesis to test it.
3. develop research field or access secondary data to test the hypothesis.
4. explain an epidemiologic study design.
5. calculate a sample size.
6. analyse basic model (multivariate analysis, logistic analysis, etc) and conduct advanced analysis (multilevel analysis, propensity score matching, multiple imputation, etc)
7. justify the research question logically, in scientific writing in English.
8. develop an intervention (policy or program) and design a study protocol to assess its effectiveness.

## 5. Format

Lectures, group discussions, and team project. English is used if needed

## 6. Course Description and Timetable

Please check with faculties in charge for the program.

### Lecture

1. Basics of epidemiology and biostatistics
2. Statistical analysis including basics and high-level
3. Critical appraisal for recent important papers to generate new research question

Available programs:

Seminar, Wednesday, 10:00-12:00  
Journal club, Wednesday, 12:00-13:00  
Special Lecture, To be announced

## **Practice**

1. Learn how to handle statistical software (STATA), using real data.
2. Participate in an epidemiological study in the field (wherever in Japan or elsewhere)
3. Report research progress and discuss how to proceed an epidemiological study

Available programs:

Analysis learning, to be announced  
Field study, to be announced

## **Lab**

Implement field study or analyze secondary data to deal with your research question, and write papers. Report research progress and discuss to brush up the study.

Available programs:

Analysis lab: to be announced  
Field study :to be announced

## **7. Grading System**

Grades are based on participation at lectures, practices, and field studies; performances in the projects; and levels of attitude, skills and knowledge on analysis, and paper writing, as professional of public health field.

## **8. Prerequisite Reading**

Participants are expected to read materials distributed beforehand. For practice and lab, tasks will be given based on the progress.

## **9. Reference Materials**

Lisa F. Berkman, Ichiro Kawachi, Maria Glymour. Social epidemiology. 2nd ed. USA: Oxford University Press; 2014.  
Richard A. Crosby, Ralph J. DiClemente, Laura F. Salazar. Research methods in health promotion. San Francisco: Jossey-Bass Public Health; 2006.  
Marcello Pagano, Kimberlee Gauvreau. Principles of Biostatistics. 2nd ed. Brooks/Cole; 2000.

## **10. Important Course Requirements**

Participants are required to have own research question.  
Instructor's permission are required before course registration

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

By appointment

## **13. Note(s) to students**

This course will offer options depending upon the need of each individual situation, such as working during daytime on weekdays. Harvard School of Public Health joint research program will be offered.  
Research field can be domestic (i.e. in Japan) or global.  
Students with any prior background (medicine, dentistry, nutrition, nursing, economics, education, etc) is welcome.

# Environmental Parasitology

Lecture	(code: 7 0 8 1	1st year	:6units)
Practice	(code: 7 0 8 2	1st~2nd year	:4units)
Lab	(code: 7 0 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Shiroh Iwanaga Lecturer Takashi Kumagai Assistant Professor Naoaki Shinzawa Assistant Professor Akina Hino  
Contact person: Takashi Kumagai E-mail iwanaga.vip@tmd.ac.jp

## 2. Classroom/Lab

Conference room and Laboratory of Environmental Parasitology (16th Floor, M & D Tower)

## 3. Course Purpose and Outline

Parasitic infections are instructed from the view points of global health, biomedical importance, and public health. For these purposes, contents of the lectures include biological aspects of pathogenic parasites, clinicopathological characteristics of parasite infections, and epidemiology/public health of parasitic diseases.

## 4. Course Objective(s)

(1) Understanding pathogenic parasites of humans. (2) Understanding clinical and pathological and biophysical features of parasitic diseases. (3) Understanding the importance of parasitic diseases in Tropical Medicine and the possible applications for disease control in developing countries.

## 5. Format

For Lecture/Seminar, subjects are announced in advance, and students who will attend should have contact with Instructor. For Practice/Experiment, discussion with Instructors should be done in advance, and research protocol should be prepared.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Infectious diseases are most urgent health problem in the 21st Century on the background situations of recent rapid increases in tourism and trading, ecological changes, and/or social infrastructural development. Appearance of drug-resistant pathogens and liable human hosts to infectious diseases are additional important matters. Parasitic infections have unique features in infectious diseases because of the big impact of social culture and human behavior, and those factors make the disease control difficult. In the lecture, the unique host-parasite interactions will be introduced from the view points of in vitro and in vivo analyses, and ecology of parasites, molecular biology, immune responses of the infected hosts and others are also included in the lecture course.

Available programs:

Lecture Every 4th Thursday (9:00~10:30) (taking contact with Contact person in advance is recommended)

Special Lecture Schedule will be announced

Journal Club Thursday morning (9:00~)

Conference Schedule will be announced

### Practice

Goals/Outline:

Diagnosis, pathogenesis and prognosis are covered by the use of clinical materials. Approaches are morphology, pathology, molecular biology and others. Philological practice is also covered.

Available programs:

Diagnosis of clinical materials: on the occasion

Field study: on the occasion. Field studies in Ghana and/or Laos are possible.

Journal club: Thursday morning

## **Lab**

Goals/Outline:

To understand host-parasite interactions, experimental pathological/immunological analyses of parasitic infections.

Available programs:

Parasitological experiment: on the request

Infection experiments and laboratory maintenance of parasites

Laboratory maintenance of parasite strains

Genetically modification of parasites

Cell culture and immunological study

Methods for molecular study on parasites

## **7. Grading System**

Performance at Lecture, Practice and Lab, and the quantity and quality of publications and/or presentations at scientific meetings are evaluated. Research planning, techniques, and outputs are considered.

## **8. Prerequisite Reading**

For Journal club, it is needed to read and search reference papers and to summarize the contents of those papers in advance.

For Laboratory research, Planning, Methodology, and Results & Discussion should be well described.

## **9. Reference Materials**

No particular books are designated. Papers and references are guided for each research subject.

## **10. Important Course Requirements**

It should be noted that pathogenic materials are used in this course. Therefore, each research plan should be approved in advance at committees for ethical/animal experimentation, and/or Biosafety.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Available at anytime on your request. Contact in advance is needed to Lecturer Shiroh Iwanaga (iwanaga.vip@tmd.ac.jp).

## **13. Note(s) to students**

Nothing particular.

# Forensic Medicine

Lecture	(code: 7 0 9 1	1st year	:6units)
Practice	(code: 7 0 9 2	1st~2nd year	:4units)
Lab	(code: 7 0 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Koichi UEMURA  
Associate Professor Toshihiko AKI  
Junior Associate Professor Kana UNUMA  
Assistant Professor Takeshi FUNAKOSHI • Kanako NORITAKE

## 2. Classroom/Lab

Make sure of the venue to the instructor before lecture in each program.

## 3. Course Purpose and Outline

Understanding of the system for the clarification of cause of death, forensic autopsy, diagnosis of cause of death, sudden death and death from poisoning.

## 4. Course Objective(s)

To obtain the ability of making a basic written statement of an expert opinion on the basis of autopsy findings.

## 5. Format

A small number of people

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The cases with forensic autopsies, especially judicial autopsies are presented. Students give a decision of the cause of death including murder cases, suicide cases and accidental cases and the intrinsic sudden death, composing of a large majority of unnatural death.

Students are also taught the form and contents of a written statement of expert opinion. Sometimes proper cases of forensic autopsy are allowed to observe.

Available programs:

Seminar Thursday, pm1-2 (every two weeks)

Journal Club Thursday, pm1-2 (every two weeks)

### Practice

Goals/Outline:

In forensic medicine, medical ethics and civil proceedings that includes medical malpractice, brain death and medical compensation, are taught. Furthermore, Students study about the criminology and situation of the injured or victim through autopsy assistance, making autopsy report and examinations related to forensic autopsy.

Available programs:

Forensic autopsy conference on Monday am9:30-

Observation of the judicial forensic autopsy on Sunday, Monday or Tuesday, am10-

## **Lab**

### Goals/Outline:

Mechanism of toxic effects was examined using cultured cells and experimental animals. In accordance with the novel abused drugs by the changes of society and environment, the methods of detection and identification for toxic substances are tried and developed cooperating with clinical medicine.

### Available programs:

Participation in a research group at any time  
Experimental Conference on Thursday

## **7. Grading System**

Participation and struggling in lecture, practice and examination are taken into evaluation.

## **8. Prerequisite Reading**

Understanding of basic forensic medicine and, terms

## **9. Reference Materials**

Forensic medicine, medical law based on forensic autopsy cases. Yuhikaku Boks, Ken-ichi Yoshida (2010/9/25)  
Standaerd Textbook Series Forensic Medicine, Igsku-Shoin, Hideo Ishidu, Mituhiro Takatsu (2012/12/14)

## **10. Important Course Requirements**

none

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Koichi Uemura E-mail:kuemura.legm@tmd.ac.jp, Office hour: Monday to Thursday

## **13. Note(s) to students**

Nothing

# Health Care Management and Planning

Lecture	(code: 7 1 1 1	1st year	:6units)
Practice	(code: 7 1 1 2	1st~2nd year	:4units)
Lab	(code: 7 1 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person : Kazuo Kawahara E-mail kk.hcm@tmd.ac.jp , Makiko Sugawa E-mail:sugawa.hcm@tmd.ac.jp

## 2. Classroom/Lab

M&D Tower 16 F Graduate student lounge of Health Care Management and Planning Division or at the conference room on the same floor.

## 3. Course Purpose and Outline

To understand the problems faced by public health and welfare, and to understand the determining factors of policies for improvements together with their validity and fitness for purpose.

## 4. Course Objective(s)

Students are expected to learn how to analyze health and welfare policies adopted domestically and overseas using objective indicators as well as the ability to theoretically and systematically discuss what they think would be the optimal solution.

## 5. Format

To introduce the domestic and foreign documents and papers about the latest health and welfare policies. And to analyze, discuss and evaluate these contents.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

By analyzing the Japanese healthcare policies and system and by reviewing their interaction with society, the structural characteristics and issues can be clarified. To resolve or find better ways to handle these issues, we conduct research into public health and welfare, and its related disciplinary areas. With the cooperation of active policy makers and personnel from the healthcare departments, the research results can be applied to the present healthcare policies and system. Through this education on collecting data, clarifying issues, analyzing the situation, and evaluating options, students taking this course are expected to grow in their ability to make healthcare policies.

Available programs:

Lecture and Conference 17:00-18:00 Monday  
Special Lecture 18:00-19:00 Monday  
Seminar 19:00-20:00 Monday

### Practice

Goals/Outline:

We analyze and discuss the health and welfare policies proposed by the government based on the health statistic data and socio-economic indicators. The goals and objectives of us are to acquire the planning and evaluation skills etc. through these process.

Available programs:

Practice and Conference 20:00-21:00 Monday

## Lab

### Goals/Outline:

To discuss the problems in studies which handling by each student can appear us the best way to carry out the studies. The students present the contents of their studies in terns and focusing the problems in their studies. These processes shows the students for the best way to develop their studies.

### Available programs:

Presentation and Conference 21:00-22:00 Monday

## 7. Grading System

PhD candidates are evaluated by the aggressiveness to the research subjects and the participation to the lecture and practice. In addition to this, the presentation number of times in the academic meetings.

## 8. Prerequisite Reading

The recent situation of medicine and related areas should be investigated through the following books, the internet, etc. including mass media information.

## 9. Reference Materials

- ① "Medical Care in Japan", Naoki Ikegami and J. C. Campbell (Chuokoron-Shinsha, Inc.)
- ② White papers from the Japanese Ministry of Health, Labour and Welfare
- ③ "National Health Trends 2014/2015" (Health, Labour and Welfare Statistics Association)
- ④ "Ministry of Health and Welfare: 50-year history"
- ⑤ "50 Years of Postwar Medical Care", Jiro Arioka (Japan Medical Journal)
- ⑥ "Public Policy Studies", Edited by Yukio Adachi and Toshimasa Moriwaki (Minerva Shobo)
- ⑦ "A Primer for Policy Analysis", Edith Stokey and Richard Zeckhauser (Keiso Shobo)

## 10. Important Course Requirements

None in particular

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hours

Contact: Kazuo Kawahara, Department of Health Care Management and Planning.; E-mail: kk.hcm@tmd.ac.jp

## 13. Note(s) to students

Not particular

# Molecular Epidemiology

Lecture	(code: 7 1 2 1	1st year	:6units)
Practice	(code: 7 1 2 2	1st~2nd year	:4units)
Lab	(code: 7 1 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Masaaki Muramatsu E-mail muramatsu.epi@tmd.ac.jp

## 2. Classroom/Lab

Conference room of Molecular Epidemiology at 2nd Floor of Building 22 on Surugadai-campus.

## 3. Course Purpose and Outline

Learn how human genome research is applied to basic and clinical medicine.

## 4. Course Objective(s)

To understand how human genome information is related to human diseases.

## 5. Format

Lectures will be done in a small group (up to 10 person). Practice and lab will be taught in a one-on-one manner.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To understand genetic and environmental risk factors of common metabolic diseases such as hypertension, diabetes, metabolic syndrome, and atherosclerosis by employing human genomic approach to epidemiology. Gene-environment interaction and epigenetic changes, such as developmental origins of health and disease (DOHaD) that underlie these diseases will also be studied.

Available programs:

Lecture: Every Thursday 10AM to 12AM (Substituted by Seminar & Journal Club)

Special Lecture: as-needed basis

Seminar & Journal Club: Every Thursday morning 10 AM to 12AM

### Practice

Goals/Outline:

To learn methods for genomic and statistical analysis by relevant computer software using template and actual data-sets,

Available programs:

genetic & statistical analysis course

### Lab

Goals/Outline:

To learn how to genotype variations such as SNPs and repeat polymorphisms in the human genome.

To learn how to analyze epigenetic changes, such as DNA methylation and histone modification.

Available programs:

Lab works will be taught through attending to the internal projects.

## **7. Grading System**

Grading will be done by the attendance and the presentation at the lab meeting, and by the content of the reporting.

## **8. Prerequisite Reading**

Reading reference materials are recommended.

## **9. Reference Materials**

Human Genome Epidemiology M.Khoury et al. (Oxford Press)  
Personal Genomics and Personalized Medicine H.Bolouri (Imperial College Press)

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact: Masaaki Muramatsu (muramatsu.epi@mri.tmd.ac.jp)

## **13. Note(s) to students**

# Research Development

Lecture	(code: 7 1 3 1	1st year	:6units)
Practice	(code: 7 1 3 2	1st~2nd year	:4units)
Lab	(code: 7 1 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Professor, Kozo Takase E-mail: ktakase.rdev@tmd.ac.jp

## 2. Classroom/Lab

Research Office, Department of Research Development, M&D Tower 16F

## 3. Course Purpose and Outline

Study on development of medical system and hospital management

## 4. Course Objective(s)

Obtaining capability of research and development on medical management

## 5. Format

small class or seminar

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The goals supposed in the lecture are mastering the technique of implementation of research development and acquiring the ability of management of projects.

Available programs:

Lecture 19:00-21:00, every Thursday (April to December)

Special Lecture as-needed

### Practice

Goals/Outline:

The aim in the practical program is developing the performance of implementation and management of projects.

Available programs:

Practical Conference 19:00-21:00, every Tuesday

### Lab

## 7. Grading System

evaluated from the point of view of discussion in the class and reports

## 8. Prerequisite Reading

preparation for curriculum contents of MMA course

**9. Reference Materials**

informed in class

**10. Important Course Requirements**

nothing particular

**11. Lectures in English**

All lectures are conducted in Japanese.

**12. Office Hour**

send inquiries to [ktakase.rdev@tmd.ac.jp](mailto:ktakase.rdev@tmd.ac.jp)

**13. Note(s) to students**

Candidates are supposed to be completed “Master of Medical Administration” course, Tokyo Medical and Dental University.

# Health Policy and Informatics

Lecture	(code: 7 1 4 1	1st year	:6units)
Practice	(code: 7 1 4 2	1st~2nd year	:4units)
Lab	(code: 7 1 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Kiyohide Fushimi    E-mail kfushimi.hci@tmd.ac.jp

## 2. Classroom/Lab

Research unit of Health Care Informatics Section

## 3. Course Purpose and Outline

To obtain the theory, applications and practical knowledge for handling medical information and database management.

## 4. Course Objective(s)

To understand methodology for analysing case-mix health data and administrative data

## 5. Format

lecture and small group discussion

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Methodology and application of data handling, data analysis, database management for health data and administrative data from hospitals and the government will be lectured. In addition, basics and application of patient case-mix system and DPC system will be lectured.

Available programs:

Lecture    to be announced

Special Lecture    to be announced

Seminar    to be announced

Journal Club    to be announced

Conference    to be announced

### Practice

Goals/Outline:

Practices of data analysis for large-scale health care data bases will be available

Available programs:

Research conference    19:00 – 21:00 on Fridays

### Lab

Goals/Outline:

Data analysis using SQL and OPAP database

Available programs:

to be announced

**7. Grading System**

reports, conference presentation, etc.

**8. Prerequisite Reading**

Health system of Japan

**9. Reference Materials**

Health care assessment by health data' edited by Shinya Matsuda and Kiyohide Fushimi, University of Tokyo Press co.

**10. Important Course Requirements**

None

**11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

**12. Office Hour**

10 am to 5 pm on weekdays by e-mail to [kfushimi.hci@tmd.ac.jp](mailto:kfushimi.hci@tmd.ac.jp)

**13. Note(s) to students**

none

# Life Sciences and Bioethics

Lecture	(code: 7 1 5 1	1st year	:6units)
Practice	(code: 7 1 5 2	1st~2nd year	:4units)
Lab	(code: 7 1 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Masayuki Yoshida, Professor      E-mail masa.bec@tmd.ac.jp

## 2. Classroom/Lab

Schedule of Lectures and seminars will be announced accordingly

## 3. Course Purpose and Outline

In order to contribute rapid technological advances in medicine and biology in a useful form to society, it is necessary to acquire solid bioethical knowledge that can be applied internationally. We aim to make a qualified judgment based on bioethics in advanced medical research and its practice. We learn about the indispensable research ethics for all fields and practical training on specific research ethical reviews.

## 4. Course Objective(s)

Learn how to prepare, submit, and discuss the protocol of clinical studies for I RB and REC

## 5. Format

Our course will be consisted from no more than 5-6 students. It is highly recommended to actively participate in the debate and discussion.

## 6. Course Description and Timetable

Check with instructor for the program detail

### Lecture

Goals/outline:

To learn the importance of ethical consideration based on specific study of three distinct area of the field; Medical Ethics, Research Ethics, and Bioethics.

Mandatory Class:

Initial Lecture series for graduate students      lecture on 4/27 and CITI e-learning

Special Lecture      Annual lecture held by our department, schedule will be announced once fixed.

### Practice

Goals/Outline:

To plan a research project with careful survey of background and previous observation. It is also important to learn a statistics required for medical research.

### Lab

Goals/Outline:

It is necessary to directly conduct such a medical study with either basic or clinical research theme.

Available programs:

## **7. Grading System**

Grading will be considered based on the participation of discussion and practical training and its outcome to Lectures, Practices, and Lab works (80%).

We also comprehensively evaluate based on the content of research, the involvement in various research and research conferences (20%).

## **8. Prerequisite Reading**

In taking courses in this field, it is mandatory to attend a lecture on research ethics at the initial training for graduate course.

## **9. Reference Materials**

In taking courses in this field, it is mandatory to attend a lecture on research ethics at the initial training for graduate course.

## **10. Important Course Requirements**

Bioethics and CITI class on April 27 (FRI) are mandatory

## **11. Lectures in English**

All lectures are conducted in Japanese.

## **12. Office Hour**

0930-1700 (MON-FRI)

## **13. Note(s) to students**

Not in particular.

# Forensic Dentistry

Lecture	(code: 8 3 7 1	1st year	:6units)
Practice	(code: 8 3 7 2	1st~2nd year	:4units)
Lab	(code: 8 3 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor SAKURADA Koichi    Assistant Professor UTSUNO Hajime    Assistant Professor ISHII Namiko

## 2. Classroom/Lab

Forensic Dentistry Office 1 (M&D Tower 8F)

## 3. Course Purpose and Outline

The purpose of the course is to understand academic field of forensic dentistry and its connection with social life. In particular, by the establishment of two laws for cause of death investigation, in recent years the identification work by the dentist is regarded as important at a crime and a big disaster. Students learn those significant through case reports.

## 4. Course Objective(s)

By taking this course, students will;

- 1) learn the history of the forensic dentistry and be able to understand the social significance.
- 2) understand an academic field of the forensic dentistry and be able to draw up its research theme.
- 3) understand why dental findings are effective for personal identification, and can explain the connection with the other methods such as DNA typing.

## 5. Format

This course is small-group format. Students learn through a lecture and a case report.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

This is a course for learning about various personal identification methods in the forensic dentistry, including intraoral findings, the morphological characteristics of bones, face image analysis, DNA typing, and so on.

Available programs:

Lecture Oct.16 to Nov.13 Every Tuesdays 16:00 – 18:00

### Practice

This is a practical course for individual identification based on dental findings, including dental charting.

Available programs:

Practice Nov.20 to Dec.4 Every Tuesdays 16:00 – 18:00

### Lab

None

Available programs:

None

## **7. Grading System**

Grading is comprehensively performed based on participation situation, the learning attitude to programs, and submitted report contents.

## **8. Prerequisite Reading**

Since an instructor gives you some instructions as necessary, please contact to him beforehand.

## **9. Reference Materials**

Forensic Dental Science (1st ed., Masanori Takahasi, Koichi Sakurada et al., Nagasuesyoten), New Essentials of Forensic Medicine (5th ed., Takehiko Takatori, Ishiyaku Publishers Inc.)

## **10. Important Course Requirements**

Please note a leak of the personal information such as photographs to treat with a lecture document.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person: Department of Forensic Dentistry, Koichi Sakurada, E-mail: sakurada.fde@tmd.ac.jp

## **13. Note(s) to students**

None

# Health Care Economics

Lecture	(code: 8 3 8 1	1st year	:6units)
Practice	(code: 8 3 8 2	1st~2nd year	:4units)
Lab	(code: 8 3 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Koichi Kawabuchi, Assistant Professor: Isao Igarashi  
Part-time Lecturers: Shigeru Sugihara, Yukiko Ito, Yusuke Kabeya  
Contact person: Isao Igarashi E-mail igarashi.hce@tmd.ac.jp

## 2. Classroom/Lab

Office of Health Care Economics

## 3. Course Purpose and Outline

Core local hospitals in communities takes on the responsibility of supporting front-line healthcare in the nation. Faced with recent changes in healthcare and long-term care, they long for personnel competent in healthcare management. Call for such personnel is strong among research organizations and public offices as well, looking for those who are proficient in qualitative and quantitative analysis. Therefore, this course aims to train students to be capable in making immediate contribution to the healthcare and welfare field, and to educate future "academic doctors" who can voice their messages in policy making.

## 4. Course Objective(s)

To learn the framework of healthcare economics, and possibly achieve certain level in the Economics Record Examination by Japan Association of ERE

## 5. Format

Study of the following through lectures and research on specific case

- Research plan (Framework, Literature review, Strategies)
- Research design (Introduction, Purpose, Research questions and hypotheses, Use of theory, Terms and definitions, Research limitations and significance, Quantitative research)
- Paper structure (Title, Abstract, Introduction, Methods, Results, Discussion, References)
- Logistic thinking
- Others

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Understanding the methods of research on phenomena in health care field through economics point of view  
The lecture will be centered around such topics as the approach to a research theme in economics and other social sciences (especially empirical studies), how to proceed with the research, and paper writing

Available programs:

Lecture/ Seminar Thursdays in June 7<sup>th</sup> through September 6<sup>th</sup>, 18:00-20:00

Special lectures (2018) May 11<sup>th</sup>, 18<sup>th</sup>, 25<sup>th</sup>, and June 1<sup>st</sup>, 18:00-20:00

### Practice

Designing and refining of each research plan through presentation and interactive discussion

Available programs:

Lecture/ Seminar Thursdays in May through September, 18:00-20:00

## Lab

Obtain health care economics points of view and master its research methods relevant to individual themes, and proceed to practice writing papers that will be accepted to academic journals

Available programs:

Time and place will be announced and notified

## 7. Grading System

Will be based on overall achievement including attendance and contributions in lectures and other occasions. Research quality, and the degree of participation in outside opportunities such as presentation at academic conferences will also be reflected in grades

## 8. Prerequisite Reading

Koichi Kawabuchi *"Mieruka' Iryokeizaigaku Nyumon"* ("Introduction to 'Visualized' Healthcare Economics", in Japanese only), Ishiyaku Publishers Inc. Participation in special lectures featured by our office as well as to courses in Basic-Clinical Borderless Education is recommended

## 9. Reference Materials

- S. B. Merriam and E. L. Simpson *"A Guide to Research for Educators and Trainers of Adults"* 2nd ed. (Updated), Krieger Publishing, 2000. (Translation in Japanese also available)
- J.W. Creswell *"Research design: Qualitative, quantitative, and mixed method approaches"* 2nd ed., Sage, 2003. (Translation in Japanese also available)
- Tuyoshi Kawasaki *"Shakaikagakukei notameno 'Yushuronbun' Sakuseijyutu Puronogakujuyturonbun kara Soturonmade"* ("Techniques of Writing 'Excellent Papers' in Social Science from Professional Academic Papers to Graduation Thesis, in Japanese) Keiso Shobo Publishing Co., Ltd., 2010.
- S. Folland, A.C. Goodman, M. Stano *"The Economics of Health and Health Care"* Prentice Hall.
- J.M. Wooldridge *"Introductory Econometrics; A Modern Approach"* South-Western Pub.

## 10. Important Course Requirements

None

## 11. Lectures in English

Lectures will be partially conducted in English.

## 12. Office Hour

Contact Igarashi (igarashi.hce@tmd.ac.jp) for appointment

## 13. Note(s) to students

Plans to schedule intensive lectures by part-time lectures on basic statistics, microeconomics, and health care economics as applied microeconomics. Audits are welcomed.

# Dental Education Development

Lecture	(code: 8 3 9 1	1st year	:6units)
Practice	(code: 8 3 9 2	1st~2nd year	:4units)
Lab	(code: 8 3 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Ikuko MORIO (Professor), Naoko SEKI (Assistant Professor)  
Contact person: Naoko SEKI E-mail: nseki.edev@tmd.ac.jp

## 2. Classroom/Lab

Seminar Room of Dental Education Development (M&D Tower 7F north-side, N-717)

## 3. Course Purpose and Outline

To help students understand the research basics concerning education in healthcare professions.

## 4. Course Objective(s)

The students will understand and acquire basic elements necessary to conduct research in healthcare professional education.

## 5. Format

Combination of mini-lectures and practice in small groups.

## 6. Course Description and Timetable

Follow up with instructors in charge of the program schedule.

### Lecture

Goals/Outline:

To understand the research on health care educational contents and acquire knowledge required for conducting educational research in health care professions. The theme will cover health care professional education ranging from the undergraduate level to life-long learning, focusing on the integration of medicine and dentistry.

Available programs:

Lecture January 11, 18, 25 and February 1, Friday 15:00-17:00

### Practice

Goals/Outline:

To experience the process of research planning and practice in order to do the following:

- determine the topic and grasp needs/demands
- to set objectives
- to evaluate and analyze data.

Available programs:

Lecture January 11, 18, 25 and February 1, Friday 15:00-17:00

### Lab

Goals/Outline:

To find issues surrounding dental workforce education, collect appropriate data, sort them out and discuss possible solutions based on the results of analysis.

Available programs:

All the research activities within the section

### **7. Grading System**

Combination of participation in discussion/practice/research. As for Lab activities, research contents, participation in related research and meetings, presentations at scientific meetings are also considered.

### **8. Prerequisite Reading**

Designated parts in the textbook or literature

### **9. Reference Materials**

None

### **10. Important Course Requirements**

Submission of assignments by deadline

### **11. Lectures in English**

All lectures are conducted in English.

### **12. Office Hour**

Friday, 17:00–19:00 Ikuko MORIO (imorio.edev@tmd.ac.jp)

Friday, 17:00–19:00 Naoko SEKI (nseki.edev@tmd.ac.jp)

### **13. Note(s) to students**

None

# Oral Health Promotion

Lecture	(code: 8 4 0 1	1st year	:6units)
Practice	(code: 8 4 0 2	1st~2nd year	:4units)
Lab	(code: 8 4 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Yoko Kawaguchi      Associate Professor Masayuki Ueno      Assistant Professor Takashi Zaitso

## 2. Classroom/Lab

To be announced depending on the programs by course instructors

## 3. Course Purpose and Outline

The purpose of the course is to foster dental health professionals who can appropriately deal with the change of trend and environment in dentistry, analyze and solve environmental, social and economic problems related to oral health, and practice and develop oral health promotion at individual and community levels.

## 4. Course Objective(s)

By taking these courses, students will be able to;

- Create a proposal for an oral health promotion program or research at individual and community levels using techniques discussed in the courses.
- Plan an oral health promotion program or research by applying social and behavioral theories and techniques.
- Develop goals, measurable objectives, and effective intervention strategies for an oral health promotion program or research.
- Implement an oral health promotion program or research in the actual field of public health.
- Design an evaluation plan using appropriate measurement tools, evaluation approaches, and evaluation designs.
- Apply appropriate data analytic methods to report the results of an oral health promotion program or research.
- Identify and explain the strengths and limitations of an oral health promotion program or research.
- Make necessary changes and improvements to an oral health promotion program or research.

## 5. Format

Small-group format

## 6. Course Description and Timetable

Check with the instructor in charge for the program when the date and time are not specifically announced.

### Lecture

Goals/outline:

One of the goals of the course is to foster dental health professionals who can appropriately deal with the change of trend and environment in dentistry, analyze and solve environmental, social and economic problems related to oral health, and practice and develop oral health promotion at individual and community levels. Specific topics include prevention of oral diseases, clinical practices of dental public health, basic principles and methods of oral epidemiology, social aspect of oral diseases, primary health care and health promotion in various settings, and oral health promotion within the context of health care and education system.

Another goal is to teach and discuss oral health issues and problems in the world. The topics include comparison of oral health care services, oral health status, and dental education in various countries from a global perspective. The principles and methods for international cooperative activities in the field of dentistry are also introduced.

The course consists of didactic lectures, case presentations and discussion sessions.

Available programs:

Lecture    Nov. 13 to Dec. 4    Every Tuesdays 15:30 - 17:30

Special Lecture    as needed

Seminar    as needed

Journal Club    as needed

**Practical filed work**

Goals/Outline:

Field work is an opportunity to apply key concepts of planning, strategies and evaluation methods, which are essential for developing and practicing oral health promotion and prevention programs at individual and community levels, and analyze actual cases.

Available programs:

Case presentation seminars as needed  
Field research and activities as needed

**Intervention study**

Goals/Outline:

Implement an intervention program in the field of maternal health, school health, industrial health or adult/elderly health, and conduct analysis and evaluation on the effects of the intervention program.

Available programs:

Conference on intervention programs as needed

**7. Grading System**

The grading will be made based on the lectures, course participation and research content.

In addition, the degree of participation in research and study meeting, number of conference participation will be considered for comprehensive evaluation.

**8. Prerequisite Reading**

Before taking these courses, students are expected to have a wide range of knowledge not only on natural science but also on social science and humanities.

**9. Reference Materials**

Oral Health Promotion (Lone Schouw and Anthony Blinkhorn) Oxford Medical Publications  
Asian Perspectives and Evidence on Health Promotion and Education (Takashi Muto et al.) Springer

**10. Important Course Requirements**

None

**11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

**12. Office Hour**

Contact person: Department of Oral Health Promotion, Masayuki Ueno, Mon & Thu 16:00-18:00, E-mail ueno.ohp@tmd.ac.jp

**13. Note(s) to students**

None

# Sports Medicine and Dentistry

Lecture	(code: 8 4 1 1	1st year	:6units)
Practice	(code: 8 4 1 2	1st~2nd year	:4units)
Lab	(code: 8 4 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor Toshiaki UENO  
Assistant Professor Hiroshi CHUREI  
Contact person: Hiroshi CHUREI E-mail chu.spm@tmd.ac.jp

## 2. Classroom/Lab

Because classroom and venues are different from each of the following program, please confirm the venue in advance to contact person. Our labs and offices are located at 3rd and 4th floor of the building 10.

## 3. Course Purpose and Outline

Purpose and outline of this course is to provide essential knowledge and experimental technique to understand and research sports medicine and dentistry through the lecture, practice and lab works described below.

## 4. Course Objective(s)

To understand oral health management for athletes and sports-loved people, To understand the diagnosis, treatment procedure and safety measure of sports-related oral and maxillofacial injury, To understand the relationship between oral function and general motor function.

## 5. Format

Lectures and small-group discussions in will be performed.

## 6. Course Description and Timetable

Check with the teacher in charge or TMDU website for the schedule of each program.

### Lecture

Goals/outline:

The following topics on sports medicine/dentistry will be lectured: 1. Maintenance and improvement of individual's health by various sporting activities and recreations; 2. Diagnosis, treatment and prevention of sports injury and disorders; 3. Improvement and optimization of athletic performance on the basis of exercise physiological and kinesiological studies.

Available programs:

Lecture November to December (every Monday 17:00-19:00)  
Special Lecture 2-3 times/yr ([http://www.tmd.ac.jp/faculties/graduate\\_school/seminar/](http://www.tmd.ac.jp/faculties/graduate_school/seminar/))

### Practice

Goals/Outline:

Trends and controversial points in recent researches for sports medicine/dentistry will be discussed through participation and presentation in Journal Club. Clinical skills and knowledge of diagnosis, treatment and prevention will be studied through participation in Clinical Conference.

Available programs:

Journal Club/Clinical Conference August to March (every Wednesday 17:30-18:30)

**Lab**

Goals/Outline:

Handlings of experimental devices for sport medicine/dentistry study and collection and analysis of data will be practically trained through participation in research group in SPMD Lab.

Available programs:

Participation in research work of SPMD lab group

**7. Grading System**

Grading is performed comprehensively based on participation situation, learning and discussing attitudes to programs.

**8. Prerequisite Reading**

None

**9. Reference Materials**

Sports dentistry (Dental North Clinics of North America) , Advances in Sports dentistry (Dental North Clinics of North America) , Textbook and Color Atlas of Traumatic Injuries to the Teeth (Willy-Blackwell), Oxford Textbook of Sports Medicine (Oxford University Press)

**10. Important Course Requirements**

None

**11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

**12. Office Hour**

Monday and Thursday 16:00-17:00

**13. Note(s) to students**

None

# Educational System in Dentistry

Lecture	(code: 8 4 2 1	1st year	:6units)
Practice	(code: 8 4 2 2	1st~2nd year	:4units)
Lab	(code: 8 4 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Kouji ARAKI  
Junior Associate Professor( non-full time) Makoto OGISO Hiroki KATAOKA

## 2. Classroom/Lab

Confirm it to the instructor in a different place by a program beforehand.

## 3. Course Purpose and Outline

The aim of the lecture is to understand the purpose and method about the evaluation of dental education system. In addition, it is to understand the level and inspection method of international dental education . The aim of the practice is to understand a method of data analysis provided by the evaluation.system for the dental education, In addition, it is to understand the comparison with the international education level The aim of the Lab is to manage the teaching materials developed for simulation education and is to understand the inspection method of the evaluation for new education system.

## 4. Course Objective(s)

- 1) You can explain various evaluation method for the dental education.
- 2) You can explain the international level in each undergraduate and postgraduate of dental education.
- 3) You can explain the construction method of the dental education system.
- 4) You can explain the dental education using simulation devices.
- 5) You can practice the simulation devices for the dental education.
- 6) You can practice the data analysis of the evaluation for the dental education..

## 5. Format

The instructor performs guidance for students to help teaching self-study, problem discovery, and development of the problem solving ability. In the practice, students can perform experience training using equipment developed for simulation education.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Main object of educational system in dentistry in the graduate course is to provide opportunity to study evaluation method for dental education curriculum, inspection method of the validity and reliability of the evaluation system for dental education, evaluation system compared between international and Japanese education level in undergraduate or after the graduation periods, and dental clinical skills improvement by the virtual reality simulation system.

Available programs:

Lecture 5/28,6/4,6/11,6/18,6/25,7/2,7/9 (every Monday 17:00~19:00)

Special Lecture It will carry out in three times from 17:00 to 19:00, on September,2018, January and February, 2019 (date undecided)

### Practice

Goals/Outline:

Students participate in data analysis and the comparison with an international educational level evaluation system.

Available programs:

Data analysis about the evaluation for dental education system from September to October (every Thursday from 16:00 to 18:00)  
Comparison with the evaluation system for the level of international education from November to December (every Thursday from 16:00 to 18:00)

## Lab

Goals/Outline:

Students participate in research of the evaluation method of a new educational system while experiencing the teaching materials and system developed for simulation education.

Available programs:

Study of the education system evaluation using the dentistry education simulation system from September to December (in total ten times for once two hours, on the day, not to arrange)

## 7. Grading System

Instructor generally evaluates it based on a lecture, practice, lab, the participation situation to the experiment and an action. In addition, Instructor performs a general evaluation based on degree of report contents, various studies and the participation in study meeting, the number of times of the presentation at the meeting.

## 8. Prerequisite Reading

- 1) Instructor recommends that you read beforehand about the following reference book.
- 2) Instructor recommends that the graduate student of the dentist will use to a dental education simulation system.

## 9. Reference Materials

\*Everything is a Japanese textbook.

- 1) 高橋優三:新医学教育あれこれ 能動教育の推進に役立つ実務資料集. 三恵社. 2011.
- 2) 千代豪昭、黒田研二 編集:学生のための医療概論 第3版. 医学書院. 2010.
- 3) J. A. Dent, R. M. Harden (著) 鈴木康之、錦織 宏 (監訳):医学教育の理論と実践. 篠原出版. 2010.
- 4) 日本テスト学会(編):テスト・スタンダード. 金子書房. 2007.
- 5) P. Schwartz, S.Mennin, G. Webb(編集)大西弘高(監訳):PBL 世界の大学での小グループ問題基盤型カリキュラム導入の経験に学ぶ. 篠原出版社. 2007.

## 10. Important Course Requirements

It needs the attendance of all lectures, but when you take a rest for a reason not to be able to bear to stop, instructor will give you the problem of the report.

## 11. Lectures in English

Lectures will be partially conducted in English.

## 12. Office Hour

Contact person: Center for Education Research of Medicine and Dentistry, Professor Kouji ARAKI

E-mail k.araki.gend@tmd.ac.jp

You do not arrange the time in particular on a day, but contact me beforehand by all means.

## 13. Note(s) to students

There is not the number of people restrictions in lecture.

As a general rule, the number of participate in the practice and Lab can assume it less than ten.

# Educational Media Development

Lecture	(code: 8 4 3 1	1st year	:6units)
Practice	(code: 8 4 3 2	1st~2nd year	:4units)
Lab	(code: 8 4 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Professor Atsuhiko Kinoshita E-mail kinoshita.emdv@tmd.ac.jp

## 2. Classroom/Lab

Information Retrieval Room in University Library, Faculty Room of Department of Educational Media Development, or Demonstration Room on 5th floor in Building 7.

## 3. Course Purpose and Outline

This course will provide students with an overview of current educational media in health science professionals utilizing information and communication technologies (ICT).

Each student must create and present original educational materials in this course.

## 4. Course Objective(s)

To understand the characteristics of current educational systems and educational media utilizing ICT.

To learn how to create and apply original educational materials.

To perform and report a study on development, application, or evaluation of new educational media.

## 5. Format

Small-group format.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The goals of the course are to understand the characteristics of current educational systems and educational media utilizing information and communication technologies, such as computer assisted simulation systems, e-learning systems, and live broadcasting systems, and to learn how to create original educational materials, and to master the way to apply them on the education for health science professionals.

Available programs:

Review meeting for the new teaching materials: 18:00 - 20:00 on every second Tuesday.

### Practice

Goals/outline:

The goal of the practice is to create a new original teaching material utilizing information and communication technologies, such as computer assisted simulation systems, and e-learning systems.

Available programs:

Practice for creating new teaching material as necessary

### Lab

Goals/outline:

The goals of the lab are to develop a new original teaching material or an educational system utilizing information and communication technologies, to apply it on the education for health science professionals, to evaluate its educational effects, and to present the results of the study.

Available programs:

Research meeting as necessary

## **7. Grading System**

Comprehensive evaluation based on the original teaching materials, research activities, and academic presentations.

## **8. Prerequisite Reading**

Student should experience sample materials of computer assisted simulation for medical and dental practice training on the website (<http://www.tmd.ac.jp/dent/program/tmd04/page04.html>).

Student should read documents on the WebClass course, and follow as instructed.

## **9. Reference Materials**

TMDU Clinical Training Series – for ESL Dentists –, Kinoshita A, et al., Developer: Tokyo Medical and Dental University (TMDU), Publisher: University of Tokyo Press, 2012.

## **10. Important Course Requirements**

Nothing in particular

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Atsuhiro Kinoshita

email: [kinoshita.emdv@tmd.ac.jp](mailto:kinoshita.emdv@tmd.ac.jp)

## **13. Note(s) to students**

none.

# Insured Medical Care Management

Lecture	(code: 7 9 4 1	1st year	:6units)
Practice	(code: 7 9 4 2	1st~2nd year	:4units)
Lab	(code: 7 9 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Masumi Ai E-mail ai.vasc@tmd.ac.jp

## 2. Classroom/Lab

To be announced

## 3. Course Purpose and Outline

The purpose of this course is to understand the concepts and the structure of social medical insurance and its problems. Also seeking the solutions or improvement measures for the problems especially for its operation and/or management.

## 4. Course Objective(s)

The objective is to understand the overview of the social medical insurance and its problems, and to seek the solution for them through the analyses of the social background and other factors.

## 5. Format

Lecture and small group discussion

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To learn the structure and the implementation details of the social insurance system for medical care in Japan.

Available programs:

Lecture: Wednesday 10:00~12:00 (held with a hospital conference mostly in Japanese only)

Special Lecture: To be announced

Seminar: Friday 18:00~20:00 (held with a hospital conference mostly in Japanese only)

### Practice

Goals/outline:

To investigate and discuss on the problems on the health insurance system.

Available programs:

Seminar: Monday 16:00~18:00

### Lab

Goals/outline:

To plan and conduct a research project on social insurance system, including data collection and analyses.

Available programs:

Laboratory meeting: Monday 14:00~16:00, Thursday 14:00~16:00

## **7. Grading System**

Will be considered based on the participation and its outcome to Lecture, Practices, and Lab works. Participation for the research meeting and submitting reports are mandatory. The submission of reports on an individual thesis based on clinical experience of the applicant is also required during the period.

## **8. Prerequisite Reading**

Being familiar with the medical terminology. A working experience as a medical staff or medical system office personnel is necessary.

## **9. Reference Materials**

No reference materials written in English. There are some reference materials in Japanese.

## **10. Important Course Requirements**

It is strictly prohibited to bring data to off-campus. The handling of personal information must be careful. Do not allow the course if there is a problem with the observance of confidentiality.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

8:30~17:15 Mon-Fri

## **13. Note(s) to students**

Not in particular.

# Global Health Entrepreneurship

Lecture	(code: 5 0 1 1	1st year	:6units)
Practice	(code: 5 0 1 2	1st~2nd year	:4units)
Lab	(code: 5 0 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Keiko NAKAMURA, MD, PhD,

Junior Associate Professor: Kaoruko SEINO, MMS, PhD

Contact person: Dr. Keiko NAKAMURA E-mail: nakamura.ith@tmd.ac.jp

## 2. Classroom/Lab

Lectures are held in lecture rooms (Graduate Lecture Room 2, M&D Tower, 13th FL; Graduate Lecture Room, 3rd Building, 6th FL; other rooms). Venue for practices and labs should be confirmed with instructors.

## 3. Course Purpose and Outline

The purpose of this course is to help prepare health professionals as leaders in global public health and entrepreneurs in global health. This course provides overview of global public health and analytical methodologies addressing disease prevention, health and quality of life and environment at local, national and global settings. Participants will learn the concept of public health and entrepreneurship in global context, specialized skills and knowledge necessary to communicate and produce quantitative and qualitative information, and strategies to integrate academic wisdom to public health policies and practices from global contexts.

## 4. Course Objective(s)

At the completion of the course, participants are expected to be able to:

- (1) Explain theoretical framework and history of global public health
- (2) Assess health and wellbeing of the populations as well as risk of diseases in by using quantitative and qualitative data, analyze critically based on evidence with multifaceted approaches
- (3) Determine appropriate uses and limitations of major quantitative and qualitative analysis methods
- (4) Apply ethical principles to conduct research in different countries with understandings and respects of cultural and other background issues
- (5) Identify population health problems at local, national and international settings, develop a research protocol to addressing solutions, and conduct research including field work when necessary
- (6) Apply sampling, data collection processes, and information technology applications effectively and productively in an actual environment
- (7) Produce high-quality research results and workable solutions that meet community health needs
- (8) Report and disseminate information and opinions in a structured and credible way, and to ensure that messages have been heard and understood by the intended audience
- (9) Develop and lead entrepreneurial projects to advance health of the populations with global context by participation of multiple stakeholders

## 5. Format

Lectures, group discussions, and team project. English is used in principle.

## 6. Course Description and Timetable

Check with teachers in charge for the program which is not specifically scheduled.

### Lecture

Outline: Demographic and environmental changes and rapid urbanization, are affecting the health and quality of life of people around the world. Academic endeavors to deepen understanding of the physical, social, cultural, and economic aspects of human-environmental interactions are fundamental to strengthen human security. Topics include overviews of major fields of global public health; human security; diverse regional issues from around the world; health equity; global environmental changes and health; health in cities; determinants of health; health promotion and education; family health; health systems around the world; field epidemiology; measuring individual and population health; evaluation of health programs; public-private partnership for health; and international health cooperation. Opportunities to read and evaluate scientific journals, share interpretations of them, and to stimulate new ideas about various problems and issues in public health are arranged. Participants are encouraged to become entrepreneurs in developing projects with global perspectives.

Available programs:

Regular Lecture, Tuesday, 10:00-12:00

Seminar, Thursday, 10:00-12:00

Special Lecture, To be announced

## Practice

Outline: Individual practicums address the quantitative and qualitative methods necessary in the assessment of health and quality of life of population and environmental qualities at local, national, and international settings and address the evaluation of the effectiveness of health interventions and programs. Opportunities to advance academic skills of critical reading of original research work in public health, knowledge of ethics for public health research and its practical applications, and professional skills and attitudes required for international health leaders are provided. Technical visits to health promotion related sites and institutions are also arranged.

Available programs:

Case Study Seminar, 1st and 3rd week Thursday, 14:00–16:00; Academic presentation, To be announced;  
Analysis and computing, Monday–Friday; Professional writing, Monday–Friday; Technical visit, To be announced

## Lab

Outline: Opportunities of applying techniques to design, prepare, implement, analyze, and evaluate a health promotion program in actual settings in diverse geographic, social, and cultural background are offered for interested and qualified students. Instructions on writing grant proposals, ethical consideration and procedures in public health research, and professional reporting skills are also provided as necessary.

Available programs:

Independent tutorial, Monday–Friday, 8:30–17:00  
Project meeting, 2nd and 4th week Thursday, 14:00–16:00  
Field study, By arrangement with individual faculty members

## 7. Grading System

Grades are based on participation at lectures, practices, and field studies; performances in the projects; and levels of attitude, skills and knowledge.

## 8. Prerequisite Reading

Participants are expected to read materials distributed beforehand.

## 9. Reference Materials

Roger Detels, Robert Beaglehole, Mary Ann Lansang, Martin Gulliford. (2009) Oxford textbook of public health. 5th ed. Oxford University Press.  
Fran Baum.(2008) The new public health. 3rd ed. Oxford University Press  
Michael H. Merson, Robert E. Black, Anne J. Mills. (2011) Global health: diseases, programs, systems, and policies. 3rd edition. Jones and Bartlett Publishers.  
Richard Skolnik. (2008) Essentials of global health. Jones and Bartlett Publishers.  
Anne-Emanuelle Birn, Yogan Pillay, Timothy H Holtz. (2009) Text book of international health: global health in a dynamic world. Oxford University Press.  
Kenneth J. Rothman. (2012) Epidemiology: an introduction. 2nd ed. Oxford University Press.  
Ann Aschengrau, George R. Seage. (2013) Essentials of epidemiology in public health. 3rd ed. Jones & Bartlett Learning, Burlington.  
International Epidemiological Association (2014) A Dictionary of Epidemiology. 6th ed. Oxford University Press.  
Bernard Rosner. (2010) Fundamentals of biostatistics. 7th ed. Cengage Learning, Independence.  
Marcello Pagano, Kimberlee Gauvreau. (2000) Principles of biostatistics, 2nd ed. Cengage Learning, Independence.  
Groves RM, Fowler FJ, Jr., Couper MP, Lepkowski JM, Singer E, Tourangeau R. (2009) Survey methodology. 2nd ed. John Wiley & Sons, Hoboken.  
Michael Marmot, Richard G. Wilkinson. (2005) Social determinants of health. Oxford University Press.  
Ross C. Brownson, Elizabeth A. Baker, Terry L. Leet, Kathleen N. Gillespie, William R. True . (2010) Evidence-based public health, 2nd ed. Oxford University Press.  
WHO and UNHABITAT (2016) Global Report on Urban Health: equitable, healthier cities for sustainable development. World Health Organization.  
Evelyn de Leeuw, Jean Simos. (2016) Healthy Cities. Springer.

## 10. Important Course Requirements

Participants are required to show willingness to learn from experiences and feedbacks, and to stay active to apply lessons to improve skills, knowledge, and performance.

Instructor's permission required before course registration

## 11. Lectures in English

All lectures are conducted in English.

## 12. Office Hour

Wednesday, 13:00–14:30

## 13. Note(s) to students

The instruction provided through courses is based on individual interests and expertise.

Intensive educational programs for working students are provided.

Collaborative programs with international organizations are prepared.

Number of participants will be limited. To attend the classes, permission of the instructors is required.

# Geriatrics and Vascular Medicine

Lecture	(code:	1st year	:6units)
Practice	(code:	1st~2nd yea	:4units)
Lab	(code:	2nd~3rd yea	:8units)

1. Instructor(s)

2. Classroom/Lab

Not offered

# Rehabilitation Medicine

Lecture	(code: 7 1 7 1	1st year	:6units)
Practice	(code: 7 1 7 2	1st~2nd year	:4units)
Lab	(code: 7 1 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Tetsuya JINNO      E-mail jinno.orth@tmd.ac.jp

## 2. Classroom/Lab

Rehabilitation training room

## 3. Course Purpose and Outline

To understand that rehabilitation medicine is a medical field mainly targeting disability, unlike traditional medical field centered on diseases and traumas. Evaluation methods peculiar to rehabilitation medicine should be understood as well. One of main themes is motion analysis in activities of daily living.

## 4. Course Objective(s)

To understand the contents of rehabilitation for disabilities due to cerebrovascular, musculoskeletal, and other diseases, and to find the tasks to be solved.

## 5. Format

Small classes

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Analysis of disabilities using International Classification of Functioning, Disability and Health.  
Rehabilitation medicine including physical, occupational, and speech therapy.  
The method of 3-dimensional motion analysis in activities of daily living.

Available programs:

Lecture    Biweekly Monday, 17:30–18:30.  
Seminar    Biweekly Wednesday 17:30–20:00  
Journal Club    Monday 7:30–8:30

### Practice

To understand the evaluation methods of disabilities and activities of daily living, and to use them for the clinical practice.

Available programs:

Arthroplasty Conference / Every Wednesday & Thursday, 13:00–14:00  
Respiratory disturbance Conference / Every Monday, 16:00–17:00

### Lab

Goals/Outline:

The 3-dimensional motion analysis of gait and upper limb movement in activities of daily living.

Available programs:

Seminar    Biweekly Wednesday 17:30–20:00

## **7. Grading System**

Evaluation of understanding degree of the lecture

Evaluation of the participation in the discussion, argument, and experiment practice and the degree of role and participation to the research conference

## **8. Prerequisite Reading**

Basis knowledge of physical, occupational, and speech therapy should be acquired.

## **9. Reference Materials**

Randall L. Braddom. Physical Medicine & Rehabilitation. Elsevier, 2011.

Abo M et al. Saishin Rehabilitation Medicine. 3rd ed. Ishiyakushuppan, 2016.

Reviews related to the research subjects.

## **10. Important Course Requirements**

N/A

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:00-17:00 Jinno T. E-mail jinno.orth@tmd.ac.jp

## **13. Note(s) to students**

# Gerodontology and Oral Rehabilitation

Lecture	(code: 8 4 4 1	1st year	:6units)
Practice	(code: 8 4 4 2	1st~2nd year	:4units)
Lab	(code: 8 4 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Shunsuke MINAKUCHI Associate Professor Haruka TOHARA Lecturer Kazumasa Kubota  
Assistant Professor: Norihisa AKIBA, Manabu KANAZAWA, Yusuke SATO, Masanao INOKOSHI  
Mai OKUBO, Yuriko KOMAGAMINE  
Contact person: Shunsuke: MINAKUCHI, E-mail s.minakuchi.gerd@tmd.ac.jp

## 2. Classroom/Lab

Differs depending on program; check with instructor before attending.

## 3. Course Purpose and Outline

Basic targets of study of this field are prevention and recovery of the oral function( mastication, swallowing and phonetic function) declining with aging.

## 4. Course Objective(s)

Understanding dental approach to make the oral function of the elderly convalescent.

Understanding the role of the dental treatment in old society.

Understanding the influence by which a occlusal reconstruction by prosthodontic treatment by dentures gives the body function.

## 5. Format

Small class size designated.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The basic objective of research in this field is the prevention and restoration of decreased oral functions accompanying aging.  
Lectures are given in follow areas.

- 1) Dental approaches for restoring oral cavity functions in the elderly
- 2) Research relating to the role of dental treatment in an aging society
- 3) Functional and psychological problems of edentulous patients and complete denture treatment.

Available programs:

Lecture Monday 19:00-20:00

Lecture in English Wednesday, Thursday 10:00-11:00 (from January)

Special Lecture Arranged (scheduled for 3-4 sessions/year)

Seminar Arranged

Journal Club Monday 17:30-18:30

### Practice

Goals/Outline:

Practice of actual dental treatment (including monitoring) on elderly individuals and fabricating complete dentures, taking impression, jaw relation records and aftercare for acquisition of skills.

Available programs:

Participation in areas of study and research at hospitals and other university-external facilities

Seminar on holistic care (Arranged)

## **Lab**

### Goals/Outline:

A physical action produces aging change. Oral functions, such as mastication, tongue movement, and lips closing present functional decline with aging. We have to understand these an elderly patient's change, and have to develop and master the effective technique about evaluating a masticatory function, body activity and central function, and recovery technique by removable dentures.

### Available programs:

Dysphagia rehabilitation, evaluating the medical risk of geriatric dental patients, evaluation of masticatory functions, complete denture CAD/CAM, denture materials, implant over denture

## **7. Grading System**

Participation in class, seminar and practice will be graded comprehensively. In Lab, grading will be done based on contribution for the study group, reports and presentation at academic meetings.

## **8. Prerequisite Reading**

None

## **9. Reference Materials**

Boucher's Prosthetic treatment for edentulous patients Groher M E Dysphagia Diagnosis and Management  
Peter E. Dawson :Dawson Functional Occlusion,

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Shunsuke: MINAKUCHI s.minakuchi.gerd@tmd.ac.jp Haruka TOHARA haruka-t@rd5.so-net.ne.jp

## **13. Note(s) to students**

In principle, class size is not limited.

# Laboratory Medicine

Lecture	(code: 7 1 8 1	1st year	:6units)
Practice	(code: 7 1 8 2	1st~2nd year	:4units)
Lab	(code: 7 1 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Shuji Tohda    E-mail tohda.mlab@tmd.ac.jp

## 2. Classroom/Lab

Lecture and practice: Laboratory (M&D tower, 10th floor, south)

Lab: Clinical laboratory (University hospital, 3rd floor)

## 3. Course Purpose and Outline

To develop the ability of clinical reasoning based on laboratory data.

To understand the development of novel laboratory tests.

## 4. Course Objective(s)

To understand the significance of laboratory tests in medicine.

To interpret the morphological findings of cells on blood and bone marrow smears.

## 5. Format

A small group tutorial

## 6. Course Description and Timetable

Check with the teachers in charge to arrange the sessions.

### Lecture

Goals/outline:

Application of laboratory medicine for clinical medicine will be lectured.

Available programs:

Lecture every Tuesday 10:00-11:00

### Practice

Goals/Outline:

Significance of novel cellular and molecular laboratory tests will be discussed.

Available programs:

Conference every Tuesday 11:00-12:00

### Lab

Goals/Outline:

Practice of hematological analysis based on morphological findings of blood smears and bone marrow smears will be held.

Available programs:

Clinical laboratory: 15:50-17:00 on Tuesday, 12:50-14:10 on Wednesday (December - February)

## 7. Grading System

Participation and performance are evaluated. Interview will be also used for grading.

## **8. Prerequisite Reading**

Read the textbook below.

## **9. Reference Materials**

Williams Hematology, 9th edition, 2015

Wintrobe's Atlas of Clinical Hematology, Lippincott Williams & Wilkins Inc.

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Contact person: Shuji Tohda 9 :00 – 18:00, E-mail tohda.mlab@tmd.ac.jp

## **13. Note(s) to students**

Ask the contact person if you have questions.

# Intensive Care Medicine I

Lecture	(code: 7 1 9 1	1st year	:6units)
Practice	(code: 7 1 9 2	1st~2nd year	:4units)
Lab	(code: 7 1 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor, Chair: Hidenobu Shigemitsu  
Contact person: Kenji Wakabayashi E-mail: wakabayashi.isc@tmd.ac.jp

## 2. Classroom/Lab

Please ask Dr Wakabayashi for classes: most lectures/experiments shall be done at the 15th floor, MD tower.

## 3. Course Purpose and Outline

Learn cardiopulmonary physiology through learning the mechanisms of acute respiratory distress syndrome and septic shock.  
Learn and acquire techniques on how to conduct a clinical research.

## 4. Course Objective(s)

Understand the mechanisms and treatment of acute respiratory distress syndrome (ARDS) and septic shock.  
Learn the process of designing/conducting clinical research and accomplish the goal to be an independent clinical researcher.

## 5. Format

Small group discussion. Using our recent results, we aim to interact with students to deepen scientific understandings.

## 6. Course Description and Timetable

In these days, 'translational research' has been defined in many ways including the translation from bench to bedside and from patient-oriented research to population research. In this course, we aim to cover all the aspects of translational research in critical care medicine, through lectures and experiments.

### Lecture

Goals/outline:

ARDS and septic shock are important in the ICU with high mortality. The goal of the lecture series is to understand the mechanisms of ARDS and septic shock. We hope this helps you to understand how the current cutting-edge therapy has been developed based on translational research.

Available programs:

Lecture (Every Thursday 11:00-12:00)  
Special lecture (June, November)  
Journal club (Every Friday 10:00-11:00)  
Academic day (Every Tuesday 13:00-16:00)

### Practice

Goals/Outline:

Learn the mechanisms and diagnostic techniques of ARDS and septic shock. Supporting therapy for critically ill patients shall be taught at the bedside.

Available programs:

Research seminar, Every Friday 11:00 - 12:00  
ICU Round (every day 8:15 - 10:30 17:00-18:00)

### Lab work

Goals/Outline:

Analyze injured organs by physiological, immunological, and molecular biological techniques. We shall also discuss the potential significance of the results for treating/preventing organ injury in the ICU.

Available programs:

Experiment of ARDS model, Monday and Thursday 13:00–17:00

- 1) Lung perfusion model (mouse)
- 2) ARDS model (mouse)
- 3) Immunological analysis of lung cells and leukocytes by FACS

## **7. Grading System**

General assessment is based on attendance rate and research content.

- 1) attendance rate (lecture, seminar, practice): 80%
- 2) presentation at academic conference and publication of research: 20%

## **8. Prerequisite Reading**

Critical Care Medicine 2014; 42:e49, Frontiers in Immunology 2017; 8:128

## **9. Reference Materials**

John B West, Andrew M Luks, West's Respiratory Physiology: The Essentials 10th edition, Wolters Kluwer

## **10. Important Course Requirements**

N/A

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Friday 13:00–14:00

## **13. Note(s) to students**

We accept up to 10 students for JC and research seminar, because of limited space and capacity.

# Intensive Care Medicine II

Lecture	(code: 5 0 8 1	1st year	:6units)
Practice	(code: 5 0 8 2	1st~2nd year	:4units)
Lab	(code: 5 0 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor, Chair: Hidenobu Shigemitsu  
Professor: Hideo Takahashi  
Contact person: Kenji Wakabayashi E-mail: wakabayashi.isc@tmd.ac.jp

## 2. Classroom/Lab

Please ask Dr Takahashi for classes: most lectures/experiments will be done at the 15th floor, MD tower.

## 3. Course Purpose and Outline

Learn the basic concept of Risk Management & Quality Management to accomplish an improvement of in-hospital mortality rate in the field of Critical care & emergency medicine.

Learn and acquire techniques on how to conduct a clinical research.

## 4. Course Objective(s)

Understand the framework of Rapid Response system for an unexpected emergent situation ,relationship between risk management & quality improvement.

Learn the process of designing/conducting clinical research and accomplish the goal to be an independent clinical researcher.

## 5. Format

Small group discussion. Using our recent results, we aim to interact with students to deepen scientific understandings.

## 6. Course Description and Timetable

Check with Dr Takahashi to arrange the sessions.

### Lecture

Goals/outline:

The goal of the lecture series is to get the basic concept and functions of Rapid Response System and practical methods to analyse work processes and system itself through the case analyses. We hope this helps you to understand how adverse events occur resulting into the increase of mortality and obtain some clues to improve the hospital system.

R

Special lecture (June, November)

Journal club (Every Friday 10:00-11:00)

### Practice

Goals/Outline:

Learn the basic Root Cause Analysis to determine the important factors & processes to fulfill Quality improvement is indispensable. Therefore, practical Root Cause Analysis using several analysis methods and techniques.

Available programs:

Research seminar, Every Friday 11:00 - 12:00

Rapid Assessment System Team Round (weekdays: Mon - Fri, 10:00 - 12:00 )

### Lab work

Goals/Outline:

Review all the death cases retrospectively and grasp the practical problems concerning the Patient Safety. Continue observing the current rapid response system and assess the effectiveness of this system in TMD. In order to improve the system, we are planning to do further assessment relating Patient & family satisfaction, effects on the multi-disciplinary medical staffs.

Available programs:  
Rapid Response System seminar  
Japan Patient Safety Forum  
Root Cause Analysis : case analysis seminar

## **7. Grading System**

General assessment is based on attendance rate and research content.  
1) attendance rate (lecture, seminar, practice): 80%  
2) presentation at academic conference and publication of research: 20%

## **8. Prerequisite Reading**

WHO Patient Safety Curriculum Guide:Multi-professional Edition 2011  
Copyright World Health Organization2011  
DL: <http://www.who.int/patientsafety/education/curriculum/en/>

## **9. Reference Materials**

Textbook of Rapid Response Systems: Concept and Implementation  
2017 June/1 2nd version going to be published

## **10. Important Course Requirements**

N/A

## **11.Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Please make contact with Dr. Takahashi E-mail [takahide0301.ccm@tmd.ac.jp](mailto:takahide0301.ccm@tmd.ac.jp)

## **13. Note(s) to students**

We accept up to 10 students for JC and research seminar, because of limited space and capacity.

# Liaison Psychiatry and Palliative Medicine

Lecture	(code: 7 2 0 1	1st year	:6units)
Practice	(code: 7 2 0 2	1st~2nd year	:4units)
Lab	(code: 7 2 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Assistant Professor Miho Miyajima E-mail: miholppm@tmd.ac.jp

## 2. Classroom/Lab

Contact us for information.

## 3. Course Purpose and Outline

Understand the psychosocial issues in the general medical settings from a viewpoint of comprehensive medicine

## 4. Course Objective(s)

Develop skills to provide a comprehensive diagnosis, treatment and prevention of psychosomatic problems in physical illness

## 5. Format

Class sizes are kept small to facilitate student-teacher interaction and class discussion

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled

### Lecture

Goals/Outline:

The lectures would cover the broad area of consultation-liaison psychiatry including;

- Psychological problems and psychiatric symptoms in the general medical settings
- Palliative care for patients with cancer

Available programs:

Lecture generally Thursday 13:00-15:00

Special Lecture generally Thursday 15:00-17:00

Seminar generally Thursday 10:00-12:00

Journal Club biweekly Thursday 17:30-19:00

### Practice

Goals/Outline:

- Develop new methods for diagnosis, treatment and prevention of psychosomatic problem through case discussions
- Learn and practice skills to develop assessments and design appropriate treatment plans for patients with various psychiatric disorders

Available programs:

### Lab

Goals/Outline:

- Our research projects are;
- Intervention study on physically ill patients with psychiatric problem
- Clinical-physiological research on psychiatric patients
- Acquire up-to-date knowledge of scientific findings and practice specialized research techniques for these area
- Apply these knowledge and techniques for further development of current research

Available programs:

## **7. Grading System**

Grades will be based on participation, research work, presentation at academic conference and research paper publications.

## **8. Prerequisite Reading**

Students are expected to preview the books on the required reading list.

## **9. Reference Materials**

Psycho-Oncology 3rd edition (eds. Holland JC et al), Oxford University Press, New York, 2015.  
Handbook of Psychiatry in Palliative Medicine 2nd edition. (eds. Chochinov HM, Breitbart W), Oxford University Press, New York, 2009.

## **10. Important Course Requirements**

N/A

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person: Prof. Miho Miyajima      E-mail: miholppm@tmd.ac.jp

## **13. Note(s) to students**

Journal club and case discussion will have less than 20 participants.

# Pharmacokinetics and Pharmacodynamics

Lecture	(code: 7 2 1 1	1st year	:6units)
Practice	(code: 7 2 1 2	1st~2nd year	:4units)
Lab	(code: 7 2 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor Masashi Nagata  
Contact person: Dr. Masashi Nagata E-mail mna-mpha@tmd.ac.jp

## 2. Classroom/Lab

To be asked to the instructor before registration.

## 3. Course Purpose and Outline

In order to understand the kinetics of drug action comprehensively, the updated knowledge about pharmacokinetics and pharmacodynamics will be lectured from the standpoint of interaction between drug molecules and the organ in the body.

## 4. Course Objective(s)

To predict the kinetics of drug action and to evaluate the drug-drug interactions, based on the mechanisms of drug absorption, distribution, metabolism and excretion

## 5. Format

The course is a small class and will have a discussion chance with registrants.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

An outline of the drug transport across the biomembrane and the drug disposition in the cell, organ and whole body will be reviewed and the recent advances on the effects of disease states and concurrent drugs on the pharmacokinetics of drugs will be discussed. In addition, the kinetic aspect of pharmacokinetic and pharmacodynamic analysis will be lectured.

Available programs:

Lecture (Pharmacology)	5/28-6/15	13:00-14:30
Lecture (Pharmacometrics)	December (Once a year)	18:00-21:10
Lecture (Therapeutic Drug Monitoring)	October (Once a year)	18:30-21:30
Journal Club	First Thursday	18:00-18:30

### Practice

Goals/Outline:

Recent literatures on the absorption, distribution, metabolism and excretion (pharmacokinetics) of drugs and related fields will be introduced and discussed. The practice of pharmacokinetic analysis based on the population approach or Bayesian method will be conducted.

Available programs:

Laboratory conference	Last Tuesday	18:00-19:00
Pharmacy Seminar	Second Thursday	18:00-18:30

### Lab

Goals/Outline:

Fundamental experimental techniques such as drug concentration measurement, drug effect evaluation and kinetic analysis will be practiced and applied to the development of the individual dosage adjustment based on the drug concentration monitoring for individual patients.

Available programs:

Join the research program TBA

### **7. Grading System**

The degree of participation to the lecture, practice and laboratory work, as well as the presentation and comments in the course will be reviewed. In addition, the research content and the number of presentations at the academic meetings will be evaluated comprehensively.

### **8. Prerequisite Reading**

Proficiency in basic pharmacokinetics, such as moment analysis and compartment model.

### **9. Reference Materials**

Clinical Pharmacokinetics and Pharmacodynamics: Concepts and Applications, 4th ed., Lippincott Williams & Wilkins (2011)

### **10. Important Course Requirements**

None

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

Ask to Dr. Nagata by e-mail: [mna-mpha@tmd.ac.jp](mailto:mna-mpha@tmd.ac.jp)

### **13. Note(s) to students**

None

# Medical Education Research and Development

Lecture	(code: 7 2 2 1	1st year	:6units)
Practice	(code: 7 2 2 2	1st~2nd year	:4units)
Lab	(code: 7 2 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Yujiro TANAKA    Junior Associate Professor Makoto TAKAHASHI    Junior Associate Professor Eriko OKADA

Related Departments:

Pathogenesis and Pathophysiology    Professor Yuki SUMI

Professional Development Center    Junior Associate Professor Yasuhiro ITSUI

Medical Welfare and Liaison Services Center    Junior Associate Professor Hajime IZUMIYAMA

Contact person: Makoto TAKAHASHI    E-mail takahashi.merd@tmd.ac.jp

## 2. Classroom/Lab

Seminar Room (N-1601)

## 3. Course Purpose and Outline

To learn theory and the methods of the latest medical education and try to present the solutions for problems about clinical education.

## 4. Course Objective(s)

- Analyze medical and/or social issues about medical education.
- Understand theory and practice of medical education.
- Conduct research of medical education.

## 5. Format

Small-group class

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

We address many problems about clinical education and discuss several approaches to their solutions. These problems have not yet been given a theoretical framework in order to examine various social elements closely related to them. Our aim is to construct an educational theory that can deal with practical difficulties and to propose possible solutions.

Available programs:

Seminar & Journal Club: 11:40-13:00 on every Friday

MMA Lecture: "Development and Utilization of Medical Experts"/"Leadership in the Medical Institution"

### Practice

Goals/Outline:

We pick out a problem based on a real case, consider a solution based on any applicable theory, and simulate for evaluation methods for the proposed solution.

Available programs:

Conference TBA

## **Lab**

Goals/Outline:

Students are expected to master skills necessary for research and development of the medical education by participating in a research group.

Available programs:

Research programs

## **7. Grading System**

Combination of attendance, participation in discussion, and assignments

## **8. Prerequisite Reading**

None

## **9. Reference Materials**

Dent JA, Harden RM, eds. A Practical Guide For Medical Teachers. Churchill Livingstone.  
Cantillon P, Wood D, eds. ABC of Learning and Teaching in Medicine. Wiley-Blackwell.

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact by E-mail as required

## **13. Note(s) to students**

None

# Acute Critical Care and Disaster Medicine

Lecture	(code: 7 2 3 1	1st year	:6units)
Practice	(code: 7 2 3 2	1st~2nd year	:4units)
Lab	(code: 7 2 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Yasuhiro Otomo  
Junior Associated Professor Masahito Kaji, Junichi Aiboshi  
Contact person: Yasuhiro Otomo e-mail: otomo.accm@tmd.ac.jp

## 2. Classroom/Lab

Lectures are performed at hospital ward on the first basement.  
Animal testing is held at 11th floor on the M&D tower.

## 3. Course Purpose and Outline

The research projects interrogate the mechanisms of the human response to acute shock and trauma. There are research projects about trauma management and epidemiology, shock, sepsis and disaster medicine. Animal work also takes place in the basic research laboratory. Students will be assigned to each study teams.

## 4. Course Objective(s)

We focus on promoting further research in the field of trauma, emergency medicine, disaster medicine and intensive care medicine. Our goal is to elucidate the medical questions of these topics.

## 5. Format

Lectures are performed individually.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Our mission is to understand biological human body reactions to life threatening events and to develop strategy for regulation the response. Clinical and basic research about trauma as well as the epidemiology and prophylaxis of trauma and disaster medicine are performed.

We aim to train researchers as a specialist for the field of acute critical care and disaster medicine who is able to join the Government science research.

Available programs:

Special Lecture TBA

Seminar Occasionally

Journal Club every on Tuesday at 5pm

Conference every morning

### Practice

Goals/Outline:

We carry out cutting-edge treatments and develop new therapeutics, through severe emergency critical care view points, aiming at revealing pathology of body reaction to the variety of stimuli.

Available programs:

Morning lecture: every morning at 7:30

Morning conference: every morning at 8:15

Morning doctors round: every morning after conference

Research conference: monthly on Tuesday

## **Lab**

Goals/Outline:

Our goal is to elucidate the mechanism of inflammation caused by severe insult such as trauma hemorrhagic shock and septic shock. Our research interest is especially the understanding for mechanistic link between lipid mediators and inflammatory signaling pathway.

Available programs:

Animal experiment : every day

Ask the corresponding person

## **7. Grading System**

Students will be graded

by their participation to Lectures, Practice and Lab; 80%

by the quality of publication and presentation of their study results; 20%

## **8. Prerequisite Reading**

no need for it

## **9. Reference Materials**

Texts are prepared individually.

## **10. Important Course Requirements**

Not especially

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

every day 9 to 5

## **13. Note(s) to students**

# Clinical Oncology

Lecture	(code: 7 2 4 1	1st year	:6units)
Practice	(code: 7 2 4 2	1st~2nd year	:4units)
Lab	(code: 7 2 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Satoshi Miyake E-mail: sm.conc@tmd.ac.jp

## 2. Classroom/Lab

To be announced.

## 3. Course Purpose and Outline

To overview the field of clinical oncology and acquire the systematic knowledge for palliative medicine and medical oncology.

## 4. Course Objective(s)

- ① To acquire the knowledge of comprehensive oncology and the skill for explain to the others.
- ② To facilitate the discussion in the field of multi-disciplinary collaboration.
- ③ To acquire the method to improve patients' QOL.

## 5. Format

Class sizes are kept small to facilitate discussion and communication.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

- ① To understand comprehensive oncology.
- ② To have an up-to-date knowledge of palliative medicine and cancer chemotherapy.

Available programs:

Lecture: Clinical Oncology I & II (2 weeks between September and December 18:30~21:10)

Special lecture to be announced

Seminar to be announced

Conferences: Palliative care; Every Monday 17:00~18:00, Cancer board; Every Thursday 18:00~19:00

### Practice

Goals/outline:

- ① To develop skills for communication and team approach. (Palliative Care Team)
- ② To develop skills in terms of assessment and management of various cancer symptoms.

Available programs:

### Lab

Goals/outline:

To have an knowledge of scientific findings and practice specialized research techniques for this area.

Available programs:

Animal experiment : none

Ask the corresponding person

## **7. Grading System**

Grades are dependent on attendance, research work, presentation at academic meeting and publications.

## **8. Prerequisite Reading**

To be announced.

## **9. Reference Materials**

Oxford Textbook of Palliative Medicine

## **10. Important Course Requirements**

To be announced.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

e-mail: sm.conc@tmd.ac.jp, Mon to Fri, 0830-1730

## **13. Note(s) to students**

Not in particular.

# Dentistry for Persons with Disabilities

Lecture	(code: 8 4 5 1	1st year	:6units)
Practice	(code: 8 4 5 2	1st~2nd year	:4units)
Lab	(code: 8 4 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Associate Professor Osamu Shinozuka Assistant Professor Yasuka Kusumoto  
Part-time Lecturer Youhei Takeuchi, Moriyuki Nakamura, Naoki Hayashi  
Contact person: Osamu Shinozuka E-mail o.shinozuka.dpd@tmd.ac.jp

## 2. Classroom/Lab

Lecture : Room 310 on the 3rd floor of Building 10 (Library Room of Dentistry for Persons with Disabilities )  
Clinical Conference : Special Care Clinic on the 1st floor of Dental Building North

## 3. Course Purpose and Outline

This course is designed to provide students with opportunity to enhance knowledge about physical , mental and medical conditions of disabilities, and to learn about dental management.

## 4. Course Objective(s)

Students expand knowledge about physical, mental and medical conditions of disabilities, and consider clinical application.

## 5. Format

Lectures and group discussion. Small-group class will be conducted.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Lectures on evaluation of neurodevelopmental disorders (intellectual disability, autism spectrum disorder, etc.), and physical disability (cerebral palsy, systemic disease, visual and hearing disorders, etc.), and the methods for management of these disabilities will be given.

Available programs:

Lecture Jun. 12 to Jul. 10 Tuesday 16:00~17:30

Special Lecture as needed

Seminar as needed

Journal Club as needed

### Practice

Goals/Outline:

Students join the clinical work at Special Care Clinic to master diagnosis, treatment planning and behavior management for patients with special needs.

Available programs:

Clinical Conference Wednesday 16:00~17:00

### Lab

Goals/Outline:

Students participate in research concerning patients with special needs, and learn the basic methods and skills for experimentation

Available programs:

Students can join any research groups at any time.

## **7. Grading System**

The grading will be made based on the situation of participation to lectures, practices, labs and content of research. In addition, the degree of contribution in research and research meeting, number of presentation at academic meetings will be considered for comprehensive evaluation.

## **8. Prerequisite Reading**

It is recommended to read reference material before lecture.

## **9. Reference Materials**

日本障害者歯科学会編集:スペシャルニーズデンティストリー 障害者歯科 第2版, 医歯薬出版, 東京, 2017.

## **10. Important Course Requirements**

none.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact Osamu shinozuka: E-mail o.shinozuka.dpd@tmd.ac.jp

## **13. Note(s) to students**

If necessary, please contact us by e-mail.

# General Dentistry

Lecture	(code:	1st year	:6units)
Practice	(code:	1st~2nd year	:4units)
Lab	(code:	2nd~3rd year	:8units)

1. Instructor(s)

2. Classroom/Lab

Not offered

# Psychosomatic Dentistry

Lecture	(code: 8 4 7 1	1st year	:6units)
Practice	(code: 8 4 7 2	1st~2nd year	:4units)
Lab	(code: 8 4 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Akira TOYOFUKU Assistant Professor: Miho Takenoshita Part-time instructor: Haruhiko MOTOMURA, Ayano KATAGIRI, Tatsuya YOSHIKAWA  
Contact person: Akira TOYOFUKU E-mail toyoompm@tmd.ac.jp

## 2. Classroom/Lab

Ask to contact person before the class

## 3. Course Purpose and Outline

Pursuing the pathophysiology of oral psychosomatic disorders from the viewpoint of brain-body interactions

## 4. Course Objective(s)

A. Understanding on MUOS (medically unexplained oral symptoms) B. Discrimination between psychiatric disorders and oral psychosomatic disorders

## 5. Format

Hold a small class in principle and discussion as occasion demands

## 6. Course Description and Timetable

### Lecture

Goal/outline

Seminar on Analysis of Mind-body Interaction Mechanisms and Clinical Application. The aim of this lecture is to learn about the features and mechanisms of oral psychosomatic disorders, especially chronic oral pain and phantom bite and discuss the clinical application on patients.

Available programs:

Lecture Jul. 3 to Jul. 31 Tuesday 18:00~20:00

Special Lecture any time

Seminar any time

Journal Club 8:00~8:25 every Tuesday & Thursday

Clinical Conference 17:00~18:00 every day except Friday

### Practice

Goals/Outline:

Learn about clinical research on mind-body interaction mechanisms, especially on psychogenic oral pain. Method to carry out epidemiology, symptomatology and psychosocial treatment-related research of oral psychosomatic disorders including burning mouth syndrome, atypical odontalgia, oral dysesthesia and occlusal discomfort (phantom bite syndrome) will be supervised.

Available programs:

- 1) Clinical round by professor (every day)
- 2) Study on pathophysiological mechanism of oral psychosomatic disorders
- 3) Psychosomatic study on oro-facial medically and psychiatrically unexplained symptoms
- 4) Development of effective treatments for oral psychosomatic disorders in primary care

## **Lab**

### Goals/Outline:

Research on stomatosensory information-processing mechanisms between trigeminal nerve and the central nervous system. Method to carry out cognitive neuroscience, psychopharmacology, pathophysiology, and biological treatment-related research of oral psychosomatic disorders including burning mouth syndrome, atypical odontalgia, oral dysesthesia and occlusal discomfort (phantom bite syndrome) will be supervised. Our research focuses on body-mind pathophysiology of "phantom tooth pain", especially information processing of the pain in the brain and the descending modulatory system in the central nervous system.

### Available programs:

- 1) Brain imaging of oral psychosomatic disorders
- 2) Psychopharmacological study on oral psychosomatic disorders
- 3) Experimental Research on chronic oral pain

## **7. Grading System**

Participation in class, seminar and practice will be graded comprehensively (70%). In Lab, grading will be done based on contribution for the study group, reports and presentation at academic meetings (30%).

## **8. Prerequisite Reading**

See <http://atoyofpsd2.wixsite.com/home>

## **9. Reference Materials**

See <http://atoyofpsd2.wixsite.com/home>

## **10. Important Course Requirements**

Absence without a report is not allowed.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Tuesday 16:00-18:00 E-mail [toyoompm@tmd.ac.jp](mailto:toyoompm@tmd.ac.jp)

## **13. Note(s) to students**

Intend to hold some special classes about 'mind' and 'consciousness' from a viewpoint of brain science. Check with the teacher in charge for the program which is not specifically scheduled.

# Behavioral Dentistry

Lecture	(code: 8 4 8 1	1st year	:6units)
Practice	(code: 8 4 8 2	1st~2nd year	:4units)
Lab	(code: 8 4 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Hiroshi Nitta      E-mail nitta.behd@tmd.ac.jp

## 2. Classroom/Lab

Generally, Lab. Room of Behavioral Dentistry ( Building #10, 3F ) (Practice and Lab. in an other place as needed )

## 3. Course Purpose and Outline

To provide patient-centered and comprehensive medical care, the student learn the availability of the approach using behavioral sciences.

## 4. Course Objective(s)

On practicing comprehensive medical care, students understand the significance of understanding psychosocial and behavioral scientific background of patients.

## 5. Format

The student attending a lecture distributes the teaching materials beforehand and explains about a content of a part in charge of. Seminar is carried out in a reading by turns form. Other reference-related documents are used as needed. The participant performs discussion based on a clinical case in all the members. The participant takes the record every time and reflects on the next time

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To practice desirable comprehensive medical care, learners get knowledge of applying behavioral sciences in providing health care

Available programs:

Lecture : Term : Oct.9 to Dec.18 Tuesday 18:00~20:00

Special Lecture : ( at all times )

Seminar : Generally every Tuesday, 18:30 ~ 20:00

Journal Club: ( at all times ) Behavioral Dentistry, 2nd Edition

David I. Mostofsky, Farida Fortune November 2013, ©2014, Wiley-Blackwell

### Practice

Goals/Outline:

Learners will be able to get practical competence for interpersonal communication skill and statistics on behavioral sciences in health care

Available programs:

Conference, Journal Club on related readings, Case Study, Data analysis of questionnaire for Patient Satisfaction

## **Lab**

Goals/Outline:

Learners will be able to make research plan for behavioral sciences in health care by applying learned knowledge and skills.

Available programs:

Case Study, Assistant of data analysis of questionnaire for Patient Satisfaction

## **7. Grading System**

Integrated evaluation:

Percentage of attendance for Lecture, Practice and Lab.

Research content.

Research report

Presentation

## **8. Prerequisite Reading**

Behavioural Sciences for Dentistry , Gerry Humphris, Margaret Ling, ELSEVIER, 2000,

Behavioral Dentistry (2nd Edition), David I. Mostofsky, Farida Fortune, Wiley-blackwell 2013

## **9. Reference Materials**

Journal of American Dental Association (JADA)

## **10. Important Course Requirements**

none

## **11. Lectures in English**

All lectures are conducted in Japanese.

## **12. Office Hour**

Wednesday, 17:00–18:00,

Please get in touch with me in advance. E-mail [nitta.behd@tmd.ac.jp](mailto:nitta.behd@tmd.ac.jp)

## **13. Note(s) to students**

none

# Professional Development in Health Sciences

Lecture	(code: 7 9 5 1	1st year	:6units)
Practice	(code: 7 9 5 2	1st~2nd year	:4units)
Lab	(code: 7 9 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Kazuki TAKADA  
Associate Professor: Jun TSURUTA  
Associate Professor: Mina NAKAGAWA  
Junior Associate Professor: Kumiko YAMAGUCHI  
Contact person: Jun TSURUTA E-mail: turucie@tmd.ac.jp

## 2. Classroom/Lab

All sessions will be held at the Faculty Staff's Office of the Institute of Education, Room 501B, 5th floor, Building 1 West

## 3. Course Purpose and Outline

While age-associated physiological changes, increased numbers of comorbid systemic conditions, and an issue of polypharmacy all jeopardize oral hygiene status of the elderly, periodontal diseases, which result from decreased oral hygiene status, predispose to and aggravate diabetes and cardiovascular diseases. In addition, the advancement in medical and dental sciences have blurred boundary between medical and dental care. Therefore, the aging society in the 21st century requires coordinated and collaborative care between medical, dental, and other health professionals. Furthermore, the advancement in information technology and rapidly increasing human mobility continue to blur boundary between countries or states. Education and professional development for health professionals need to continue to evolve as well as to adjust to such concurrent societal needs. Coursework, activities and projects, and research that students engage aim to produce leaders in health professional education who could assess concurrent societal needs for healthcare and develop appropriate curriculum by drawing on key pedagogical theories and learning methods and by using a process-based approach and outcome logic models.

## 4. Course Objective(s)

At the end of the course, students will be able to:

- 1) Describe the history, legality, and entire scheme (from undergraduate and graduate education and to continued professional development) of medical and dental education in Japan
- 2) Describe systems, accreditation, and quality control measures for health professional development in Japan and other countries
- 3) Describe key educational theories and learning methodologies which draw on those theories
- 4) Describe and effectively use a process-based approach and an outcome logic model in planning and running curriculum
- 5) Conduct survey and analysis necessary for societal needs assessment, set appropriate learning goals based on survey results, and select assessment methodologies appropriate for the goals
- 6) Design a logical and feasible curriculum that best fits its ecosystem

## 5. Format

Students' learning activities include participation to lectures, various activities, project work, and research. Lectures are bidirectional and student-centered, and students are expected to come well-read and prepared and to participate actively. Program is organized based on the experiential learning theory by David Kolb, incorporating components of reflective observation, abstract conceptualization, active experimentation, and concrete experience.

## 6. Course Description and Timetable

Check with the course instructors for session schedules and timetable.

### Lectures

Goals/outline:

Lectures are bidirectional, are student-centered, and provide opportunities for learners to acquire high-level and practical knowledge of the followings: history of medical and dental education in Japan, professional education/development/certification in Japan and North American/European countries, key pedagogical theories and learning methods, process-based approach and logic models in curriculum development, and competencies and their assessment/evaluation.

Available programs:

Lectures/activities/project work: 13:00-14:00 Tuesday  
Journal club: 11:00-12:00 Tuesday

## **Activities and project work**

Goals/outline:

Students will engage in various activities and project work to apply knowledge and skills they acquire through lectures. Examples of activities/project work are societal needs assessment (survey and analysis) for future health professionals, defining competencies/choosing appropriate learning methods and assessment/evaluation methods, and developing curriculum using process-based approach and logic models.

Available programs:

Lectures/activities/project work: 14:00–15:00 Tuesday

## **Research**

Goals/outline:

By participating in our research activities, students will become able to recognize unresolved clinical or scientific questions, formulate an hypothesis, identify methods and resources to address this hypothesis, understand the scientific theory and methodology (both quantitative and qualitative) that form the basis of medical discoveries, communicate new knowledge obtained from scientific inquiry responsibly and clearly, and understand the ethical requirements for human-oriented scientific inquiry.

Available programs:

- Needs assessment in health care and in professional development in health science fields
- Curriculum development for professionals of the future needs in health sciences
- Interprofessional education curriculum development

## **7. Grading System**

Students will be graded based on their active participation to class sessions, research, and academic activities (participation to and presentation at domestic and international research conference).

## **8. Prerequisite Reading**

Come to class prepared and ready to participate actively, by reading assigned texts and other required materials carefully and comprehensively before the class session. Participate in class through active listening, taking notes, asking questions, taking part in discussions, engaging your mind on the topic matter, and respecting other people's viewpoints. Always raise your hand before sharing something with the class. Students who do not participate in class discussions or who do not ask questions may be believed to be unprepared for class. Study outside of class by reviewing course notes after each class session and studying in small groups with classmates.

## **9. Reference Materials**

- 1) Understanding Medical Education: Evidence, Theory and Practice: Tim Swanwick, Wiley-Blackwell, 2010
- 2) Curriculum Development for Medical Education: A Six-Step Approach: David E. Kern, Patricia A. Thomas, Mark T. Hughes, The Johns Hopkins University Press, 2010
- 3) Professionalism in Medicine: A Case-Based Guide for Medical Students: John Spandorfer, Charles A. Pohl, Cambridge university Press, 2010
- 4) Assessment in Health Professions Education: Steven M. Downing, Rachel Yudkowsky, Routledge, 2009
- 5) Millennials Rising: The Next Great Generation: Neil Howe, William Strauss, Random House LLC, 2000
- 6) A Practical Guide for Medical Teachers: John A. Dent, Ronald M. Harden, Churchill Livingstone, 2013
- 7) Qualitative Research & Evaluation Methods: Integrating Theory and Practice: Michael Quinn Patton, SAGE Publications, Inc, 2015

## **10. Important Course Requirements**

Dates, time, and location of each session are subject to change. Please check with the most updated course syllabus.

## **11. Lectures in English**

All lectures are conducted in English.

## **12. Office Hour**

Kazuki Takada (Professor): 14:00 – 15:00 Monday

Jun Tsuruta (Associate professor): 15:00–16:00 Friday

Mina Nakagawa (Associate professor): 16:00–17:00 Thursday

Kumiko Yamaguchi (Junior associate professor): 16:00–17:00 Tuesday

## **13. Note(s) to students**

# Neuroanatomy and Cellular Neurobiology

Lecture	(code: 7 2 5 1	1st year	:6units)
Practice	(code: 7 2 5 2	1st~2nd year	:4units)
Lab	(code: 7 2 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Sumio TERADA, Assistant Professors: Masahiko KAWAGISHI, Kenta SAITO, Keisuke SATO  
Contact person: Sumio TERADA E-mail: terada.nana@tmd.ac.jp

## 2. Classroom/Lab

Lecture:

Conference and Seminar, Journal Club  
Staff Room 1/2, Department of Neuroanatomy and Cellular Neurobiology (Building 3, 13th floor)  
Special Lecture To be announced.

Practice:

Cellular neurobiology practice (Basic)  
Refer to the medical school timetable (Neuroanatomy).  
Cellular neurobiology practice (Advanced)  
Lab Rooms, Department of Neuroanatomy and Cellular Neurobiology (Building 3, 13th floor)  
Journal Club, Conference and Seminar  
Staff Room 1/2, Department of Neuroanatomy and Cellular Neurobiology (Building 3, 13th floor)

Lab:

Lab Rooms, Department of Neuroanatomy and Cellular Neurobiology (Building 3, 13th floor)  
EM Room, Instrumental Analysis Research Division, Research Center for Medical and Dental Sciences (Building 8 South, 3rd floor)

## 3. Course Purpose and Outline

The aim of this course is to provide students with a basic understanding of the morphological organization of the human nervous system as well as neuroanatomical methodologies in sufficient depth to form the basis for further research studies.

## 4. Course Objective(s)

- (1) To provide an overview of the organization of the nervous system and to understand its ultrastructure and cytoarchitectures.
- (2) To obtain a basic understanding of the spectroscopic techniques used to investigate morphological and functional connectivity of neurons.

## 5. Format

Special Lectures are open to every student interested in attending. Limited to 5-6 students in other programs.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To discuss morphological and molecular cell biological basis of selected studies. Topics include cellular neurobiology and other related areas with special reference to microscopic and spectroscopic techniques. Special lectures by prominent researchers are arranged irregularly.

Available programs:

Conference and Seminar From 2:00 PM, on every other Friday.  
Special Lecture To be arranged.  
Journal Club To be arranged.

## **Practice**

Goals/Outline:

Survey of the anatomy and functional organization of the human central nervous system with clinical applications, from basic to expert level. Advanced level of survey (including specialized journal club, and/or conference) is arranged, if necessary.

Available programs:

Cellular neurobiology practice (Basic) Refer to the medical school timetable (Neuroanatomy).

Cellular neurobiology practice (Advanced) To be arranged.

Journal Club To be arranged.

Conference and Seminar From 2:00 PM, on every other Friday.

## **Lab**

Goals/Outline:

Lectures and laboratory treating the central nervous system from the ultramicroscopic points of view are arranged.

Available programs:

Cellular neurobiology lab Consult the course manager. Over two solid weeks are necessary.

## **7. Grading System**

Grading will be based on class participation (100% for Lecture and Practice, 75% for Lab) and on a short paper (25% for Lab) in English or Japanese.

## **8. Prerequisite Reading**

Prerequisite: Basic undergraduate-level knowledge on biomedical sciences

## **9. Reference Materials**

1. Jackson MB. Molecular and Cellular Biophysics. Cambridge Univ Press; 1st ed (2006).
2. Hayat MA. Principles and techniques of electron microscopy. CRC Press; 3rd ed (1989).

## **10. Important Course Requirements**

Consult your academic advisor in advance on schedule before taking the course.

## **11. Lectures in English**

All lectures are conducted in Japanese.

## **12. Office Hour**

Pre-inquiry by e-mail (terada.nana@tmd.ac.jp) is preferable.

## **13. Note(s) to students**

Enrollment limited up to 5-6 students except Special Lectures.

Prereq; Permission of instructor for non-medical students.

Preference to non-medical graduate students for Cellular neurobiology practice (Basic).

# Systems Neurophysiology

Lecture	(code: 7 2 6 1	1st year	:6units)
Practice	(code: 7 2 6 2	1st~2nd year	:4units)
Lab	(code: 7 2 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Izumi Sugihara      Associate Professors: Yuriko Sugiuchi, Yoshiko Izawa

## 2. Classroom/Lab

Office room of the professor (Building 3, 14th floor)

## 3. Course Purpose and Outline

We hope that the participants can learn knowledge, research techniques, and way of thinking in neuroscience, or neurophysiology and related fields in particular by attending our courses.

## 4. Course Objective(s)

We hope each participants can obtain capability of planning, conducting and evaluating neuroscience research.

## 5. Format

Weekly lectures are designed for a small group of participants. Practices are designed for a small number of students. All the courses can be in English.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The nervous system is studied in a variety of ways from gene, molecular through cellular, neural network, and in vivo levels because of its anatomical complexity and functional diversity. The goal of our education is for students to understand the link between the morphology and function of the nervous system through neurophysiological approaches mainly at the neural network level and to learn a way of thinking about further questions about the nervous system, including those about pathological states of the nervous system in diseases. For this purpose, we give lectures on the neural structure, network, function, development and molecular expression of the cerebellum, cerebrum, basal ganglia, and brainstem.

Available programs:

Weekly graduate course lecture      Every Monday 18:30~19:30  
Special Lecture      December 5, 17:00~19:00 (planned)

### Practice

Goals/Outline:

To support for students to learn for themselves basic matters in neuroscience and neurophysiology, we provide technical practices, journal club and seminars for progress reports. Technical practices include basic electronics (e.g. designing and making an amplifier), computer simulation programming, and analysis of neural networks using light and fluorescent microscopes.

Available programs:

Journal Club (or reading circle)      Every monday 17:30~18:30  
Lab practice      arbitrary

## Lab

### Goals/Outline:

To understand the structural and functional organization of the nervous system, we support for students to learn several basic neuroscience techniques including neuronal labeling with viral tracers and genetically manipulated animals, in vivo and in vitro electrophysiological techniques in anesthetized and awake trained animals. We then recommend students to utilize these techniques to analyse structure and function of basic neuronal systems in the brain such as somatosensory, vicerocensory, vestibular, cerebellar, oculomotor and reward systems. Students are supposed to learn basic approach to basic and clinical Available programs:

### Experiments and data analysis

Experiments include anesthesia, brain surgery (injection of tracers), perfusion, electrical microstimulation, recording and analysis of neural activity, neuronal labeling with immunohistochemical techniques, and three-dimensional mapping with a light microscope.

## 7. Grading System

Lecture: evaluation will be based on participation, preparation and involvement of a student

Practice: evaluation will be based on participation, preparation and involvement of a student

Lab: evaluation will be based on participation, reports and external activity (presentation and publication).

## 8. Prerequisite Reading

Participants have to prepare their presentation in the lecture. They have to read through the article for the Jornal Club. They are supposed to arrange other things with the instructor (professor).

## 9. Reference Materials

### Textbooks:

Ito, The Cerebellum, Brain for an Implicit Self. Pearson Education, 2012.

Carpenter and Reddi, Neurophysiology 5thEd, Hodder Arnold, 2012.

Bear et al., Neuroscience, Exploring the Brain, Lippincott.

Sanes et al., Development of the Nervous System, Academic Press Elsevier.

Squire et al., Fundamental Neuroscience, Academic Press Elsevier.

## 10. Important Course Requirements

Nothing special

## 11. Lectures in English

All lectures are conducted in English.

## 12. Office Hour

Contact person: Izumi Sugihara     E-mail isugihara.phy1@tmd.ac.jp,     Office hour: 8:30–17:15 daily.

## 13. Note(s) to students

<http://www.tmd.ac.jp/med/eng/eng/phy1-E.html>

# Pharmacology and Neurobiology

Lecture	(code: 7 2 7 1	1st year	:6units)
Practice	(code: 7 2 7 2	1st~2nd year	:4units)
Lab	(code: 7 2 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Tsutomu Tanabe      Assistant professor: Hironao Saegusa, Makoto Fujikawa, Daisuke Tanaka  
Contact person: Tsutomu Tanabe      E-mail t-tanabe.mphm@tmd.ac.jp

## 2. Classroom/Lab

Special lecture course and practice course are in the laboratory No. 1 and lab works are in the other laboratories.

## 3. Course Purpose and Outline

Many intriguing mysteries left in the issue of brain function like (1) learning and memory, (2) cognition and behavior, (3) generation of consciousness, (4) personality and mentality. On the other hand, in the modern world with a complicated human relations and prolonged life span, necessity of deeper understanding and development of the means to cure the numerous neurological disorders and pain is enormously increased.

## 4. Course Objective(s)

1. Become a scientist capable of lecturing science to students.
2. Become a scientist capable of conducting major experiments by him/herself.
3. Become a scientist capable of preparing a research plan by him/herself.
4. Become a scientist capable of writing a grant proposal by him/herself.

## 5. Format

Small group (5~6 persons) study

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

In the brain function like (1) learning and memory, (2) cognition and behavior, (3) generation of consciousness, (4) personality and mentality, many intriguing questions are still remained to be answered. On the other hand, in the era of satiation and longevity, needs for preventing and treating numerous neurological disorders and pain have been risen. For the purpose of integrating the accumulated findings of the neuronal function at the molecular and cellular level into the ones at the system level, we will lecture the subjects on (1) Neurotransmitter receptors, G-proteins and ion channels, (2) Ion channelopathies, (3) Neurodegeneration and functional disturbance in the central nervous system, (4) Central control of pain perception and sensation, (5) Pharmacological control of stem cell proliferation and differentiation in this special lecture course.

Available programs:

Lecture	Every Monday 17:00-18:00
Special Lecture	Graduate School of Medicine Lecutere Series 31 times/year
Seminar	Once a month
Journal Club	Monday 11:00-12:00      Thursday 17:30-18:30

### Practice

Goals/Outline:

1. Acquire the skills of preparing an informative presentation and develop an effective way of presenting results in the audience.
2. Understand the meaning of the research conducted and learn how to figure out the meaningful future directions from the conclusions.
3. Practice answering the questions raised by the audience.

Available programs:

Conference report      on-demand basis  
Progress report        once a month for each small group  
Research presentation   twice a year

## **Lab**

Goals/Outline:

During the first couple of months, students are requested to acquire basic techniques of biochemistry, molecular biology, pharmacology and electrophysiology that are routinely used in our laboratory. Then students will be given a small project to do using the techniques they have learned during the initial training. Students are also required to read relevant scientific papers and conduct seminar style lectures to other lab members monthly. After completion of the initial phase, students start their own project under the supervision of the faculties in the lab.

Available programs:

1. Regulation of Microglial Ca channel function in Neuroinflammation/Neurodegenerative diseases
2. Regulation of Macrophage Ca channel function in Inflammatory bowel disease and Rheumatoid arthritis
3. Energy metabolic imaging at single cell level of cancer stem cell/cancer cell using Bioluminescence and FRET and Imaging
4. Energy metabolic imaging at single cell level of neuron, microglia and astrocyte in the degenerative area of the mouse model of various neurodegenerative diseases
5. Neural mechanisms of pleasure and motivation in feeding
6. Molecular basis of Calcium channelopathy
7. Alteration of Neuron-Glia interaction in Neurological disorders

## **7. Grading System**

Grading is based on the wide-ranging evaluations, including attendance record (60%) and the degree of contribution on the course (10%). Furthermore, contribution to the research planning and progress (20%), presentation at the research conference (10%)

## **8. Prerequisite Reading**

Read reviews and original papers covering the fields and understand the contents. Read the textbook of brain science and neuroscience to deepen the knowledge related to the fields.

## **9. Reference Materials**

Principles of Neural Science (5th ed.) McGraw Hill, 2013. ISBN 0-07-139011-1  
Molecular Biology of the Cell (6th ed.) Garland Science, 2014 ISBN 9780815344322

## **10. Important Course Requirements**

None

## **11. Lectures in English**

All lectures are conducted in English.

## **12. Office Hour**

Office hours are not especially provided. Make an appointment by e-mail (t-tanabe.mphm@tmd.ac.jp) before visiting.

## **13. Note(s) to students**

none

# Molecular Neuroscience

Lecture	(code: 7 2 8 1	1st year	:6units)
Practice	(code: 7 2 8 2	1st~2nd year	:4units)
Lab	(code: 7 2 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Kohichi Tanaka

Contact person: Molecular and Cognitive Neuroscience Kohichi Tanaka E-mail tanaka.aud@mri.tmd.ac.jp

## 2. Classroom/Lab

Please confirm venue with instructors

## 3. Course Purpose and Outline

The final goal of this course is to understand molecular, cellular, and neuronal ensemble mechanisms underlying higher order brain functions including learning and memory. For that purpose, we teach molecular genetics, physiological and behavioral methods.

## 4. Course Objective(s)

Connecting neural mechanisms of behavior to their underlying molecular and genetic substrates

## 5. Format

All programs will be held with small-group. We will provide opportunities for discussions as much as possible to improve communication with students.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Cognition consists of sensory inputs from vision, somatic sensation, hearing, olfaction and taste, and memory retrieved from these. In this lecture, we will review the latest findings of mechanism of sensation and memory, the fundamental processes of cognition, at the level of molecule, cell, system and behavior. Furthermore, we address how sum of these findings constitutes cognition.

Available programs:

Journal Club Every Friday 11:00 - 12:00

### Practice

Goals/Outline:

The aim of this practice is to learn molecular biological, anatomical, electrophysiological and psychological approaches to elucidate the mechanism of cognition. Moreover, based on previous case reports of cognitive deficits, students should plan and discuss what kinds of the researches are possible and meaningful to elucidate the pathology of these diseases, leading to unveil the mechanism of cognition.

Available programs:

Progress Report, Every Friday 10:00 - 11:00

### Lab

Goals/Outline:

Students should generate genetically modified animals to comprehensively understand the cognitive mechanisms at the level of molecule to behavior. Then, students should analyze cognitive deficits of mutant animals and those molecular mechanisms.

Available programs:

Participation in the ongoing research project; as needed  
Training for cell biology: five times a year 13:00 - 16:00

Experiment:

1. Gene cloning and generation of targeting vector.
2. Generation of genetically modified mice
3. Behavioral analysis of the mice
4. Morphological analysis of central nervous systems.

## **7. Grading System**

Students are evaluated for their participation in course, research reports, presentations at academic meetings and publications.

## **8. Prerequisite Reading**

N/A

## **9. Reference Materials**

- [Neuroscience—Exploring the brain] (Lippincott Williams & Wilkins)
- [From Neuron to Brain] (Sinauer)

## **10. Important Course Requirements**

N/A

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

8:30–12:00

## **13. Note(s) to students**

In principle, progress report and journal club are held with less than ten participants.

# Neuropathology

Lecture	(code: 7 2 9 1	1st year	:6units)
Practice	(code: 7 2 9 2	1st~2nd year	:4units)
Lab	(code: 7 2 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Hitoshi Okazawa    E-mail okazawa.npat@mri.tmd.ac.jp

## 2. Classroom/Lab

Need to check with professor in advance; classes are different in each program.

## 3. Course Purpose and Outline

Understanding of the outline of research on neurodegenerative diseases and developmental disorders

## 4. Course Objective(s)

Obtaining the ability to design and perform original research

## 5. Format

The size of the class should be small. In order to stimulate interaction with participants, the class will be discussion-oriented.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Recently, not only elucidation of molecular mechanisms underlying neurodegenerative disease pathology, but also development of therapeutic approaches utilizing the elucidated molecular mechanisms has been extensively progressed. In this lecture, while we teach students the latest progress in the field, we will especially focus on understanding of aggregation of abnormal disease protein and molecular alteration or impairment of functional proteins caused by the protein aggregation in neuronal cells.

Available programs:

Lecture    As scheduled

Special Lecture    As scheduled

Seminar    As scheduled

Journal Club    Once a week: 13:00-15:00

Conference    As scheduled

### Practice

Each lab member should systematically describe their research progress and the knowledge in related field in short time. Advices to develop members' presentation skills will be given.

Available programs:

Rehearsals and reports for conferences: As needed

Research progress report: Tuesdays and Thursdays 17:00-18:00

**Lab**

Goals/Outline:

To elucidate molecular mechanisms underlying neurodegenerative diseases and to develop new therapeutic approaches utilizing the molecular mechanisms obtained. We generally use fly and mouse models expressing the disease genes in neurons. Techniques that we use are: molecular biology using plasmid, cosmid, and virus vector; immunohistochemistry; primary culture of neuronal cells and neural stem cells; creation of genetically modified mouse.

Available programs:

As needed

**7. Grading System**

Students will be evaluated based on quality of research reports, presentations in conferences, and /or scientific papers.

**8. Prerequisite Reading**

Related papers would be suggested in each occasion.

**9. Reference Materials**

Suggestions will be provided in each project.

**10. Important Course Requirements**

n.a.

**11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

**12. Office Hour**

10AM-6PM

**13. Note(s) to students**

Number of participants for journal club and research meeting in the lab should be around 10 people.

# Ophthalmology and Visual Science

Lecture	(code: 7 3 0 1	1st year	:6units)
Practice	(code: 7 3 0 2	1st~2nd year	:4units)
Lab	(code: 7 3 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor; Kyoko Ohno-Matsui, Junior Associate Professor; Hiroshi Takase, Takeshi Yoshida, Koju Kamoi  
Contact person: Kyoko Ohno-Matsui E-mail k.ohno.oph@tmd.ac.jp

## 2. Classroom/Lab

Ask the instructor for details

## 3. Course Purpose and Outline

Basic and advanced learning of ophthalmology

## 4. Course Objective(s)

To learn the knowledges and skills required in ophthalmic research

## 5. Format

To discuss the details of research protocols in a small group and to provide some lectures to facilitate the students to make their own research plan

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To understand the pathophysiology of various tissues within the eye and visual pathways and to understand the pathogenesis, diagnosis, and treatments of various ocular disorders

Available programs:

Lecture as needed

Special Lecture as needed

Seminar as needed

Journal Club as needed

Lecture of eye disease the first Monday of every month Research progress; the third Monday of every month

### Practice

Goals/Outline:

To realize the diagnostic procedures and treatment strategies against various ocular disorders

Available programs:

Research progress; once a month, fourth Monday, Spot diagnosis; once a month, second Monday

Clinical Conference: every Wednesday

### Lab

Goals/Outline:

To investigate the pathogenesis of various ocular disorders using surgically obtained specimens or human eye samples by immunological, molecular biological, and pathological methods

Available programs:

research progress; once a month, second Tuesday

### **7. Grading System**

Grade evaluation is comprehensively performed according to the attendance at conference, lecture and practice, the attitude shown by the presentation and making comments during the discussion, the research content, and the number of conference presentation as the first author.

### **8. Prerequisite Reading**

Reading textbooks of ophthalmology or basic research in this field.

### **9. Reference Materials**

The Eye :Basic Science in Practice (SAUNDERS) etc

### **10. Important Course Requirements**

Nothing particularly

### **11. Lectures in English**

Lectures will be partially conducted in English.

Research Progress meeting will be conducted in English.

### **12. Office Hour**

Please contact and ask our department.

### **13. Note(s) to students**

We would like to recruit the students who are highly motivated and interested in visual science and ophthalmology.

# Otorhinolaryngology

Lecture	(code: 7 3 1 1	1st year	:6units)
Practice	(code: 7 3 1 2	1st~2nd year	:4units)
Lab	(code: 7 3 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Takeshi Tsutsumi

Contact person: Takeshi Tsutsumi E-mail tsutsumi.oto@tmd.ac.jp

## 2. Classroom/Lab

Please contact the leaders prior to lecture.

## 3. Course Purpose and Outline

Achieve the ability to perform the correct diagnosis and treatment of the disease in otorhinolaryngology and to design the basic research to analyze the pathophysiology of the disease in otorhinolaryngology.

## 4. Course Objective(s)

To study subjects of otolaryngology, that is, signs and symptoms of hearing loss, dysequilibrium, respiration, smell, swallowing, phonation. Also to research these pathologies using techniques of molecular biology, morphology and physiology.

## 5. Format

Small group teaching is principle. Through mini-conference and one-minute lecture, thorough discussion with lecturer, is planned.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Otorhinolaryngology manages various organs and disorders in ear, nose, throat, head and neck regions. Therefore, lots of signs, symptoms and disorders, that is, hearing disturbance, dysequilibrium, respiration, olfaction, swallowing, phonation, are research objects of otorhinolaryngology. Especially, communication disturbance concerning listening and speaking are featured speciality in otorhinolaryngology. Above mentioned organs have extremely precise mechanism, therefore, they suffer damages from various kinds of diseases, such like circulatory disturbance, infection, neoplasm and trauma. With current progress in molecular biology, novel mechanisms of otorhinolaryngological diseases will be investigated and the new prospects of the treatment will be presented.

In this course, we lecture pathology, etiology, diagnosis and treatment of otorhinolaryngological disorders with latest topics.

Available programs:

Special Lecture As occasion demands

Journal Club Every Tuesday morning.

Conference Every Tuesday evening

## **Practice**

Goals/Outline:

You will learn basic diagnostic techniques, examinations and data interpretations in otorhinolaryngology. Following subjects should be mastered; Techniques: otoscope, rhinoscope, laryngoscope.

Examinations: Hearing tests including pure-tone, speech, Bekesy, impedance audiometry, tubal function testing, otoacoustic emission, electrocochleogram, auditory brainstem response. Equilibrium tests including standard tests, electronystagmography, gravicorder and three dimensional oculography. Rhinological test: smell test and rhinometry. Diagnostic observation: middle ear, paranasal sinus, nasopharynx, larynx and hypopharyngeal endoscope. Ultrasonography: parotid, submandibular gland, thyroid, parathyroid and lymph node.

Data interpretations: After obtaining these data, you interpret the data and make an appropriate diagnosis and treatment for the patients by yourself.

In addition to these program, cadaver dissection for temporal bone, nose and paranasal sinus, head and neck will be scheduled.

Available programs:

Neuro-otological conference: Every Tuesday (17:00-18:00)

Professor round: B10 Ward: Every Tuesday (9:00-12:00)

Clinical conference: Every Tuesday (18:00-19:00)

Research seminar: 10 times per year, Thursday evening.

## **Lab**

Goals/Outline:

Mechanism causing otorhinolaryngological disorder varies, therefore, anatomy and physiology should be mastered. After that, clinical data, such as diagnosis and treatment outcome of the patient, are investigated and analyzed. Through these processes, your task is to investigate new features of pathology, and also to develop novel diagnostic methods and treatments. For this purpose, you can perform basic research using an animal model. In the laboratory, techniques of molecular biology, morphology, histopathology and electrophysiology are used.

Available programs:

- 1) Molecular biology in hearing and dysequilibrium disorder.
- 2) Clinical studies on dysequilibrium disorder and its treatment.
- 3) Electrophysiological research in cochlear pathology (basic and clinical researches)
- 4) Investigation of images and image-guided surgery in this area.

## **7. Grading System**

Achievement of attendance to the lecture, seminar, laboratory is evaluated. Research report and presentation in convention are also estimated. Your overall activity will be assessed.

## **8. Prerequisite Reading**

Please consult to lecturer.

## **9. Reference Materials**

Modern Oto-Rhino-Laryngology, Yasuya Nomura, Kimitaka Kaga(Editors), 2013 Nanzando, Tokyo

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Every Friday 16-18: Dr. T.Tsutsumi E-mail: tsutsumi.oto@tmd.ac.jp

## **13. Note(s) to students**

No limitation for applicant. Presenter in the journal group will be limited to 10 persons.

# Neurology and Neurological Science

Lecture	(code: 7 3 2 1	1st year	:6units)
Practice	(code: 7 3 2 2	1st~2nd year	:4units)
Lab	(code: 7 3 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor and Chairperson: Takanori Yokota Professor: Nobuo Sanjyo  
Junior Associate Professor: Satoru Ishibashi • Yoichiro Nishida  
Assistant Professor: Kokoro Ozaki, Takaaki Hattori, Yousuke Yagi, Keisuke Abe  
Contact person: Kokoro Ozaki  
E-mail: k-oznuro@tmd.ac.jp

## 2. Classroom/Lab

Check the website or office board for locations of lectures: Conference Room (B11F, medical hospital), Neurology and Neurological Science Laboratories (12F, 15F Building III), etc.

## 3. Course Purpose and Outline

Students have to understand characteristics of neurological diseases as a research object, through getting lectures and practical trainings for a proceeding of elucidating the pathogenic mechanisms, and development and improvement of diagnostic procedures or evaluation of the diseases.

## 4. Course Objective(s)

Students have to understand characteristics of neurological diseases as a research object, and acquire at least one method (technique) to perform elucidating the pathogenic mechanisms, or development and improvement of diagnostic procedures, evaluation or treatment of the diseases. Students will perform their projects and get a results using the methods.

## 5. Format

Students are trained by performing experiments, taking lectures and practicing in a small group. Throughout this course, students learn not only experimental techniques but also gain ideas and how to solve problems through discussions.

## 6. Course Description and Timetable

### Lecture

Goals/Outline:

Neurology and Neurological Science is a very broad, multidisciplinary field including degeneration, demyelination, paroxysmal disorder, vascular disorder, and inflammation that occurred in the central nervous system, peripheral nervous system, autonomic nervous system, and skeletal muscle.

Our field covers wide spectrum of neurological disorders, from those that are acute (e.g. stroke, disturbance of consciousness and seizure) to chronic/slowly progressive diseases (e.g. Alzheimer's disease), from common (e.g. epilepsy, headache) to very rare diseases, and from easily curable to intractable diseases. Throughout this doctoral course, the faculty and staff provide continued supports, explaining not only overview of the diseases but also new research methods such as molecular genetics, molecular biology, genetic engineering, immunological approach in order to elucidate causes and pathogenesis of these diseases and to establish therapies.

Available programs:

### Lecture

Special Lecture (e.g. ONSA seminar)	twice a year
Ochanomizu Brain Science Seminar	twice a year
Basic Research Journal Club	every Tuesday 17:00 - 18:00
Clinical Pharmacology Seminar	Tuesday(occasionally)14:30 - 14:45
Neurology Seminar	every Tuesday 14:30 - 14:45

### Practice

Our curriculum provides a program to practice the evaluation processes, enabling students to understand pathophysiology of cerebrovascular disorders, neurodegenerative diseases, and neuroimmunological diseases based on clinical examination and various laboratory examinations including neuroimaging study such as PET and MRI. In addition, the students practice the diagnostic process as well as process of deciding and performing a treatment.

Available programs:

Clinical neurology ward round	every Tuesday	8:00 – 12:00, 13:30 – 14:30
Clinical conference	every Tuesday	8:00 – 9:00
Neuromuscular conference	every Monday	17:00 – 17:30
Electrophysiological examination conference	every Monday	17:30 – 20:00
Neuroimmunology conference	every Thursday	16:00 – 18:00
Neuroimaging conference	every Thursday	16:00 – 18:00
Stroke conference	alternate Wednesday	18:00 – 19:00
Integrated clinical conference	the 2nd Wednesday	19:00 – 20:00

## Lab

Goals/Outline:

We conduct experiments by using immunological, molecular biological and molecular genetic methods in order to elucidate genes which are risk factors or causes of neurological diseases, metabolic derangement that leads to neuronal death, pathogenesis, and treatment for autoimmune diseases (e.g. Multiple Sclerosis, Myasthenia Gravis). We also carry out clinical studies using electrophysiological and neuroimaging techniques in order to elucidate pathophysiology.

Available programs:

Molecular genetics experiment	Everyday	available any time
Molecular biology experiment	Everyday	available any time
Biochemistry experiment	Everyday	available any time
Immunology experiment	Everyday	available any time
Morphology experiment	Everyday	available any time
Neuroimaging experiment	Every Thursday	available any time

## 7. Grading System

Students are evaluated based on their participation in the lectures, internships and experiments as well as their presentation at conferences and seminars. Publication of original papers is highly evaluated.

## 8. Prerequisite Reading

Students should make a contact with their teachers (primary investigators) to check textbooks and reference literatures. They are required to read those textbooks and well prepare for the lectures and practical trainings.

## 9. Reference Materials

Students should ask their teachers (primary investigators) because textbooks are different according to their projects.

## 10. Important Course Requirements

Not particularly.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Mail to contact person: Kokoro Ozaki: k-oznuro@tmd.ac.jp

## 13. Note(s) to students

The curriculum aims to provide education in a small group. Therefore, we may select applicants if candidates exceed the number of available enrollment spaces.

# Psychiatry and Behavioral Sciences I

Lecture	(code: 7 3 3 1	1st year	:6units)
Practice	(code: 7 3 3 2	1st~2nd year	:4units)
Lab	(code: 7 3 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Takayuki Okada, Professor

Contact person: Takayuki Okada TEL 5803-5242 E-mail takayukiok@gmail.com

## 2. Classroom/Lab

Office of the Professor, outpatient station conference room at the University Hospital, and other seminar rooms.

## 3. Course Purpose and Outline

This course aims at understanding the mechanisms of the brain function and dysfunction underlying the expression of cognition and behavior, as well as the etiology and pathophysiology of mental disorders by using molecular neurobiology, molecular genetics, neuroimaging, and neurophysiology. Its purposes also include to master various approaches to studies in the research field of forensic psychiatry. Fundamental knowledge of mental disorders, which is crucial to develop novel treatment and prophylaxis for them, will be provided during the course.

## 4. Course Objective(s)

The goals of this course are: 1) to understand major symptoms, treatment and hypothetical etiologies of schizophrenia, mood, anxiety, and other mental disorders, 2) to understand the mechanism of action of antipsychotics, antidepressants, anxiolytics, antiepileptics and others, 3) to understand psychotherapy and other treatment and care of mental disorders, and 4) to understand research objectives and methodologies of forensic psychiatry.

## 5. Format

Small group tutorial style by mentors, including research progress meeting, at-the-bench discussion, and journal seminars.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline: The lecture course aims at understanding the mechanisms of the brain function and dysfunction underlying the expression of cognition and behavior, as well as the etiology and pathophysiology of mental disorders. The methodologies of basic and clinical research using cutting-edge technologies of molecular neurobiology, molecular genetics, neuroimaging, and neurophysiology, and sociology and psychology will be instructed. Prevention and development of novel treatment of the disorders, and present condition and prospects of forensic psychiatry research will be further discussed.

Available programs:

Lectures	by department staffs as occasion demands
Special Lectures	by invited foreign and domestic speakers as occasion demands
Joint Seminars	with Department of Psychosomatic Dentistry once per year
Journal Club	every Thursday 8:00-8:45

### Practice

Goals/Outline: Training session program will be provided to master the internationally standardized classifications of operational diagnosis and the clinical scaling tools for psychiatric disorders. The basics for the planning of treatment and prophylaxis based on the comprehension of the psychiatric symptoms and diagnosis process will be acquired through clinical pharmacology, neuroimaging, neurophysiology, clinical biochemistry, and molecular genetics. In the field of forensic psychiatry, the ways to learn and practice the method of psychiatric evaluation, the biological basis of illegal acts and their relationship with mental illnesses will be mastered. Further skills should be also obtained to establish research strategies to deal with unsolved problems.

Available programs:

Clinical conference Thursday 9:15–12:00, 13:00–15:30

Joint case conference of Departments of Neurology, Neurosurgery and Neuropsychiatry Second Wednesday 18:30–19:30

Clinical research presentation Monday of the 1st week 17:00–19:00

Research conference of mental disorders as occasion demands: Thursday 18:00–19:30.

(Its information is available at the bulletin board in front of the laboratory and in the psychiatric ward.)

## **Lab**

Goals/Outline: The research goal is to investigate the neural mechanisms of mental disorders through the studies of clinical cases and experimental animal models. We will use the up-to-date techniques of the molecular biology, molecular genetics, neuroimaging, and neurophysiology to understand the etiology and pathophysiology of those illnesses and cognitive and behavioral dysfunctions at the molecular level. The final goal will be the development of novel diagnostic methods, treatment and prevention for the diseases. In the field of forensic psychiatry, we will conduct research from a new viewpoint on improvement of the method of psychiatric evaluation, the biological basis of illegal acts and their relationship with psychiatric disorders.

Available programs:

Ask the corresponding person.

## **7. Grading System**

Evaluation will be based on the research progress reports and presentation, paper publication in the research journals, and presentation at the national and international conferences.

## **8. Prerequisite Reading**

1) Required to read through the text and the handout–printing materials beforehand, 2) Prerequisite additional preparation will be in advance informed.

## **9. Reference Materials**

- 1) Kaplan & Sadock's Comprehensive Textbook of Psychiatry, 9th ed. Benjamin J. Sadock & Birginia A. Sadock (eds). Lippincott Williams & Wilkins. (electronic edition) 2009
- 2) Lewis's Child and Adolescent Psychiatry: A Comprehensive Textbook, 4th ed. André Martin & Fred R. Volkmar (eds). Lippincott Williams & Wilkins. (electronic edition) 2007
- 3) Molecular Neuropharmacology, 3rd ed. Eric J. Nestler, Steven E. Hyman, and Robert C. Malenka (eds). Mc Graw Hill Medical 2015

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person: Takayuki Okada TEL 5803-5237 E-mail takayukiok@gmail.com

## **13. Note(s) to students**

# Psychiatry and Behavioral Sciences II

Lecture	(code: 5 0 2 1	1st year	:6units)
Practice	(code: 5 0 2 2	1st~2nd year	:4units)
Lab	(code: 5 0 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Takayuki Okada

## 2. Classroom/Lab

Seminar Rooms in Building #3 (for more detailed information, check with the instructor)

## 3. Course Purpose and Outline

The main purpose of this course is to introduce you to the basics of forensic, especially criminal psychiatry. Forensic psychiatry is one of the subspecialty of applied psychiatry and deal with varied topics between law and mental health. Some of the topics covered in this course will include the basic structure of the criminal and mental health systems for Mentally Disordered Offenders (MDOs), the historical and social background of the systems. We will explore these topics by reviewing psychiatry, psychology, legal, sociological research findings, and discussing how we can apply them to the research activity for revealing psychopathology of criminals and developing violence risk assessment and management tools and crime prevention strategy.

## 4. Course Objective(s)

- (1) Outline the basic criminal system and mental health systems and the interaction between them.
- (2) Accurately describe the legal concept of forensic psychiatry examination and criminal responsibility (insanity defense)
- (3) Recognize the psychological features of offenders of various crime types.
- (4) Be able to identify and describe various theories of crime, diagnostics, treatment, correction, social reintegration of mentally disordered offenders.
- (5) Demonstrate a basic understanding of the latest research trend of criminal psychiatry, criminal psychology, criminal sociology, and criminal law study.

## 5. Format

The lecture and practice will be held in small-group basis.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

This course provides students with insight into some of the basic interactions between legal system and mental health system. This course deal with a wide variety of materials relevant to the study of forensic psychiatry including treatment of MDOs, criminal responsibility, forensic psychiatric expert testimony, risk assessment and risk management of MDOs. Students will learn about the basic and applied biological research approach to the etiology of crime and social problematic behaviors.

Available programs:

- (1) lecture for graduate students: 19:00~21:00 on Wednesday (alternate-week)
- (2) special lecture for graduate students: not regularly scheduled
- (3) graduate seminar: not regularly scheduled
- (4) graduate seminar on psychiatry and behavioral sciences: 18:00~19:00 on Monday and Thursday (alternate-week)

### Practice

Students learn the basic concept and skills of forensic case assessment and management from discussing cases of forensic expert examinations and clinical cases under the Medical Treatment and Supervision Act (MTSA). Students will set a research agenda from these discussions and establish their basic research plan.

Available programs:

- (1) Clinical conference: 10:45~12:15, 14:30~17:00 on Thursday
- (2) Forensic Case Conference: not regularly scheduled

### **Lab**

Students establish their own research plan and conduct the research (collect data, analyze the data, discuss the results, write a research paper, and submit it to a scientific journal). The forensic psychiatry research topics may vary widely depending on the student's interest, for example, the political research about forensic mental health services and correctional medicine, methodological study about forensic report writing, developing effective practice of expert testimony, validation study of risk assessment and risk management tools in forensic settings.

Available programs:

Students choose their own research topics. Along with the theme, program (location and schedule) will be decided.

### **7. Grading System**

The grade determination is based on your attendance, class (lecture, practice, and Lab) participation, oral participation in class discussion, report writings. Also, an excellent research activity, for example, frequent presentation in research meetings, publishing in major journal can be comprehensively considered to the grading.

### **8. Prerequisite Reading**

- (1) Students are expected and required to have elementary knowledge of and enough background in general psychiatry, because this course is in APPLIED psychiatry.
- (2) Students should prep the relevant sections of the reference materials.
- (3) Instructor will provide advance notice when special preparation required.

### **9. Reference Materials**

- (1) Forensic Psychiatry (volume 1~ 6) Masaaki Matsushita ed. Nakayama-shoten (in Japanese) 2006
- (2) Forensic Psychiatry and Expert Testimony (Clinical psychiatry lecture series 19) Masaaki Matsushita ed. Nakayama-shoten (in Japanese) 1998
- (3) Forensic Psychiatry: Clinical, Legal and Ethical Issues (second edition) John Gunn, Pamela Taylor CRC Press 2014
- (4) Study Guide To Forensic Psychiatry (second edition) Robert I. Simon, Robert E. Hales American Psychiatric Publishing 2010

### **10. Important Course Requirements**

Students must maintain confidentiality of all clinical and research data and client information.

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

Mon 10:00-18:00, Thur 18:00-19:00 in room #5 of Psychiatry and Behavioral Sciences on 13th floor of building #3 Takayuki Okada E-mail takayukiok.psyc@tmd.ac.jp

### **13. Note(s) to students**

# Neurosurgery

Lecture	(code: 7 3 4 1	1st year	:6units)
Practice	(code: 7 3 4 2	1st~2nd year	:4units)
Lab	(code: 7 3 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Taketoshi Maehara Associate Professor: Tadashi Nariai  
Contact person: Taketoshi Maehara Email: maehara.nsr@gmail.com

## 2. Classroom/Lab

Ask the instructors before the class start.

## 3. Course Purpose and Outline

To acquire the sufficient knowledge and insight into the pathological conditions as well as normal functions of the central nervous system and spinal cord, and to nurture the mind of exploration.

## 4. Course Objective(s)

To acquire the proper knowledge for diagnosis of neurological disease and for neurosurgical treatment.  
To conduct experiments using novel research methods and give the solution to the clinical and basic problem in neuroscience field.

## 5. Format

Small group (~10 students) is favorable.  
Talk & discussion style.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

#### Goals/outline

There are various attracting subjects in the field of clinical or basic research. It is essential to acquire the sufficient knowledge and insight into the pathological conditions as well as normal functions of the central nervous system and spinal cord, which will directly benefit for the improvement of clinical results. Main educational purpose of neurosurgery in the graduate course is to provide students opportunity to acquire the proper technique as well as the broad knowledge, and to nurture the mind of exploration.

Available programs:

Lecture: Tuesday and Thursday 8:00-10:00

Special Lecture: as required

Seminar: as required

Journal Club: Friday 8:00-8:30

### Practice

#### Goals/outline

To acquire the proper knowledge for diagnosis of neurological disease and for neurosurgical treatment. Students will have the experience of various methods for the evaluation of neurological disorder as neurological exam, basic of neuro-imaging, physiological and molecular biological methods.

Available programs:

Meet with patients: Tuesday and Thursday 8:15–10:30  
Clinical conference: Tuesday 13:00–14:00  
Joint conference: 2nd Wednesday 19:00–20:00  
neuro–pathology joint conference: 2nd Monday 18:30–20:00  
EEG conference: every Thursday 17:30–18:30  
Stroke conference 1st and 3rd Tuesday 18:00–19:00

## **Lab**

Goals/outline

The main purpose of Lab study is to give the solution to the clinical and basic problem in neuroscience field, by using proper methods of physiological, biochemical, molecular–biological, and neuroimaging techniques.

Available programs:

Join Lab team: as required  
Animal experiment course: as required  
Cell biology course: as required

## **7. Grading System**

By students' attendance rate, oral presentation.

## **8. Prerequisite Reading**

Ask the instructors before the class start.

## **9. Reference Materials**

Ask the instructors before the class start.

## **10. Important Course Requirements**

none

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Please email the Office of professor, Taketoshi Maehara at [maehara.nsrq@tmd.ac.jp](mailto:maehara.nsrq@tmd.ac.jp) The hours of operation are from 9 am to 5 pm.

## **13. Note(s) to students**

Journal club & Meet with patients: maximum of 10 students  
Join Lab team: maximum of 5 students.

# Endovascular Surgery

Lecture	(code: 7 3 5 1	1st year	:6units)
Practice	(code: 7 3 5 2	1st~2nd year	:4units)
Lab	(code: 7 3 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Shigeru Nemoto (professor, director) Kazutaka Sumita (associate professor),  
Kazunori Miki (assistant professor)  
Contact person: Shigeru Nemoto E-mail nemoto.evs@tmd.ac.jp

## 2. Classroom/Lab

conference room at 20F of MD tower

## 3. Course Purpose and Outline

Main educational purpose of Endovascular Surgery in the graduate course is to provide students the proper technique as well as the basic knowledge of neuroendovascular surgery.

## 4. Course Objective(s)

Course objects of Endovascular Surgery in the graduate course is to acquire the proper technique as well as the basic knowledge of neuroendovascular surgery.

## 5. Format

Few members each group.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Integrated lectures on anatomy, physiology, pathology, neurology with regard to endovascular surgery are performed. Clinical neuroscience (peripheral neuropathy, cerebrovascular disease, brain tumors etc) are also included.

Available programs:

Lecture	at any occasion
Special Lecture	at any occasion
Seminar	at any occasion
Journal Club	once a week
Conference	endovascular conference (Tokyo Seminar of Neuro-Endovascular Therapy for Stroke) once a year

### Practice

Goals/Outline:

In each clinical case diagnostic imaging program is made for proper diagnosis and treatment. Interpretation of MRI, CT, SPECT and angiography findings are made at daily conference.

Technical learning of angiography is obtained at angio-suite.

Available programs:

Clinical round	every day	17:00-18:00
Stroke conference	every Wednesday	18:00-19:00
Combined neuroscience conference	every month (second Wednesday)	18:30-20:00

## **Lab**

### Goals/Outline:

Hemodynamic influence caused by endovascular devices are studied using computerized 3 dimension analysis of fluid hemodynamics.

To obtain catheterization and endovascular technique animal model and virtual simulator training are used.

### Available programs:

flow study program

simulator training program at skills lab ( on plan )

animal model training program ( collaboration program with Jichi Medical University )

## **7. Grading System**

Attending the lecture and practice and oral exam.

## **8. Prerequisite Reading**

Student should learned basic knowledge of brain anatomy and neurology.

## **9. Reference Materials**

Surgical Neuroangiography 1-3 (Springer)

## **10. Important Course Requirements**

Nothing in particular.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

We are available from Monday to Friday, 9:00 a.m. to 5:00 p.m.

## **13. Note(s) to students**

Due to clinical services for patients, members are limited.

# NCNP Brain Physiology and Pathology

Lecture	(code: 9 0 1 1	1st year	:6units)
Practice	(code: 9 0 1 2	1st~2nd year	:4units)
Lab	(code: 9 0 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor and Chairman Mikio Hoshino  
Professor Yu-ichi Goto, Hiroshi Kunugi, Noritaka Ichinohe, Takashi Hanakawa  
Associate Professor Yoshitsugu Aoki

## 2. Classroom/Lab

Ask professors for the details.

## 3. Course Purpose and Outline

The nervous system is a very fine and complex organ to elicit the higher brain function and its malfunction causes a variety of neurological and psychiatric disorders in humans. In this lecture, students learn the structure, development and function of the normal nervous and muscle systems as well as pathology of developmental disorders, psychiatric disorders, neurological diseases and muscle diseases. Students also study the latest progress of advanced remedy for neuromuscular diseases. The lecture is held at NCNP (National Center of Neurology and Psychiatry).

## 4. Course Objective(s)

To know the basic structure and the developmental machinery of the nervous system of mammals including humans. To understand the pathology of some neuropsychiatric diseases.

## 5. Format

The size of the class is small. Each student is supervised by a senior scientist.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

First, students learn the basic structure of the nervous system and the developmental machinery for the brain. Then, students study the pathology of neuropsychiatric disorders. They also learn recent progress of diagnosis and treatment for neuropsychiatric diseases.

Available programs:

Lecture Every Tuesday 16:00 - 17:00

### Practice

Goals/Outline:

Students should learn the structure, development and function of the nervous and muscle systems as well as experimental skills required for their research. Each member should give a talk at Journal Club and Research Progress. Advices to develop members' presentation skills will be given.

Available programs:

Conference As needed

Journal Club Once a week

Research Progress Once a week

## **Lab**

Goals/Outline:

Our goal is to elucidate the molecular machinery underlying physiology and pathology of the nervous and muscle systems, which contributes to diagnosis and treatment of psychiatric, neurological and muscle diseases.

Available programs:

## **7. Grading System**

We evaluate students generally based on progress reports on their studies and presentations at meetings in addition to attendance at lectures, practices, experiments and papers.

## **8. Prerequisite Reading**

Students are expected to have basic knowledge of cell biology, brain science, and developmental biology.

## **9. Reference Materials**

Essential Cell Biology (Alberts et al), Developmental Biology (Gilbert), Principle of Neural Science (Kandel)

## **10. Important Course Requirements**

Students should do their best in this course.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:00 ~ 18:00

## **13. Note(s) to students**

NCNP Homepage <http://www.ncnp.go.jp/english/index.html>

National Institute of Neuroscience, NCNP Homepage [http://www.ncnp.go.jp/nin/index\\_e.html](http://www.ncnp.go.jp/nin/index_e.html)

# Immune Regulation

Lecture	(code: 7 3 6 1	1st year	:6units)
Practice	(code: 7 3 6 2	1st~2nd year	:4units)
Lab	(code: 7 3 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Hajime KARASYAMA, Associate Professor: Yoshinori YAMANISHI  
Assistant Professors: Yohei KAWANO, Soichiro YOSHIKAWA, Specially Appointed Assistant Professor: Kensuke MIYAKE  
Contact person: Hajime KARASUYAMA E-mail: karasuyama.mbch@tmd.ac.jp

## 2. Classroom/Lab

To be announced

## 3. Course Purpose and Outline

The aim of this course is to understand how the immune system is organized and regulated to protect our body from the attack of pathogens, and to explore the molecular mechanisms underlying immune-related disorders, including allergy, autoimmune diseases, cancers, and chronic infections.

## 4. Course Objective(s)

Students gain an understanding of basic aspects of the structure and functions of the immune system and describe the applied aspects of immunology such as defense mechanism, allergy and autoimmunity.

## 5. Format

In a small group, with extensive discussion and bench works.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Lectures are given regarding the front line researches on molecular mechanisms underlying the development and activation of immune cells as well as their functions in vivo. In particular, lectures focus on the latest topics about the roles of basophils in protective immunity and allergic reactions, the engineered animal models of allergy, and the in vivo imaging of allergic reaction.

Available programs:

Progress meeting: weekly

Journal Club: weekly

### Practice

Goals/Outline:

Access to and analysis of the database related to immunology, including DNA and protein sequences, and their 3D-structure.

Available programs:

### Lab

Goals/Outline:

-Analyze the molecules involved in the differentiation, activation and migration of basophils in vitro and in vivo by using biochemical and genetic approaches.

-Establish engineered animal models of allergic disorders, and understand the cellular and molecular mechanism underlying the diseases, leading to the development of novel strategies for prevention and treatment of the diseases.

Available programs:

## **7. Grading System**

Evaluating the planning of experiments, the progress in the planned experiments, the presentation of data in the progress meeting, and the discussion during lectures and practice.

## **8. Prerequisite Reading**

Start reading any chapter of your interest in the textbooks listed below.

## **9. Reference Materials**

1. Immunobiology 9th Edition (2016), Garland Science
2. Cellular and Molecular Immunology 9th Edition (2017), Elsevier

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Contact first via e-mail (karasuyama.mbch@tmd.ac.jp)

## **13. Note(s) to students**

None

# Molecular Virology

Lecture	(code: 7 3 7 1	1st year	:6units)
Practice	(code: 7 3 7 2	1st~2nd year	:4units)
Lab	(code: 7 3 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Shoji Yamaoka, Professor; Hiroaki Takeuchi, Assistant Professor; Takeshi Yoshida, Assistant Professor; Momoe Itsumi, Assistant Professor;

Contact person: Shoji Yamaoka E-mail: shojmmb@tmd.ac.jp

## 2. Classroom/Lab

On the 17th floor of M&D Tower

## 3. Course Purpose and Outline

To learn general knowledge of virology and experimental techniques.

## 4. Course Objective(s)

To understand the virological research and analyze the experimental results for reaching the conclusion.

## 5. Format

No more than 10 students will be allowed to join the lectures so that students are encouraged to join discussion.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Learn the latest progress in the basic and clinical research of virology from the molecular and immunological view points.

Language will be English when a foreign student joins.

Available programs:

Lecture Every Monday, from 14:00 to 15:00

### Practice

Goals/Outline:

Understand experimental procedures for virology, bacteriology, immunology and molecular cell biology to prepare research article.

Available programs:

Journal Club Every Wednesday, from 12:00 to 13:00, Language: English regardless of the attendance of foreign students.

### Lab

Goals/Outline:

Learn and acquire experimental procedures and techniques. Special attention will be paid to handling pathogens. Evaluate experimental results and plan new experiments. English will be used for foreign students.

Available programs:

Progress Report Every Monday, 15:00-17:00

## **7. Grading System**

Students will be evaluated comprehensively on the basis of his/her participation in discussion, practice and experiments as well as research outcome, presentation and involvement in research meetings.

## **8. Prerequisite Reading**

Reading the Journal Club paper in advance, acquiring the safe and accurate procedures before starting infection experiments.

## **9. Reference Materials**

Fields Virology, Medical Microbiology and Infection at a Glance

## **10. Important Course Requirements**

Nothing particular

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

from 9 AM to 18 PM.

## **13. Note(s) to students**

The number of students joining the programs will be limited to 10.

# Immunotherapeutics

Lecture	(code: 7 3 8 1	1st year	:6units)
Practice	(code: 7 3 8 2	1st~2nd year	:4units)
Lab	(code: 7 3 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Mari KANNAGI

Associate Professor: Takao, MASUDA

Assistant Professor: Atsuhiko, HASEGAWA · Yoshiko, Nagano

(Contact person: M. Kannagi, E-mail kann.impt@tmd.ac.jp)

## 2. Classroom/Lab

Office and laboratory at the M & D tower 17 th floor.

## 3. Course Purpose and Outline

Our research area is in between clinical and basic science, involving immunology, microbiology, and molecular biology. We participate in education for undergraduate medical students in basic immunology and a part of clinical immunology. For graduate students, we provide opportunities to research mechanisms of infectious diseases and develop immunological therapeutics.

## 4. Course Objective(s)

We investigate the disease mechanisms of human retroviral infection, such as AIDS caused by human immunodeficiency virus type 1 (HIV-1) and adult T-cell leukemia (ATL) caused by human T-cell leukemia virus type I (HTLV-I). These diseases are not simply explained by the direct pathogenic effects of the viruses, but influenced by a complex interplay between viruses and the host immune system. The aim of our research is the understanding disease mechanisms and the development of prophylactic and therapeutic strategies in these viruses infection. In order to conduct experiments of this area, students will be trained for tissue culture, immunological methods, molecular biological methods, and handling infectious materials and animals.

## 5. Format

Personal instruction by the supervisor, and total discussion at a seminar.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

**【Outline】** To understand disease mechanisms and develop new therapies of persistent viral infection, we focus on recently published papers in related areas including clinical science, immunology, microbiology, and molecular biology in the seminar. The seminar is mainly in English and all the students and staffs in the laboratory study the paper with active discuss. Every other Monday (12:30-14:30)

Available programs:

Seminars including journal club and progress report on every other Monday (12:30-14:30).

### Practice

**【Outline】** We handle human materials that are infected with human retroviruses or other viruses. The students will be trained for handling biohazardous materials. Some of the students need skill to handle experimental animals (mice and rats). Other techniques required in our research area include cell and tissue culture, flow cytometry, PCR, immunoblotting, etc. The students will be trained for these skills. First Monday (15:010-17:00)

Available programs:

1. Analysis of immunological risks for ATL development in HTLV-I-carriers.
2. Development of anti-tumor vaccine using experimental animal model for ATL.
3. Immunological and molecular mechanism of HTLV-1 induced leukemogenesis.
4. Molecular mechanism of HIV replication especially related to HIV-1 integrase.
5. Immunological suppressive mechanisms on HIV-1 replication.

### **Lab**

**【Outline】** We have the P1, P2 and P3 facilities in our laboratory. The flowcytometer is placed in the P2 facility so that the clinical materials can be analyzed immediately. The infectious materials are manipulated inside the safety cabinets in the P2 and P3. We also run regular molecular cloning, quantitative PCR, immunoblot analyses in a P1 area. The animal experiments will be performed in the central experimental animal center.

Available programs:

Participation in the experiments on going.

### **7. Grading System**

Evaluation will be made based on the attendance and performance at the seminar and practice.

### **8. Prerequisite Reading**

Basic immunological knowledge is required.

### **9. Reference Materials**

[http://www.tmd.ac.jp/english/faculties/graduate\\_school/index.html](http://www.tmd.ac.jp/english/faculties/graduate_school/index.html)

### **10. Important Course Requirements**

The students make presentation on their study periodically in seminars.

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

9:00-17:00

### **13. Note(s) to students**

# Cellular and Environmental Biology

Lecture	(code: 7 3 9 1	1st year	:6units)
Practice	(code: 7 3 9 2	1st~2nd year	:4units)
Lab	(code: 7 3 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

MASAYUKI HARA, Ph.D.

Associate Professor

Contact person: Masayuki Hara E-mail mhara.ric@tmd.ac.jp

## 2. Classroom/Lab

It is mainly performed in the department.

## 3. Course Purpose and Outline

The purpose of this course is to develop the ability to perform the following. 1. Find out problems in an environmental variation of a living organism. 2. Conceive the experimental ways of coping for the problems solving. 3. Prove the validity of the way. 4. Evaluate the results correctly.

## 4. Course Objective(s)

The student of this course can find out his/her own task from the problems in an environmental variation of a living organism, conceive the experimental ways of coping for the task, prove the validity of the way, and evaluate the results correctly.

## 5. Format

It is performed in an individual or a seminar form for few students.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The organism has been influenced by the environment, has been adapted for the environment, has formed the environment, and has evolved. The organism exists as a part of earth environment, and it is thought that each structure and function of an organism is necessary for the survival plan against the environment. The interaction of each cell in a multicellular organism and the microenvironment on which it was put is not exceptional including the process of differentiation. In order to understand the response and adaptation of an organism (cell) against an environmental alteration, the interaction mechanisms are explained.

Available programs:

Lecture Every Monday between May and June 13:00-14:30

Journal Club Every Monday 17:00-18:00

### Practice

Goals/Outline:

In advancing a study, we discuss about the following; (1) examination of the related paper, and extraction of controversial points, (2) evaluation against the performed experimental procedure, (3) reliability of the experimental results, and (4) concluded points. Furthermore, we plan an experimental design about the new direction drawn from the discussion, and examine the validity.

Available programs:

Research Conference Every Friday 17:00-18:00

## **Lab**

Goals/Outline:

In this department, the experimental approaches from biochemistry, molecular biology, and cell biology are mainly performed. Therefore, these procedures must enough become skilled, simultaneously must be understood about the principle.

Available programs:

Participation in a research group    Anytime

## **7. Grading System**

It is performed based on the situation of attendance to lectures, practice, and experiments (80%), and the situation of presentation to academic meeting and/or journal about the details of your research (20%).

## **8. Prerequisite Reading**

None

## **9. Reference Materials**

None

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Please contact to the above E-mail address, if necessary.

## **13. Note(s) to students**

None

# Biodefense Research

Lecture	(code: 7 4 0 1	1st year	:6units)
Practice	(code: 7 4 0 2	1st~2nd year	:4units)
Lab	(code: 7 4 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Toshiaki Ohteki, Junior Associate Professor: Taku Sato  
Contact person: Toshiaki Ohteki E-mail: ohteki.bre@mri.tmd.ac.jp

## 2. Classroom/Lab

To be announced upon inquiry.

## 3. Course Purpose and Outline

The aim of this course is to understand the molecular basis of induction and failure of homeostasis by focusing on immune cells, tissue stem cells, and their functional interplay in the living body.

## 4. Course Objective(s)

Students should be able to understand differentiation and function of immune cells and tissue stem cells, and their abnormalities as possible causes of disease development.

## 5. Format

Small group or individual training/lesson will be given.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Immune cells and tissue stem cells are essential for the maintenance of homeostasis in the body by eradicating invading pathogens and regenerating tissue cells, respectively. Based on the background, this course deal with immune cells playing a role in the host defense and tissue stem cells playing a role in the tissue regeneration, and introduce up-to-date information on differentiation and function of these cells and related disorders.

Available programs:

Special Lecture: as required

Seminar: once a year

Journal Club: weekly

### Practice

Goals/Outline:

This course deal with the latest research papers related to immunology and tissue stem cell biology. Students are expected and discuss the novelty and points remaining unsolved in these papers and the data weekly presented by themselves with supervisors in terms of their technical accuracy, immunological meaning, and future experimental design.

Available programs:

Progress Meeting: weekly

### Lab

Goals/Outline:

Students are expected to learn the basic techniques to prepare immune cells and tissue stem cells from various tissues of normal, transgenic, and gene-targeting mice, and manipulate differentiation and function of these cells ex vivo and in vivo.

Available programs:

Experimental course: 10:00–17:00. Details will be announced upon participation.

### **7. Grading System**

Evaluating based on attendance, research reports, and discussion status at the course.

### **8. Prerequisite Reading**

Basic understanding of immunology and stem cell biology is required before attending this course.

### **9. Reference Materials**

Janeway's Immunobiology 8th edition

### **10. Important Course Requirements**

None

### **11. Lectures in English**

Lectures will be partially conducted in English.

### **12. Office Hour**

Please contact via e-mail to Professor Ohteki (ohteki.br@mri.tmd.ac.jp).

### **13. Note(s) to students**

None

# Pathological Cell Biology

Lecture	(code: 7 4 1 1	1st year	:6units)
Practice	(code: 7 4 1 2	1st~2nd year	:4units)
Lab	(code: 7 4 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Shigeomi Shimizu, Associate professor: Norio Shimizu, Lecturer: Satoko Arakawa, Assistant professor: Shinya Honda  
Contact person: Pathological Cell Biology, Shigeomi Shimizu  
E-mail shimizu.pcb@mri.tmd.ac.jp

## 2. Classroom/Lab

Venue is changed depending on the program. Please ask Instructors.

## 3. Course Purpose and Outline

Cell death and autophagy are fundamental cellular function to regulate various biological events. This course will provide an overview of molecular mechanisms and physiological and pathological roles of "Cell death" and "Autophagy". This course will also provide a comparative overview of virus life cycles and strategies viruses use to infect and replicate in hosts. We will discuss virus structure and classification and the molecular basis of viral reproduction, and virus-host interactions.

## 4. Course Objective(s)

The first object of the course is to understand biological significance of "Cell death" and "Autophagy". The second object of the course is to describe at the molecular level the replication strategies of representative DNA and RNA viruses and the effects of virus infection on cell growth control and survival.

## 5. Format

Lecture is done by individual guidance or seminar for a few students. Lab is done by individual guidance.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The lecture explains basic pathways of life phenomena causing variety of disease from the points of molecular, cellular, or organism level. Concretely, the lecture explains cell growth, cell death and cell division that are responsible for development, homeostasis, and disease based on these abnormalities. In virus treatment, we explained the molecular mechanisms of continuous infection of EB virus and HIV type I virus, and also explained the novel virus treatment.

Available programs:

Lecture: Cancer Biology

Special Lecture: occasion demands

Seminar: occasion demands

### Practice

Goals/outline:

The practice examines research papers about physiological and pathological cell function, especially focusing cell death and autophagy. The practice also studies strategies in life science research by a research drafting for investigation of cell function and its abnormality, analyses of results and simulations of discussion.

Available programs:

Presentation once a week

Journal club once a week

## **Lab**

Goals/outline:

The lab focuses on the acquisition of experimental techniques such as analyses of gene-targeting mice, analytic methods of cellular and organellar function. We also focus on the practice of research drafting. In virus treatment, we focus on the acquisition of techniques for detection of EB virus and HIV type I virus. Methods of cell culture for virus detection are also acquired.

Available programs:

## **7. Grading System**

We evaluate the percentage of attendance at class. In some case, we set a report.

## **8. Prerequisite Reading**

Students do not have to prepare for the class

## **9. Reference Materials**

Molecular Biology of the Cell, Medical Virology

## **10. Important Course Requirements**

nothing

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Thursday 16:00 Contact; Shigeomi Shimizu, Pathological Cell Biology (E-mail [shimizu.pcb@mri.tmd.ac.jp](mailto:shimizu.pcb@mri.tmd.ac.jp))

## **13. Note(s) to students**

# Lipid Biology

Lecture	(code: 5 1 0 1	1st year	:6units)
Practice	(code: 5 1 0 2	1st~2nd year	:4units)
Lab	(code: 5 1 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Takehiko Sasaki

## 2. Classroom/Lab

M&D Tower 19F South, Department of Biochemical Pathophysiology/Lipid Biology

## 3. Course Purpose and Outline

This course will focus on the pathophysiological conditions emanate from dysregulation of cellular lipid metabolism.

## 4. Course Objective(s)

The objective of the course is to provide the students with current knowledge on the role of lipid metabolism in the integrity of cellular membranes, energy storage/consumption and intra/extracellular signal transduction. Further, students will recognize the relationship between lipid metabolism and a wide variety of diseases such as cancer, immune disease, inflammatory disease, bone disease, neurological disorder and cardiovascular disease. The new methodology of lipid biology by virtue of the recent progress in LC-MS/MS technique will also be discussed in the context of medical sciences.

## 5. Format

Lecture and small group discussion.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Upon completion of this course, students are expected to effectively:

1. Describe the chemical nature of the various classes of lipids and cellular membranes;
2. Discuss the synthesis/degradation/modification of fatty acids and complex lipids;
3. Describe the relationship between lipid metabolism and various diseases;
4. Understand the basic strategies for lipid biology (cell biological, biochemical, mass spectrometric analyses)

Available programs:

Lecture Wednesday 18:00-19:30

Special Lecture 3 times/year

### Practice

Goals/Outline:

Training program will be provided to master the basic skills to characterize biological lipids extracted from cell lines, primary cultured cells, specimens obtained from gene-targeted mice and clinical samples.

Available programs:

Lab Seminar Monday 10:00-11:30

## **Lab**

### Goals/Outline:

From the lipid point of view, our lab aims to elucidate the molecular mechanisms underlying pathophysiology of intractable diseases including cancers and inflammatory diseases, which will be useful in developing novel diagnostic and therapeutic approaches for treatment of the diseases. Each graduate student sets their own research theme after consultation with the supervisors. Students will conduct experiments using techniques such as DNA sequencing, FACS analysis, western blotting, genome editing and reverse phase LC-MS/MS, obtain data, interpret the results and write original papers with the supervisors.

### Available programs:

As needed.

## **7. Grading System**

A comprehensive evaluation: participation to lectures, experimental researches and presentation of the research results.

## **8. Prerequisite Reading**

It is advisable to recognize limitations of the current knowledge and appreciate unresolved questions in the medical/biological field that you are interested in in particular.

## **9. Reference Materials**

Molecular Biology of the CELL (Garland Science)

Original research papers and review articles that we have published.

## **10. Important Course Requirements**

Capable of communicating with lab members in English or Japanese language.

## **11. Lectures in English**

Partial classes are taught in English.

When an international student registers this subject for credits, this course is taught in English.

## **12. Office Hour**

Contact: Takehiko Sasaki, M&D Tower 19F South, Department of Biochemical Pathophysiology/Lipid Biology

TEL 03-5803-5822 E-mail tsasaki.pip@mri.tmd.ac.jp

## **13. Note(s) to students**

# Pediatrics and Developmental Biology

Lecture	(code: 7 4 4 1	1st year	:6units)
Practice	(code: 7 4 4 2	1st~2nd year	:4units)
Lab	(code: 7 4 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Tomohiro Morio , Associate Professor: Hirokazu Kanegane,  
Specially Appointed Professor: Shozaburo Doi,  
Specially Appointed Associate Professor: Kosuke Imai, Masatoshi Takagi  
Junior Associate Professor: , Kenichi Kashimada, Atsuko Taki  
Assistant Professor, Erioko Tanaka, Yoshichika Maeda  
Contact person: Tomohiro Morio E-mail tmorio.ped@tmd.ac.jp

## 2. Classroom/Lab

Conference room at the 8th floor (A8) of the Medical Hospital.  
Postgraduate seminar room at the 9th floor of M&D tower.

## 3. Course Purpose and Outline

Through the course, we learn development and differentiation of our cells, tissues, and organs; and understand how defect in the process leads to childhood disorders. The final goal of our research is to elucidate the molecular mechanisms of intractable diseases in children and to develop novel measures to cure the diseases.

## 4. Course Objective(s)

Understanding of normal development of children, etiology of disease from a molecular, cellular, biological, and genetic aspect .

## 5. Format

Seminar will be carried out in a small group. Each participant will be assigned to one project and will have instruction from the assigned tutor.

## 6. Course Description and Timetable

Check with the teacher in charge of the program for which schedule is not yet fixed.

### Lecture

Goals/outline:

The students will learn normal development and organogenesis during fetus/infants/children, and the disorders caused by abnormal differentiation or development of the organs. The students will understand normal physiology in childhood as well as molecular pathogenesis of the childhood diseases.

Special lecture course: to understand molecular and cellular pathogenesis of below indicated disorders.

Pediatric Immunology: Inborn Errors of Immunity (Primary Immunodeficiency, Autoinflammatory diseases, etc)

Pediatric Hematology/Oncology: Childhood hematological disorders and malignancy

Pediatric Endocrinology: Disorders of sex differentiation

Pediatric Cardiology: Pulmonary hypertension

Lecture	Pediatrics	As needed basis
Special Lecture	2-3 / year	As needed basis
Seminar	Monday Seminar	18:00-19:00 Monday
Journal Club	Journal Club	7:00-7:40 (Monday on the 1st and 3rd wk, Wednesday on the 2nd and 4th wk)
Conference	Morning Conference	8:00-8:45 Monday-Friday
	Hem/Onc Meeting	8:30-9:30 Wednesday
	laboratory Progress Report	18:00-19:30 Tuesday

## **Practice**

### Goals/Outline:

The students will acquire skills and knowledge to examine, evaluate, and treat the childhood patients, through lectures and practices.

### Available programs:

Morning Conference	8:00–8:45 Monday–Friday
Clinical Round	16:30–17:30 Monday 14:00–16:00 Wednesday
Pediatric Hematology/Oncology/Immunology	8:45–9:45 Wednesday
Pediatric Nephrology	19:00–21:00 the 2nd Thursday of the month
Pediatric Cardiology	19:00–21:00 the 3rd Friday of the month
Pediatric Neurology	19:00–21:00 the 4th Tuesday of the month
Pediatric Endocrinology	18:30–20:30 the 1th Friday of the month
Neonatology	19:30–21:00 the 4th Friday of the month

## **Lab**

### Goals/Outline:

The students will acquire the basic knowledge and skills in cellular biology, molecular biology, cellular morphology, and physiology in the following programs.

### Available programs:

The student will acquire basic knowledge on genome analysis and genetic study of diseases, molecular biology techniques, and immunophenotyping & immune function study.

The student will be assigned to one of the following programs:

#### #1 Pediatric Hematology/Oncology

Keywords: Childhood malignancy, DNA damage response, Cell cycle checkpoint, Hematopoietic stem cells,

#### #2 Pediatric Immunology

Keywords: Primary Immunodeficiency, B cell development, Class switch recombination, Protein & Gene therapy

#### #3 Regenerative Medicine

Keywords: Patient-derived iPS cells, Cell differentiation, Drug screening

#### #4 Pediatric Endocrinology

Keywords: Sex differentiation, Adrenal function

#### #4 Pediatric Cardiology

Keywords: Pulmonary hypertension, Pulmonary vascular disorders, Electrophysiology

#### #6 Pediatric Neurology

Keywords: DNA damage response and neural degeneration, Sleep disorder

## **7. Grading System**

Grading will be done by assessing knowledge, laboratory performance, ability to design experiments, skills of presentation and presentation at the scientific meeting,

## **8. Prerequisite Reading**

Knowledge about basic pediatrics and molecular cellular biology.

## **9. Reference Materials**

Nelson Text book of Pediatrics, ELSEVIER  
Molecular Biology of THE CELL, Newton Press  
Cellular and Molecular Immunology, ELSEVIER

## **10. Important Course Requirements**

Nothing

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

9am–5pm

## **13. Note(s) to students**

Guidance and instruction can be done in English.

# Rheumatology

Lecture	(code: 7 4 5 1	1st year	:6units)
Practice	(code: 7 4 5 2	1st~2nd year	:4units)
Lab	(code: 7 4 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Hitoshi Kohsaka, M.D., Ph.D.

Contact person: Hitoshi Kohsaka, M.D., Ph.D. E-mail kohsaka.rheu@tmd.ac.jp

## 2. Classroom/Lab

M&D Tower 13th floor

## 3. Course Purpose and Outline

The objectives of this program are to gain an accurate understanding of molecular and cellular pathology and therapy of rheumatic diseases, and to learn about methods to resolve various problems in clinical practice.

## 4. Course Objective(s)

The goal of this program is to acquire the ability to plan and conduct research that resolves issues in relation to diagnosis and treatment of rheumatic diseases.

## 5. Format

Small group meeting

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Understanding molecular and cellular pathology and treatment of rheumatic diseases

Available programs:

Journal Club every other Thursday evening

Conference every Thursday evening

### Practice

Goals/Outline:

Familiarizing how pathology of rheumatic diseases is investigated for development of new treatments.

Available programs:

Participation in research studies and clinical studies.

### Lab

Goals/Outline:

Investigating pathology of rheumatic diseases for development of new treatments.

Available programs:

Participation in research studies and clinical studies.

## **7. Grading System**

Comprehensive grading based on the participation in the research program and discussion, study progress, and conference presentation.

## **8. Prerequisite Reading**

It is preferable for students to acquire the general knowledge of rheumatic diseases.

## **9. Reference Materials**

Standard medical textbooks

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Contact person: Hitoshi Kohsaka, M.D., Ph.D.      E-mail [kohsaka.rheu@tmd.ac.jp](mailto:kohsaka.rheu@tmd.ac.jp)

## **13. Note(s) to students**

10 students at maximum

# Dermatology

Lecture	(code: 7 4 6 1	1st year	:6units)
Practice	(code: 7 4 6 2	1st~2nd year	:4units)
Lab	(code: 7 4 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor and Chairman: Hiroo Yokozeki  
Associate Professor: Takeshi Namiki  
Assistant Professor: Makiko Nishida, Tsukasa Ugajin  
Contact person: Hiroo Yokozeki E-mail: 3064derm@tmd.ac.jp

## 2. Classroom/Lab

N/A

## 3. Course Purpose and Outline

To study the pathology, Immunodermatology, Physiology of the skin, To study the mechanism of skin diseases

## 4. Course Objective(s)

To understand the pathogenesis of skin diseases

## 5. Format

Conducting research as a member of the laboratory. A small group meeting will be held periodically to have discussions with instructors.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To understand a structure, function, immunological roles, biological roles of the skin  
To understand the pathophysiological mechanism of skin diseases

Available programs:

Lecture November 19th to 22nd 18 times lectures

Special Lecture July, December: Yushima Danwa kai

April: skin allergy study lecture, skin care lecture

Seminar Thursday PM3:00-6:00

Journal Club Monday AM8:00-8:30 Thursday PM 4:00-5:00

Conference Research conference: Tuesday AM8:00-8:30 Thursday PM 5:00-6:00

### Practice

Goals/Outline:

To practice how to make a diagnosis of skin diseases by clinical and pathological examination.

Available programs:

Clinical conference every Thursday PM 3:00-6:00

## Lab

Goals/Outline:

General:

Etiological and immunological mechanisms of cutaneous allergic responses.

Establishment of a potent therapeutic approach for treatment-resistant allergic skin diseases.

Research projects:

1. Biological significance of prostaglandin D2 and its receptors in skin inflammation.
2. Mechanisms of eosinophil and basophil infiltration to the skin.
3. Biosynthesis of prostanoids in basophils and contribution to skin diseases.
4. Therapeutic approach for atopic dermatitis with STAT6 siRNA.
5. Stable form of galectin-9 as a novel therapeutic tool for psoriasis.
6. Analysis of scratching behavior in mouse model of skin inflammation.
7. Development of potent therapeutic tools for a mouse model of angiosarcoma
8. Analysis of skin diseases by using iPS cells induced epidermal sheets

Available programs:

N/A

## 7. Grading System

Total grading score is to be assessed based on one's enthusiasm for science, experimental skills, and scientific quality of manuscript submitted for publication.

## 8. Prerequisite Reading

To understand the immunology and pathology

## 9. Reference Materials

Lever's Histopathology of the skin, David E Elder, 2005. Fitzpatrick's Dermatology in general Medicine, IM Freedberg et al, 2003

## 10. Important Course Requirements

Nothing

## 11. Lectures in English

Lectures will be partially conducted in English.

## 12. Office Hour

Hiroo Yokozeki, M.D., Professor E-mail: 3064derm@tmd.ac.jp

## 13. Note(s) to students

# NCCHD Child Health and Development

Lecture	(code: 9 0 3 1	1st year	:6units)
Practice	(code: 9 0 3 2	1st~2nd year	:4units)
Lab	(code: 9 0 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Dr. Hidenori Akutsu  
Dr. Masashi Onodera  
Dr. Maki Fukami  
Dr. Kenichiro Hata  
Dr. Shuji Takada  
Dr. Kenji Matsumoto

## 2. Classroom/Lab

National Center for Child Health and Development, seminar rooms (2nd, 4th, 5th, 7th, 8th, 9th floors)

## 3. Course Purpose and Outline

Our course purpose is to educate the developmental process of human life from the viewpoints of latest molecular biology and genetics. NCCHD Child Health and Development is to study the health and development of infants, children, adolescents, and young adults through basic science education and innovative research. We support to learn the Child Health Care and Development through educating and training by experts.

## 4. Course Objective(s)

To acquire practical knowledge based on the scientific and medical viewpoints encompassing human developmental biology through gametic differentiation.

## 5. Format

Lectures are setting in small group discussion style

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The goal of this course is to learn the developmental process of human life from the viewpoints of latest molecular biology and genetics. Medical science for child health and development is the study to comprehensively grasp various health problems related to "human life cycle" to begin with the fertilization and to continue to the next generation through generation and development. Students of this course are required to understand a role and a function of medical care for child health and development, to acquire ability to handle such health problems and support relevant person with specialized theory and technique.

Available programs:

### Practice

Goals/Outline:

Students report progress of each study and discuss research plan each other. When someone derives a certain conclusion from the series of experimental results, those findings will be reported in national and international academic meetings or published in an academic journal.

Available programs:

## Lab

Goals/Outline:

[Hidenori Akutsu] Exploring molecular mechanism for acquisition of zygote totipotency, epigenetic reprogramming and pluripotency in stem cells. Application studies for reproductive medicine and regenerative medicine.

[Shuji Takada] Identification of target molecules in severe diseases and establishment of disease model mice by studying molecular mechanisms of genomic imprinting, gametogenesis and sexual differentiation.

[Maki Fukami] Elucidation of genetic abnormality in congenital severe metabolic diseases using advanced genetic analysis

[Masashi Onodera] Studying for cellular model in human severe disease by advancing flow cytometry.

[Kenji Matsumoto] Elucidation for allergic disease mechanism and target molecules using molecular biology and 'omics' technology.

[Kenichiro Hata] Elucidating for molecular mechanism of perinatal abnormality using system biology.

Available programs:

## 7. Grading System

Your attendance to lectures and lab works including your commitments to presentation and publishing will affect your final grade of the course. Conducting your research and attendance to lectures: 70%, Presentation and/or publishing your works: 30%

## 8. Prerequisite Reading

It is recommended that you read through Developmental Biology, Scott F. Gilbert. Sinauer Associates Inc.

## 9. Reference Materials

Developmental Biology, Scott F. Gilbert. Sinauer Associates Inc.

## 10. Important Course Requirements

Lectures, seminars and meetings are carried out in Japanese, however discussion with English speakers is performed in English.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Akutsu, Hidenori: akutsu-h@ncchd.go.jp, Takada, Shuji: takada-s@ncchd.go.jp, Fukami, Maki: fukami-m@ncchd.go.jp, Onodera, Masafumi: onodera-m@ncchd.go.jp, Matsumoto, Kenji: matsumoto-k@ncchd.go.jp, Hata, Kenichiro: hata-k@ncchd.go.jp

## 13. Note(s) to students

The documents such as English general remarks are distributed as needed.

# Human Pathology

Lecture	(code: 7 4 7 1	1st year	:6units)
Practice	(code: 7 4 7 2	1st~2nd year	:4units)
Lab	(code: 7 4 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Professor Yoshinobu EISHI

## 2. Classroom/Lab

Depending on the program. Confirm to lecturers before the program.

## 3. Course Purpose and Outline

Pathology is the logic of human disease in a broad sense, and is the scientific field for elucidation of pathogenesis, progression, and clinical outcome of human disease principally by the morphological analysis of human cells, tissues, and organs. Our courses contain the classes of both diagnostic pathology and scientific research. The diagnostic classes include a lot of clinicopathological conferences with clinicians. In the research classes, we hold practical training on the research techniques mainly using human tissue specimens.

## 4. Course Objective(s)

The objective of our course is to learn the skill of surgical pathology and to understand the role of pathologists in clinical medicine. Basic theory and research techniques of biology should be also learned in order to approach the research issues arising in routine pathological diagnosis.

## 5. Format

Discussion in a small group with histological slides and microscope when necessary.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

The students study by observation in the routine pathological diagnosis of biopsied or surgically resected human specimens and understand the role of the surgical pathology in the hospital.

Available programs:

Cutting surgically resected materials	everyday 10:00-12:00
Diagnosis of biopsy specimens	evryday 10:00-12:00
Case study in Pulmonology	Wednesday 17:00 - 18:30
Case study in Breast Surgery	1st Monday 18:30 - 20:30
Case study in Neurosurgery	2nd Monday 18:30 - 20:30
Case study in Gynecology	3rd Monday 18:30 - 20:30
Case study in Dermatology	4th Monday 18:30 - 20:30
Surgical case meeting	Tuesday 13:30-14:00

### Practice

The students learn the procedure of pathological autopsy, the observation of macroscopic and microscopic findings of lesions, preparation of autopsy reports, through the participation in pathological autopsies. In the process of the comparison between clinical and pathological findings, the students acquire the total knowledge about pathogenesis and progression of diseases.

Available programs:

Case control	Tuesday 9:30 - 11:30
Macroscopic check	Tuesday 14:30 - 15:00
CPC	Tuesday 17:00 - 19:00

### **Research practice**

The students learn the techniques necessary for pathological diagnosis, such as immunohistochemistry, in-situ hybridization, or polymerase-chain reaction, and so on. The students participate in the practical research activities on the elucidation of etiology and the development of novel methods in surgical pathology.

Available programs:

To be involved in research meeting on Thursday 18:00–20:00

A short training course for the methods listed below on 1st Friday 13:00–17:00.

- 1) Preparation of histological sections
- 2) Immunohistochemistry
- 3) DNA extraction from paraffin sections
- 4) In situ hybridization for paraffin sections
- 5) Real-time PCR including RT-PCR
- 6) Flow cytometry for lymphocytes
- 7) Double-colored immunofluorescence
- 8) Preparation of monoclonal antibodies for paraffin sections

### **7. Grading System**

Submit summary for the journal club (at least 2 times) and clinic-pathological conference (at least 2 times) held in Tuesday

### **8. Prerequisite Reading**

It is necessary to review a macroscopic anatomy and the microscopic organization science of each organ because knowledge of the organization science is indispensable to understand a pathological change in a disease.

### **9. Reference Materials**

- (1) Robbins & Cotran Pathologic Basis of Disease 9th ed. W B Saunders Co.
- (2) Rosai and Ackerman's Surgical Pathology 10th ed. Mosby.

### **10. Important Course Requirements**

Nothing

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

Professor Yoshinobu EISHI E-mail eishi.path@tmd.ac.jp

### **13. Note(s) to students**

No limit for participants, but in a small group composed of five students or less.

# Physiology and Cell Biology

Lecture	(code: 7 4 8 1	1st year	:6units)
Practice	(code: 7 4 8 2	1st~2nd year	:4units)
Lab	(code: 7 4 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Shingo Sato (Junior associate professor), Hiroki Ochi (Assistant professor), Satoko Sunamura (Assistant professor)

## 2. Classroom/Lab

TBA

## 3. Course Purpose and Outline

Recent progress in molecular biology and genetics advanced our understanding of molecular basis of physiological function and pathophysiological mechanisms of various diseases. Besides, signal transduction system using intracellular, intercellular, and inter-organ networks has been shown to be essential for whole body homeostatic function. In this lecture, we will discuss hierarchical regulatory system governing individual homeostasis.

## 4. Course Objective(s)

To join our research team and learn various experimental techniques including molecular biology, cellular biology, and physiology.

To progress our research projects and improve our understanding of whole body homeostasis by inter-organ network system.

## 5. Format

Small group discussion

## 6. Course Description and Timetable

Check with the teachers in advance for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Recent progress in molecular biology and genetics advanced our understanding of molecular basis of physiological function and pathophysiological mechanisms of various diseases. Besides, signal transduction system using intercellular, intersystem, and inter-organ networks has been shown to be essential for whole body homeostatic function. In this lecture, we will discuss hierarchical regulatory system governing individual homeostasis.

Available programs:

Graduate School Seminar: TBA

Graduate School Special Seminar: TBA

Journal Club: On the second Friday of every month, 12:00–13:30

### Practice

Goals/Outline:

To understand the background of the research field and bring up relevant scientific questions.

To develop scientific thinking with effective questions and learn the way of scientific presentation.

Available programs:

Lab meeting: On every Monday, 15:30 – 17:00

### Lab

Goals/Outline:

You can Join our research team and learn various experimental techniques including molecular biology, cellular biology, and physiology.

Available programs:

You can participate in our research team anytime.

### **7. Grading System**

You will be evaluated based on your attendance rate for the lecture, practice, lab, and academic meetings, and your attitude for scientific research.

### **8. Prerequisite Reading**

You are recommended to improve your knowledge about physiology, molecular biology, endocrinology, bone biology, and molecular oncology.

### **9. Reference Materials**

N/A

### **10. Important Course Requirements**

N/A

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

Contact information: Shingo Sato, TEL: 03-5803-5156, E-mail: tmd.phy2@gmail.com

### **13. Note(s) to students**

N/A

# Molecular Cellular Cardiology

Lecture	(code: 7 4 9 1	1st year	:6units)
Practice	(code: 7 4 9 2	1st~2nd year	:4units)
Lab	(code: 7 4 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Tetsushi Furukawa      Assistant Professor Kensuke Ihara  
Contact person: Tetsushi Furukawa, E-mail: t\_furukawa.bip@mri.tmd.ac.jp

## 2. Classroom/Lab

It will be held in seminar room in M&D tower, which will be announced in time.

## 3. Course Purpose and Outline

The purpose of this course is to learn basic physiology, pharmacology, and molecular biology of cardiovascular system and cardiovascular diseases in taking into consideration to advance to the translational research.

## 4. Course Objective(s)

The goal of this course is to understand basic physiology, pharmacology, and molecular biology of cardiovascular system and cardiovascular diseases.

## 5. Format

In general, it will be held with few attendances. We will encourage question and discussion to promote interaction between lecturer and attendances.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

You will learn pathogenesis for cardiovascular diseases including fetal arrhythmias, sudden cardiac death, and gender difference through lecture and discussion. The goal is to obtain knowledge, with which you will proceed your own research project.

Available programs:

Lecture    every 2 weeks, Monday 15:00–16:30  
Special Lecture    once per year  
Seminar    once a week, every Friday 15:00–16:30  
Journal Club    once a week, every Friday 17:00–19:00

### Practice

Goals/Outline:

You will learn pathogenesis for cardiovascular diseases including fetal arrhythmias, sudden cardiac death, and gender difference through experiment and practice. The goal is to obtain technique, with which you will proceed your own research project.

Available programs:

Research conference once a week, every Tuesday 10:00–11:00

### Lab

Goals/Outline:

Using multi-disciplinary approach including molecular, genetic, and electrophysiological techniques, we will study unproven important cardiovascular theme shown below.

Available programs:

- Participation in a research group
- (1) Personalized medicine for cardiac arrhythmias (especially atrial fibrillation and sudden death)
- (2) Basic research for gender-specific medicine in cardiovascular diseases
- (3) Use of human ES- and iPS-derived cardiomyocytes for arrhythmia research
  - Screening system of drug effects and toxicities
  - Establishment of diseased model cardiomyocytes
- (4) State-of-art technology for arrhythmia researches
  - Motion vector technology for cardiomyocyte function assay
  - Basic research for 3-D simulator of cardiac electrical activity using super-computer

## **7. Grading System**

It will be given on the status of attendance to discussion, seminar, and research conference, and on presentations and remarks. In addition, it will be given comprehensively also considering research content, attendance to research meetings, and presentation in meetings.

## **8. Prerequisite Reading**

The basic knowledge in molecular biology, and hopefully in cardiac physiology and pharmacology is required.

## **9. Reference Materials**

N/A

## **10. Important Course Requirements**

Communication skill in English  
Strong motivation to perform research  
Cooperativity with other lab. members

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

9:00-18:00

## **13. Note(s) to students**

# Molecular Medicine and Metabolism

Lecture	(code:	1st year	:6units)
Practice	(code:	1st~2nd year	:4units)
Lab	(code:	2nd~3rd year	:8units)

1. Instructor(s)

2. Classroom/Lab

Not offered

# Stem Cell Regulation

Lecture	(code: 7 5 1 1	1st year	:6units)
Practice	(code: 7 5 1 2	1st~2nd year	:4units)
Lab	(code: 7 5 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Tetsuya Taga, Associate Professor Ikuo Nobuhisa, and Assistant Professor Kouichi Tabu  
Contact person: Prof. Tetsuya Taga E-mail: taga.scr@mri.tmd.ac.jp

## 2. Classroom/Lab

The venue should be confirmed by contacting instructors before attendance. It varies depending on the programs.

## 3. Course Purpose and Outline

The purpose of this course is to encourage students to comprehensively understand stem cells in normal and pathological conditions. Students will improve their abilities to independently study stem cell regulations and applications through education and training about origins, properties, and regulations of stem cells that function in tissue development, maintenance and regeneration. The course will especially focus on neural stem cells, hematopoietic stem cells, and cancer stem cells in view of cell-external cues from "niches" and cell-intrinsic cues such as epigenetic regulations.

## 4. Course Objective(s)

The objectives of this course are as follows: To help students absorb knowledge and research strategies that are necessary to understand and employ regulatory mechanisms of stem cell development, maintenance, and fate determinations, particularly in neural stem cells, hematopoietic stem cells, and cancer stem cells. To make students learn molecular biological, cell biological, and histological methods for conducting research projects. To develop students' skills to recognize problems by themselves, construct working hypotheses, design and perform experiments to solve them, properly discuss experimental results, and report the summary of research in English.

## 5. Format

Programs are set up for a small number of students for more intense discussion and in-depth participation.

## 6. Course Description and Timetable

Check with the teacher in charge of the program.

### Lecture

Goals/outline:

This course will introduce to students the recent topics in the research field of stem cell regulation. Tissue stem cells possess potential to generate all cell types present in a given tissue. In order to understand tissue development and regeneration from the biological and clinical viewpoints, it is important to study the molecular regulation of stem cell maintenance and fate specification. Not only normal tissue stem cells, e.g. neural and hematopoietic stem cells on which we place particular focus, but also cancer stem cells will be discussed to consider the problem of cancer recurrence. We will refer to cell-extrinsic signals like growth factors in the niche and cell-intrinsic program such as epigenetic modifications as cell fate regulatory elements.

Available programs:

Research Meeting 15:00 ~ 16:30 on every Friday

### Practice

Goals/outline:

In this course, students will learn the molecular basis of stem cell regulation in view of cell-extrinsic signals and cell intrinsic-programs during tissue development, maintenance, and regeneration from molecular to whole-body levels. Students will receive exposure to cutting edge concepts and research technologies, and study regulatory mechanisms in neural, hematopoietic and cancer stem cells from multiple viewpoints. With emphasis also on physiological and pathological conditions surrounding the stem cells, the course aims to improve student's understanding of stem cells.

Available programs:

Progress Report 16:00 ~ 19:00 on every Monday, 17:30 ~ 19:00 on every Tuesday  
Workshop 16:30 ~ 18:00 on every Friday

## **Lab**

Goals/Outline:

Each student will conduct independent research, under supervision of instructors, on regulatory mechanisms of either the neural, hematopoietic, and cancer stem cells. Other tissue stem cells can be tackled by consultation. Students are advised to design experiments regarding, for example, stem cell development, maintenance of multipotentiality, cell-fate specification, cell migration, maturation, maintenance, and regeneration. Through execution of such experiments, students shall understand general property of stem cells in both/either physiological and/or pathological conditions and obtain a hint for going into translational research.

Available programs:

Participation to the research groups by consultation

## **7. Grading System**

Grading will be undertaken based on lecture/practice/lab participation, performance, presentation, reports, and lab work execution.

## **8. Prerequisite Reading**

Students should read in advance literature on stem cell regulations. They should also possess the necessary skills to run Word, Excel, and PowerPoint, which are used in the Lectures and Practice.

## **9. Reference Materials**

Molecular Biology of the Cell, fifth edition. Garland Science. 2008.  
StemBook. Harvard Stem Cell Institute. 2008-. (<http://www.ncbi.nlm.nih.gov/books/NBK27044/>)

## **10. Important Course Requirements**

Participants are required to study on a voluntarily basis.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

11:00 ~ 12:00 on every Monday (make an appointment by E-mail). Prof. Tetsuya Taga's E-mail address: taga.scr@mri.tmd.ac.jp

## **13. Note(s) to students**

None.

# Molecular Pharmacology

Lecture	(code:	1st year	:6units)
Practice	(code:	1st~2nd year	:4units)
Lab	(code:	2nd~3rd year	:8units)

1. Instructor(s)

2. Classroom/Lab

Not offered

# Stem Cell Biology

Lecture	(code: 7 5 7 1	1st year	:6units)
Practice	(code: 7 5 7 2	1st~2nd year	:4units)
Lab	(code: 7 5 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Emi Nishimura, Assistant Professor Hiroyuki Matsumura  
Contact person: Prof. Emi Nishimura TEL 5803-4651 E-mail nishscm@tmd.ac.jp

## 2. Classroom/Lab

To be announced by E-mail

## 3. Course Purpose and Outline

The purpose of this course is to provide students with opportunities to learn Stem Cell Biology and its clinical relevance.

## 4. Course Objective(s)

1) define the term "stem cell" and "tissue stem cells" 2) learn methodology for stem cell research 3) understand the mechanisms underlying tissue cell turnover and homeostasis 4) learn about diseases caused by stem cell defects 4) learn about clinical applications

## 5. Format

Seminar & Hands-on Lab

## 6. Course Description and Timetable

Recent topics in the field of stem cell biology and medicine will be presented and discussed with participants.  
The exact schedule should be checked with the teacher in charge for the program.

### Lecture

Goals/outline:

Our goal is to understand the mechanisms of tissue homeostasis driven by stem cell systems and to apply the knowledge to better understand the mechanisms underlying the tissue decline, cancer development and other diseases associated with aging. We will discuss how stem cells including both tissue stem cells and cancer stem cells are generated and maintained in tissues and apply the knowledge to regenerative medicine and treatment of cancer and other diseases.

Available programs:

Lecture and Special Lecture : To be announced by E-mail  
Seminar : Monday morning (To be announced by E-mail)

### Practice

Goals/Outline:

The purpose of our Journal Club is to introduce Stem Cell Biology and Cancer Biology to participants by providing an opportunity to read, present, and discuss some noteworthy papers of high impact and quality in the field. We will aim to distinguish what is known from what is not known, and determine what should be done next. Students will learn how to plan experiments, how to analyze and interpret the results.

Available programs:

Journal Club 10:00-11:00 AM on Monday  
Progress Report 11:00-12:00 AM on Monday

## **Lab**

### Goals/Outline:

The purpose of our Lab is to provide an opportunity to learn in vivo and in vitro analysis of tissue stem cells from genetically modified mice. The techniques include immunohistochemical staining, histological analysis, FACS analysis and generation of transgenic mice.

Available programs:

Hands-on Lab: To be announced by E-mail

## **7. Grading System**

Report (80%) and discussion (20%) for grading

## **8. Prerequisite Reading**

Read the sections about stem cells in "Molecular Biology of THE CELL", "the biology of Cancer" (by Robert A. Weinberg) and StemBook online.

## **9. Reference Materials**

Molecular Biology of THE CELL, the biology of Cancer (by Robert A. Weinberg) etc.

## **10. Important Course Requirements**

Please make contact with Prof. Emi Nishimura by e-mail first. Please prepare the report which include the summary for the definitions and key concepts of "somatic stem cells", "stem cell niche" and "stem cell renewal". Submit the report (in 3 pages) by the end of November for further discussion.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:30-16:30 TEL:03-5803-4651, E-mail:nishscm@tmd.ac.jp

## **13. Note(s) to students**

NP

# Respiratory Medicine

Lecture	(code: 7 5 8 1	1st year	:6units)
Practice	(code: 7 5 8 2	1st~2nd year	:4units)
Lab	(code: 7 5 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Senior Lecturer: Toshihide Fujie  
Contact person: Toshihide Fujie E-mail: tfujie.pulm@tmd.ac.jp

## 2. Classroom/Lab

M&D tower, north1303

## 3. Course Purpose and Outline

Respiratory Medicine deals with a variety of pulmonary diseases including tumors, infectious diseases, allergic diseases, non-allergic inflammatory diseases, and genetic disorders.

## 4. Course Objective(s)

Main objective of integrated pulmonology in the graduate course is to provide students to study specific diagnostic modalities as well as basic scientific findings regarding the pathogenesis of pulmonary diseases.

## 5. Format

After reviewing a variety of pulmonary diseases and the latest topics, pathogenesis of each pulmonary disease will be discussed.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Integrated pulmonology deals with a variety of pulmonary diseases including tumors, infectious diseases, allergic diseases, non-allergic inflammatory diseases, and genetic disorders. Main objective of integrated pulmonology in the graduate course is to provide students to study specific diagnostic modalities as well as basic scientific findings regarding the pathogenesis of pulmonary diseases.

Available programs:

Journal Club Saturday, 8:00 am  
Conference Saturday, 9:00 am

### Practice

Goals/Outline:

Respiratory Medicine clinic provides a full spectrum of diagnosis and treatment of a variety of pulmonary diseases. Consultant system is open to all departments in this hospital and daily clinical conference regarding inpatients is organized by professors of the department. In outpatient clinic, chemotherapy, home oxygen therapy, support for ceasing smoke, management of sleep apnea, and arrange of clinical studies are provided.

Available programs:

Conference of Pulmonary Medicine Every weekday, 8:15 or 8:30 am  
Round for in-patients Friday, 10:00 am  
Joint conference of Surgery &Pathology Wednesday. 5:30 pm

## **Lab**

Goals/Outline:

- 1) Pathogenesis of hypersensitivity pneumonitis and detection of environmental causative antigen
- 2) Airway remodeling in bronchial asthma model
- 3) Acute exacerbation in pulmonary fibrosis
- 4) Proteomics of pulmonary fibrosis associated with collagen vascular disease
- 5) Pathogenesis of pulmonary fibrosis and emphysema

Available programs:

Lab meeting any time

## **7. Grading System**

We evaluate the participation situation in discussion, exercise, research practice (60%). For example, presentation and remarks in the meeting. In addition, we comprehensively evaluate (40%) the grade on the basis of research content, degree of involvement in study group meeting, number of presentations at academic conference and paper submission.

## **8. Prerequisite Reading**

Alberts B, et al: Molecular biology of the cell. 6th edition, 2014.

## **9. Reference Materials**

None

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:00 – 17:00

## **13. Note(s) to students**

Students who have interest in pulmonary medicine are welcome to join us.

# Gastroenterology and Hepatology

Lecture	(code: 7 5 9 1	1st year	:6units)
Practice	(code: 7 5 9 2	1st~2nd year	:4units)
Lab	(code: 7 5 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Mamoru Watanabe  
Contact person: Kiichiro Tsuchiya E-mail dept.gast@tmd.ac.jp

## 2. Classroom/Lab

Different with each course.

## 3. Course Purpose and Outline

The purpose of this course is the understanding the situation of inflammatory bowel disease (IBD) in Japan and the problems about the pathogenesis and intractable cause of IBD. In addition, the understanding the patogeneisis and problems about the liver diseases such as viral hepatitis, cirrhosis and hepatocellular carcinoma is the purpose of this course.

## 4. Course Objective(s)

The objective of this course is to learn the basic sciense such as molecular biology, immunology, cancer biology and regenerative medicine for understanding the problems about G.I and liver disease. Moreover, it is to performe the examination for the elucidation of own study thema.

## 5. Format

Different with each course.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Research project is selected from the clinical problems in the Gastroenterology and Hepatology to understand the research policy, as clinical science that the results of research project finally should be restored to clinical medicine.

Available programs:

Research Conference	every Tuesday	18:00~19:30
Journal Club	every Tuesday	18:00~19:30

### Practice

Goals/Outline:

To cultivate the awareness of the issues that the subject of basic research is awaken from medical practice through learning the fundamental knowledge such as endoscopic technique and clinical information of gastroenterology.

Available programs:

Clinical conference	every Tuesday	7:30~8:30
Endoscopic examination	every Tuesday, Thursday, Friday	
X-ray examination	every Wednesday	
Abdominal echo examination	every Monday, Friday	

### Lab

Goals/Outline:

To get novel knowledge by basic research raised from clinical practice.

Available programs:

Mucosal immunology, Inflammatory related carcinogenesis  
Digestive regeneration  
Hepatitis / HCC  
Liver regeneration

## **7. Grading System**

Different with each course.

## **8. Prerequisite Reading**

To learn the basic knowledge about gastroenterology. To read the previously published papers of this laboratory.

## **9. Reference Materials**

not specified. Books for molecular biology, immunology, clinical medicine

## **10. Important Course Requirements**

Nothing in particular

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

every wednesday 9:00–12:00 (reservation required) Contact person: Kiichiro Tsuchiya      E-mail dept.gast@tmd.ac.jp

## **13. Note(s) to students**

We prepare many opportunities for the study abroad.

# Specialized Surgeries

Lecture	(code: 7 6 0 1	1st year	:6units)
Practice	(code: 7 6 0 2	1st~2nd year	:4units)
Lab	(code: 7 6 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor, Hiroyuki Uetake ; Associate Professor, Toshifumi Kudo, Toshiaki Ishikawa, Tsuyoshi Nakagawa and Kentaro Okamoto  
Contact person: Hiroyuki Uetake E-mail h-uetake.srg2@tmd.ac.jp

## 2. Classroom/Lab

Operative Conference, B-5 conference room; Clinical Conference, A-9 conference room

## 3. Course Purpose and Outline

1) To understand ethiology, diagnosis and adequate treatment for colorectal and breast cancer. 2) To understand multidisciplinary treatment for unresectable colorectal cancer. 3) To understand ethiology, diagnosis and adequate treatment for periferal vascular disease. 4) To understand ethiology, diagnosis and adequate treatment for pediatric surgical disease.

## 4. Course Objective(s)

1) To make the treatment strategy for colorectal and breast cancer. 2) To keep and assess QoL and organ function after operation. 3) To make the multidisciplinary treatment strategy for advanced colorectal and breast cancer. 4) To understand ethiology, diagnosis and adequate treatment for periferal vascular disease. 5) To make the treatment strategy for pediatric surgical disease.

## 5. Format

To improve the ability of presentation and communication, enough opportunities of presentation and discussion are set.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/Outline:

Surgery for cancers of the colon and rectum and the breast is the most important tool, but recently chemotherapy has achieved great advance. In order to establish the strategy how to eradicate cancers, it is important to elucidate the mechanism of development and progression of cancers. The latest findings on surgical oncology are reviewed. The most effective therapy for nonresectable cancers is reviewed in view of a multidisciplinary treatment approach. Surgical treatment for cancers often complicates physiological dysfunctions in digestion, absorption, defecation, sexual intercourse and urination, resulting in impairing post-operative QOL. The students take the lectures about anatomy and physiology of the digestive organs and the breast to acquire the knowledge required to prevent a decline in QOL.

Available programs:

Lecture: As necessary

Special Lecture: As necessary

Seminar: As necessary

Journal Club: Every Thursday, 15:00 - 16:30

Research Conference: Every Thursday, 15:00 - 16:30

### Practice

Goals/Outline:

The goals of the practice in this course are as follows:

- 1) Understanding the procedures of diagnosis of cancers of the gastrointestinal tract and the breast.
- 2) Selecting the most appropriate treatment approach including surgical resection and chemotherapy based on the staging and patient survival.
- 3) Preventing the physiological and neurological dysfunction complicated after surgery.

Available programs:

Clinical Round: Every Monday and Thursday, 9:00 - 10:00. Tuesday, Wednesday and Friday, 8:00-9:00

Pre-operative Conference: Every Thursday, 7:30 - 9:00

Post-operative Conference: Every Monday, 7:30 - 9:00

Clinical Conference: Upper GI, every Monday, 17:30 - 20:00;

Clinical conference: the colon and rectum, every Wednesday, 17:30 - 20:00; Clinical conference: the breast, every Friday, 18:00 - 19:00

## **Lab**

Goals/Outlines:

- 1) Development of novel therapeutics for gastrointestinal and breast cancers by elucidating invasion/metastasis mechanisms of cancer.
- 2) Identification of genes involved in gastrointestinal carcinogenesis by comprehensive analysis of mRNA and genomic DNA
- 3) Identification of predictive factors for response to chemotherapeutic agent and application of these findings to individualized medicine.
- 4) Development of the radical operation without dysfunction by clarifying the involvement of the automatic nerves in gastrointestinal motility, digestion and absorption, urination and ejaculation.
- 5) Development of less invasive operation for cancer of the stomach, the colon and rectum, and the breast.

Available programs:

Participation in a research group: As necessary

## **7. Grading System**

- 1) Attendance to the lectures and the conferences
- 2) Contents of the research presentation
- 3) Contents of the article

The student is evaluated in consideration of the above three points.

## **8. Prerequisite Reading**

No

## **9. Reference Materials**

No

## **10. Important Course Requirements**

No

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

9 am to 5 pm, Monday to Friday

## **13. Note(s) to students**

# Cardiovascular Medicine I

Lecture	(code: 7 6 1 1	1st year	:6units)
Practice	(code: 7 6 1 2	1st~2nd year	:4units)
Lab	(code: 7 6 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Kenzo Hirao

Contact person : Kenzo Hirao Phone;03-5803-5231 E-mail; 0160.cvm@tmd.ac.jp

## 2. Classroom/Lab

Appropriate location would be selected to study efficiently.

## 3. Course Purpose and Outline

The major purpose of our course is to educate state-of art as well as fundamental literacy of clinical and experimental cardiovascular medicine.

## 4. Course Objective(s)

The primary objective of our course is to enable our students to learn the latest knowledge and clinical skills of cardiovascular medicine.

## 5. Format

Senior doctor coaches student individually as the best way in any case. We offer the student both clinical research and basic investigation.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The rising epidemic of cardiovascular disease is fuelled by obesity, hypertension, diabetes and aging. Extensive research identified immunoinflammatory mechanisms as key drivers in the initiation and progression of the disease, from early asymptomatic stages of vascular and myocardial injury leading to the clinically manifest dysfunction and remodeling in advanced stages. Heart failure is the end stage of all cardiovascular diseases including arrhythmia, hypertension, myocarditis and others. We investigate the mechanisms of vascular and myocardial inflammation in cardiovascular disease. Besides, many clinical technique are required to treat both in-hospital and out-hospital patients, i.e PCI and ablation and implantation of ICD and CRT. Cardiac imaging (ultrasound, MRI, CT, PET, intracoronary imaging and others) is one of the most exciting and fast-developing area. Our aim of the lecture is to understand broad knowledge on the cardiovascular diseases from bench to bedside.

Available programs:

Lecture Periodically

Special Lecture Periodically

Seminar Thursday morning every two weeks

Journal Club Tuesday evening every two weeks

Conference Tuesday evening every two weeks

### Practice

Goals/Outline:

We can offer all techniques to treat patients from fundamental skills to new and challenging techniques. For example, we are doing PCI, Ablation on many origins of arrhythmia, implantation of pacemaker/ ICD/ CRT. We also conduct non-invasive imaging and medical treatment of patients with cardiovascular diseases.

Available programs:

Morning conference : every day  
Professor's round : every Friday  
Electrophysiology meeting : every Tuesday evening  
Coronary angiography meeting : every Friday

## **Lab**

Goals/Outline:

We identify the mechanisms of cardiovascular diseases especially focusing on the inflammation with cardiac transplantation and myocarditis. Our investigation is based on deep interest and passion to contribute findings new treatments of heart disease. The targets of our investigation cover myocardial ischemia, cardiac rejection of the transplantation, myocarditis, heart failure, atherosclerosis, periodontal disease, pulmonary hypertension, atrial fibrillation, and so on.

Available programs:

Molecular biology, Animal experiments, Electrophysiological study, Pathohistological analyses, Gene analyses are available.

## **7. Grading System**

You will be graded as multi-dimensional and appropriate way.

## **8. Prerequisite Reading**

It is necessary for our students to have essential knowledge regarding biology and medicine.

## **9. Reference Materials**

Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine. Douglas L. Mann, Douglas P. Zipes, Peter Libby, and Robert O. Bonow, eds. Elsevier, 2015 [ISBN: 978-1-4557-5134-1]

## **10. Important Course Requirements**

None.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:00 – 17:00 on weekdays.

## **13. Note(s) to students**

We will provide whatever you need to study cardiovascular disease in clinical and basic ways.

# Cardiovascular Medicine II

Lecture	(code: 5 0 3 1	1st year	:6units)
Practice	(code: 5 0 3 2	1st~2nd year	:4units)
Lab	(code: 5 0 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Kenzo Hirao and Associate Professor Masahiko Goya  
Contact person : Kenzo Hirao Phone;03-5803-5231 E-mail; 0160.cvm@tmd.ac.jp

## 2. Classroom/Lab

Appropriate location would be selected to study efficiently

## 3. Course Purpose and Outline

The main purpose of our course is to educate state-of-art as well as fundamental knowledge and clinical and experimental heart rhythm disorder and cardiovascular medicine.

## 4. Course Objective(s)

The primary objective of our course is to enable our students to learn latest knowledge and clinical skills for appropriate diagnosis and optimal therapy of heart rhythm disorder and cardiovascular medicine.

## 5. Format

Senior doctor coaches students individually as the best way in any case. We offer the students both clinical and basic investigations.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Our goal is to educate students all about heart rhythm disorder. Arrhythmias are wide spectrum diseases including from one needing no therapy to life-threatening lethal one such as Brugada syndrome. The substrate for arrhythmia can contain any cardiac disorders, which are evaluated by cardiac MRI, CT, coronary angiogram, echocardiogram and intracardiac echocardiogram. Electrophysiologic findings are available by ECG, Holter monitoring, cardiac electrophysiologic study, 3-dimension mapping during arrhythmias. Therapeutic modalities are drugs, devices and catheter ablation. The genetic disorder such as long QT syndrome, catecholaminergic polymorphic VT and Brugada syndrome are treated nowadays using devices and ablation in part of them and genetic diagnosis is also lectured.

Available programs:

Lectures & special lectures Periodically  
Seminar Thursday morning every two weeks  
Journal Club Thursday evening every two weeks  
Conference Tuesday evening every two weeks

### Practice

We offer techniques to diagnose and treat patients with arrhythmias from fundamental skills and knowledge to newest ones. For example, we can offer the skills and knowledge regarding invasive electrophysiologic study, catheter ablation, implantation of pacemaker/ICD/CRT as well as non-invasive diagnostic methods such as ECG, signal averaged electrocardiography and exercise test. We conduct the way of logical thinking on the process from the appropriate diagnosis to optimal therapy.

Available programs:

Heart Rhythm Center clinical conference : every Tuesday evening  
Heart Rhythm Center research conference : Tuesday evening every two weeks  
Moring confrence : everyday  
Catheter ablation : everyday  
Device implantation : everyday

### **Lab**

We invetigate for elucidation of the mechanisms of the diseases or condition provoking heart rhythm disorders and for the development of novel methods for the diagnosing and treating them. We clarify the molecular leveled pathophysiology of refractory arrhythmias using basic elctrophysiologic study in animal models as well as molecular biologic and histologic approaches. We also invetsigate the pathophysiology of rare chanaelopathy arrhythmias using genetic analyses.

Available programs:

Molecular biology, animal experiments, electrophysiologic study, pathophysiological analyses, gene analyses are available.

### **7. Grading System**

The students will be graded as multi-dimensional and appropriate ways.

### **8. Prerequisite Reading**

It is necessary for our students to have essential knowledge regarding biology and medicine.

### **9. Reference Materials**

Cardiac Electrophysiology: From Cell to Bedside. Zipes DP, Jalife J. eds. 2014 Elsevier, saunders, Philadelphia

### **10. Important Course Requirements**

none

### **11.Lectures in English**

Lectures will be partially conducted in English.

### **12. Office Hour**

9:00–17:00 on weekdays

### **13. Note(s) to students**

We will provide whatever you need to study heart rhythm disorder in clinical and basic ways.

# Anesthesiology I

Lecture	(code: 7 6 2 1	1st year	:6units)
Practice	(code: 7 6 2 2	1st~2nd year	:4units)
Lab	(code: 7 6 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Prof. Tokujiro Uchida    E-mail uchida.mane@tmd.ac.jp  
Junior Associate Prof: Jiro Kurata

## 2. Classroom/Lab

Depends on the program. Contacts the tutor before the course.

## 3. Course Purpose and Outline

A comprehensive understanding of research trends, research methods, and analysis of results by introducing the latest papers published in prestigious journals related to anesthesiology.

## 4. Course Objective(s)

Understanding research background, basic knowledge and skills necessary for the research.

## 5. Format

Laboratory programs are conducted by the tutor.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Fostering the academic specialists with particular knowledge and skills in the areas related to our professional. In particular, aiming ①to acquire the knowledge and technology throughout the perioperative management patients with severe systemic impaired organ function, ②to clarify the mechanisms of general anesthetic action and pain chronification in the human central nervous system that will help to develop methods to monitor intraoperative awareness and to diagnose chronic pain, ③to invent new modality of artificial ventilation, pain management, and fluid management in patients undergoing thoracic surgery aiming to improve their outcome, ④to identify mechanisms behind postoperative acute kidney injury and invent new measures for prevention, diagnosis, and treatment.

Available programs:

Lectures & Special Lectures: Will be held according to an agenda

Seminar: Will be held according to an agenda

Journal Club & Conference : Every morning 8:00-8:30

### Practice

Goals/Outline:

Acquiring various anesthetic methods for clinical use as well as the basic knowledge and skills for research. In addition, future educators in the field experience teaching practice for trainee doctors.

Available programs:

Initial training program of clinical anesthesia for necessary persons.

## Lab

Goals/Outline:

- 1) Discovering most effective ventilation methods for injury lungs.
- 2) Therapeutic mechanism of mesenchymal stem cell for lung injury (rat and mouse model)
- 3) Studies on the central nervous system effects of general anesthetics by human electrocorticogram and functional neuroimaging.
- 4) Studies on the mechanisms of cerebral pain processing and pain chronification by human functional magnetic resonance imaging and positron emission tomography.
- 5) Studies on the effects of protective one-lung ventilation on ventilatory mechanics.
- 6) Epidemiologic studies to identify incidence of, and risk factors for postoperative acute kidney injury in patients undergoing liver resection.
- 7) Studies on the effect of anesthetics on the developing brain.

Available programs:

Participation in research groups such as 1) best mechanical ventilation for injured lungs in animal models, 2) mesenchymal stem cell for lung injury 3) etc

## 7. Grading System

A comprehensive evaluation by reports, participation to lectures, experimental researches and presentation of the research results.

## 8. Prerequisite Reading

Articles related to the research projects

## 9. Reference Materials

Journals such as "Anesthesiology", "Anesthesia and Analgesia", "British Journal of Anaesthesia "

## 10. Important Course Requirements

## 11. Lectures in English

Lectures will be partially conducted in English.

## 12. Office Hour

Anytime except vacances period by email. mail address : uchida.mane@tmd.ac.jp

## 13. Note(s) to students

# Anesthesiology II

Lecture	(code: 7 6 2 1	1st year	:6units)
Practice	(code: 7 6 2 2	1st~2nd year	:4units)
Lab	(code: 7 6 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Prof. Tokujiro Uchida E-mail uchida.mane@tmd.ac.jp  
Associate Prof. Tokujiro Uchida , Junior Associate Prof. Jiro Kurata

## 2. Classroom/Lab

Depends on the program. Contacts the tutor before the course.

## 3. Course Purpose and Outline

A comprehensive understanding of research trends, research methods, and analysis of results by introducing the latest papers published in prestigious journals related to anesthesiology.

## 4. Course Objective(s)

Understanding research background, basic knowledge and skills necessary for the research.

## 5. Format

Laboratory programs are conducted by the tutor.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Fostering the academic specialists with particular knowledge and skills in the areas related to our professional. In particular, aiming ①to acquire the knowledge and technology throughout the perioperative management patients with severe systemic impaired organ function, ②to clarify the mechanisms of general anesthetic action and pain chronification in the human central nervous system that will help to develop methods to monitor intraoperative awareness and to diagnose chronic pain, ③to invent new modality of artificial ventilation, pain management, and fluid management in patients undergoing thoracic surgery aiming to improve their outcome, ④to identify mechanisms behind postoperative acute kidney injury and invent new measures for prevention, diagnosis, and treatment.

Available programs:

Lectures & Special Lectures: Will be held according to an agenda

Seminar: Will be held according to an agenda

Journal Club & Conference : Every morning 8:00-8:30

### Practice

Goals/Outline:

Acquiring various anesthetic methods for clinical use as well as the basic knowledge and skills for research. In addition, future educators in the field experience teaching practice for trainee doctors.

Available programs:

Initial training program of clinical anesthesia for necessary persons.

## Lab

Goals/Outline:

- 1) Discovering most effective ventilation methods for injury lungs.
- 2) Therapeutic mechanism of mesenchymal stem cell for lung injury (rat and mouse model)
- 3) Studies on the central nervous system effects of general anesthetics by human electrocorticogram and functional neuroimaging.
- 4) Studies on the mechanisms of cerebral pain processing and pain chronification by human functional magnetic resonance imaging and positron emission tomography.
- 5) Studies on the effects of protective one-lung ventilation on ventilatory mechanics.
- 6) Epidemiologic studies to identify incidence of, and risk factors for postoperative acute kidney injury in patients undergoing liver resection.
- 7) Studies on the effect of anesthetics on the developing brain.

Available programs:

Participation in research groups such as 1) best mechanical ventilation for injured lungs in animal models, 2) mesenchymal stem cell for lung injury 3) etc

## 7. Grading System

A comprehensive evaluation by participation to lectures, experimental researches and presentation of the research results.

## 8. Prerequisite Reading

Miller's Anesthesia, 8th edition, Ronald D. Miller edited. Saunders, 2014

## 9. Reference Materials

Journals such as "Anesthesiology", "Anesthesia and Analgesia", "British Journal of Anaesthesia "

## 10. Important Course Requirements

Sufficient level of communication using English or Japanese language.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Anytime except vacation periods by email. Mail address : uchida.mane@tmd.ac.jp

## 13. Note(s) to students

# Cardiovascular Surgery

Lecture	(code: 7 6 3 1	1st year	:6units)
Practice	(code: 7 6 3 2	1st~2nd year	:4units)
Lab	(code: 7 6 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Hirokuni Arai  
Associate Professor: Tomohiro Mizuno  
Contact person: Hirokuni Arai E-mail: hiro.cvsg@tmd.ac.jp

## 2. Classroom/Lab

Different venue depending on the specific program

## 3. Course Purpose and Outline

To analyze the unsolved phenomena and etiologies of Cardiovascular diseases, and to acquire the ability and the skill to solve those mechanisms.

## 4. Course Objective(s)

To be able to point out the unsolved phenomena and the etiologies of Cardiovascular diseases, and to acquire the skills of analyzing and solving those problems.

## 5. Format

Small-group guidance

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Cardiovascular Surgery is a discipline of medical science which deals the surgical treatment of the disease of heart and aorta. Main objective of Cardiovascular Surgery in the graduate course is to provide students opportunity to study surgical anatomy, pathophysiology, pharmacology, and advanced treatment. Students are also taught basic research for the surgical treatment.

Available programs:

Journal Club: Tuesday 9:00-9:30

Cardiovascular Surgery Seminar: once in a year (4hrs)

### Practice

Goals/Outline:

Practices on the methods and points of case history, physical examination, imaging diagnosis, and laboratory tests. The treatments and cares of patients are learned in accordance with the disease, as well as the perioperative cares and surgical techniques of cardiovascular surgery.

Available programs:

Professor rounds: Monday, Wednesday, Thursday and Friday 8:15-9:15am

Preoperative Conference: Thursday 9:15-10:15am

Surgical Operation: Monday, Wednesday, Thursday and Friday

Research Conference: Tuesday 7:30-9:00am

Wet Labo: Tuesday 2:00-5:00pm(once in a month)

## Lab

Goals/Outline:

To elucidate the mechanism of ischemic heart diseases, such as left ventricle dilatation and subsequent heart failure, mitral valve regurgitation (MR) and left ventricle aneurysm.

- 1) Developing technique of beating mitral valve surgery
- 2) Developing new technique/surgery for ischemic heart disease
- 3) Research for prognosis of postoperative patients with long term follow up

Available programs:

Laboratory: everyday

Research Conference: Tuesday 7:30-9:00

## 7. Grading System

Comprehensive evaluation system

## 8. Prerequisite Reading

You have to learn about basic knowledge about the etiologies, pathophysiologies, diagnosis, indications and surgical procedures of Cardiovascular diseases in advance.

## 9. Reference Materials

Nicholas Kouchoukos, Eugene Blackstone, Frank Hanley, James Kirklin, *Kirklin/Barratt-Boyes CARDIAC SURGERY 4th*  
Siavosh Khonsari, *CARDIAC SURGERY: Safeguards and Pitfalls in Operative Technique*  
Laurence Cohn, *CARDIAC SURGERY IN THE ADULT*

## 10. Important Course Requirements

N/A

## 11. Lectures in English

Lectures will be partially conducted in English.

## 12. Office Hour

Enquiry: Hirokuni Arai Cardiovascular Surgery Phone: +81-3-5803-5267 Email: hiro.cvsg@tmd.ac.jp

## 13. Note(s) to students

N/A

# Nephrology

Lecture	(code: 7 6 4 1	1st year	:6units)
Practice	(code: 7 6 4 2	1st~2nd year	:4units)
Lab	(code: 7 6 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Shinichi Uchida  
Contact person: Shinichi Uchida E-mail suchida.kid@tmd.ac.jp

## 2. Classroom/Lab

MD Tower 13th floor Department of Nephrology

## 3. Course Purpose and Outline

We try to clarify the homeostatic actions in kidney and to understand the molecular pathogenesis of diseases caused by the dysregulations of kidney. Based on the pathogenesis, we try to develop novel therapeutic strategies.

## 4. Course Objective(s)

To understand the homeostatic actions in kidney and its dysregulations in disease states.

## 5. Format

Please refer to the teacher in charge of each program.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

We lecture molecular mechanism of homeostatic actions in kidney, and mechanisms of diseases when the homeostatic actions are dysregulated. In addition, we mention future prospective for advanced treatments for these diseases.

Available programs:

Lecture as needed  
Special Lecture as needed  
Journal Club Thursdays 17:00 - 18:00  
Research Conference Every Monday 14:00 - 17:00

### Practice

Goals/Outline:

In hospitalized patients, we try to understand pathogenesis of their diseases caused by dysregulation of homeostatic actions in the kidney, and to discuss therapeutic approaches based on the pathogenesis.

Available programs:

Ward round Thursdays 14:00 - 15:00  
Case Conference Thursdays 15:00 - 17:00  
Pathology Conference Tuesdays (twice a month) 17:00 - 18:30  
Blood Purification Conference Thursdays 11:00 - 13:00

## **Lab**

### Goals/Outline:

We are extensively studying channels and transporters and their upstream regulators. Especially, we are focusing on the molecular pathogenesis of salt-sensitive hypertension and its consequence in various organs in the body. Generation and analysis of genetically engineered mice is one of the major strategies for this research. We are considering the use of next generation sequencing to identify responsible genes for kidney disease of unknown etiology.

### Available programs:

We can accept as needed.

We can provide opportunity for studying abroad.

## **7. Grading System**

We give a grade from comprehensive standpoint based on attendance and research results.

## **8. Prerequisite Reading**

You should know the basic kidney structures and functions.

## **9. Reference Materials**

Renal Pathophysiology The essential. Lippincott Williams & Wilkins  
Brenner & Recor's The Kidney. Elsevier.

## **10. Important Course Requirements**

nothing special

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:00-17:00 Mon-Fri

## **13. Note(s) to students**

# Comprehensive Reproductive Medicine

Lecture	(code: 7 6 5 1	1st year	:6units)
Practice	(code: 7 6 5 2	1st~2nd year	:4units)
Lab	(code: 7 6 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Naoyuki Miyasaka  
Associate professor: Satoshi Obayashi  
Junior associate professor: Naoyuki Yoshiki  
Contact person: Naoyuki Miyasaka E-mail n.miyasaka.gyne@tmd.ac.jp

## 2. Classroom/Lab

OB/GYN conference room on the 8th floor in the medical hospital building B (B-8) / the 10th floor south in M&D tower

## 3. Course Purpose and Outline

Comprehensive reproductive medicine (CRM) is a department which studies on obstetrics and gynecology. Our research and clinical fields include reproductive medicine, fetal and maternal medicine, gynecologic oncology and women's health care. The purposes of our courses are to understand and investigate the pathophysiological mechanisms responsible for women's diseases in order to contribute to the development of obstetrics and gynecology.

## 4. Course Objective(s)

Our research works are focusing on reproductive medicine, fetal and maternal medicine, gynecologic oncology and women's health care.

Our main objectives are

- 1, Investigation for a new progress in treatment technique
- 2, Acquisition of medical knowledge and procedure
- 3, Providing systemic lecture about women's physiological and pathological change during adolescence through senescence.

## 5. Format

A lot of lectures by active leaders in the front line of various fields are held during the doctor course, which is free to join. But this practice is essential to be inspired to get the knack. Every staff and mentor in the department can lead to get the technique of the experiments and the research presentation and to complete thesis.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Our goal is to understand systemically from the physiological to the pathological condition through clarifying characteristics of the reproductive cells and organs, and to foster the universal education of reproductive endocrinology, perinatal medicine, gynecological oncology, climacteric/menopausal medicine and gynecological infection disease. These 5 fields are the main targets of this department.

Available programs:

- ICT Lecture Wednesday 18:00-19:00
- Special Lecture once a year
- Seminar As needed
- Journal Club Monday 8:00- 8:30
- Pre-surgical Conference Monday 16:00 - 18:00
- Research Conference Friday 17:00 - 19:00

### Practice

Goals/outline:

To acquire the clinical skill of medical diagnosis and therapeutic maneuver based on understanding the lecture.

- I Reproductive endocrinology: Mastering of the ovulation induction, oocyte pick-up and ICSI by attending IVF program
- II Perinatal medicine: Acquisition of assessment technique on maternal and fetal condition by joining obstetrical team
- III Gynecological oncology: Mastering medical diagnosis and therapeutic maneuver through bed-side learning
- IV Climacteric/menopausal medicine: Mastering therapeutic maneuver to improve female QOL by attending menopausal clinic
- V Gynecological infection disease: Attending the clinic and acquirement of therapeutic maneuver

Available programs:

Gynecological pathology conference 3rd Monday 18:00- 20:00

IVF conference As needed

Professor's round & pre-operation conference Every Monday 14:00- 17:00

Post-operation conference Everyday (except Monday) 16:00- 17:00

## Lab

Goals/Outline:

As a clinical department, laboratory experiments need to restore the results to practical medicine like diagnostic methods, therapeutic maneuver and preventive medicine.

I Reproductive endocrinology:

1 Development of the method to increase intracellular Ca<sup>2+</sup> influx to obtain restored fertility

2 Improvement of implantation by clarifying physiology of granulosa cell, germ cell, villi, endometrium.

II Perinatal medicine:

1 Elucidation of the CP mechanism by MRI and pathology with using the animal model of cerebral blood flow occlusion.

2 Clarifying the mechanism of the uterine contraction through nitric oxide – arginine pathway

III Gynecological oncology:

1 Investigation of the effect of the growth factors on cultured carcinoma cells

2 Constructive mechanism of blood vessel with using

IV Climacteric/menopausal medicine:

1 Revelation of osteoporosis with cultured osteoblast and osteoclast

2 Clarification of female hormone on the endothelial function and the formation of atherosclerosis

3 Explanation of aging on central nervous system

V Gynecological infection disease: Attending the clinic and acquirement of therapeutic maneuver

1 To reveal the infection mechanism of herpes and adenovirus

Research divisions :

1) Research in physiology, endocrinology and metabolism in the reproductive medicine

2) Research of female physical and mental changes with aging

3) Pathophysiological examination of gynecological oncology

4) Clinical research and basic research in perinatal medicine

Available programs:

1, Cell culture technique of ovarian granulosa cells, endometrial cells, malignant cells, osteoblast and so on.

2, Determination of intracellular calcium (by Fura 2 method)

3, Measurement of intra-cellular IP<sub>3</sub>

4, Hormonal assay in plasma, urine, follicular fluid (RIA & EIA)

5, Immunohistochemistry with ABC method

6, Analysis of micro-structure with electrical microscopy

7, Determination with molecular biological technique.

8, Physiological determination of endothelial function

9, Determination of cerebral blood flow with MRI in cerebral infarction

10, Analysis of protein expression with flow-cytometry

## 7. Grading System

Grading will be done by these factors;

Lecture: attendance and discussion

Practice: clinical service at out and admitted patients

Lab: individual discussion with mentor and monthly progress report at research meeting

## 8. Prerequisite Reading

Students can get the reference materials from the lecturer and discuss with them.

## 9. Reference Materials

Lecturer will inform the materials later.

## 10. Important Course Requirements

nothing

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

contact person: Associate professor: Satoshi Obayashi E-mail s.obayashi.gyne@tmd.ac.jp

## 13. Note(s) to students

We will strongly recommend to joining the OB/GYN related medical society. A part of necessary expense should be supported by the department.

# Urology

Lecture	(code: 7 6 6 1	1st year	:6units)
Practice	(code: 7 6 6 2	1st~2nd year	:4units)
Lab	(code: 7 6 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Yasuhisa FUJII  
Contact person: Yasuhisa FUJII E-mail y-fujii.uro@tmd.ac.jp

## 2. Classroom/Lab

Venues are different according to the program.

## 3. Course Purpose and Outline

Urology is the surgical specialty that focuses on the urinary tracts, and on the male reproductive system. The organs covered by urology include the kidneys, adrenal glands, ureters, urinary bladder, urethra, and the male reproductive organs (testes, epididymis, vas deferens, seminal vesicles, prostate and penis). Urology is closely related to, and in some cases overlaps with, diverse medical fields including oncology, nephrology, gynecology, andrology, neurology, pediatric surgery, gastroenterology, and endocrinology. Minimally-invasive surgery for urological disorders has been one of the most important topics in this field.

## 4. Course Objective(s)

Our course objectives include;

- 1) to understand the pathophysiology and means of diagnosis and treatment of various urological disorders and to appropriately diagnose, treat, and manage patients with these diseases.
- 2) to learn gasless single-port robot-assisted surgery, which is one of the minimally-invasive surgeries and has been developed in our department.
- 3) through basic research, to gain new findings which will lead to the improvement of oncological and functional outcomes of patients with urological diseases.

## 5. Format

A small class in which the students will be trained through mutual discussion.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline

The urinary tracts and the male reproductive system are well controlled by automatic and somatic nervous systems and endocrine systems. The students will learn these modulating systems, destruction of which will lead to various urologic symptoms and diseases. And the students will also learn the etiology, diagnosis and treatment of urologic malignant diseases. Minimally-invasive surgery for urological disorders has been one of the most important topics in this field.

Available programs:

Lecture : Every Monday 7:00-8:00

Special Lecture: As needed (Usually three times a year)

Seminar: Every other Saturday 8:00-10:30

Special Seminar: As needed (Usually once a year by an international lecturer, 3 times a year by domestic lecturers)

Clinical Conference: Every Thursday 17:00-18:00

Case Conference: Every Thursday 7:00-9:00

## **Practice**

### Goals/Outline:

Medical professionals specializing in the field of urology are called urologists and are trained to diagnose, treat, and manage patients with urological disorders. Particularly, our graduate students will learn gasless single-port robot-assisted surgery, which is one of the minimally-invasive surgeries and has been developed in our department. The students will also learn urologic radiology, be promoted the ability of logical thinking, and will also have a lot of chances to improve their English presentation skills by preparing papers for international journals and meetings. Case conference is held in English.

### Available programs:

Urologic Radiology Conference: Third Thursday 17:00–18:00

Study Presentation: As needed (in the international and domestic meetings, usually 4 times a year)

Ward round: Every Monday 16:00–17:00

Attendance of Surgery: As needed

Preoperative Case Conference: Every Thursday 7:00–9:00

## **Lab**

### Goals/Outline:

Following studies have been extensively carried out in our laboratory with various biological and molecular biological techniques:

- 1) Overcoming therapeutic resistance to chemo- and/or radiotherapy against urological malignancies using novel molecular targeted agents
- 2) Investigation on functional roles of mitochondrial molecular chaperone TRAP1 in malignant cancer cells
- 3) Development of radiation-sensitizing strategy to bone metastasis by modulating STAT1 expression
- 4) Investigation on the underlying mechanisms of diffusion-weighted MRI signals of urological malignancies

### Available programs:

Participation in a research group, cell and animal researches: As needed

## **7. Grading System**

Grading are performed in a comprehensive way based on the lecture, practice, and laboratory participation situation, reports about research, the number of presentation in the international meetings and publication in the journals, conference presentations, and surgery participation .

## **8. Prerequisite Reading**

It is preferred to acquire the basic knowledge of urologic diseases and basic skills of basic research before admission.

## **9. Reference Materials**

Kazunori Kihara edited, Gasless Single-Port RoboSurgeon Surgery in Urology, Springer

Kazunori Kihara edited, Illustrated minimum incision urologic surgery, Igakushoin (in Japanese)

CAMPBELL-WALSH UROLOGY, 10th EDITION, ELSEVIER

European Association of Urology Guidelines, <http://www.uroweb.org/guidelines/online-guidelines/>

## **10. Important Course Requirements**

Nothing in particular

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

9:00–17:00, Phone: 03-5803-5295

Yasuhisa Fujii, E-mail: y-fujii.uro@tmd.ac.jp

## **13. Note(s) to students**

Nothing in particular

# Gastrointestinal Surgery

Lecture	(code: 7 6 7 1	1st year	: 6units)
Practice	(code: 7 6 7 2	1st~2nd year	: 4units)
Lab	(code: 7 6 7 3	2nd~3rd year	: 8units)

## 1. Instructor(s)

Professor Yusuke KINUGASA, Associate Professor Masamichi YASUNO, Mikito INOKUCHI, Yasuaki NAKAJIMA

## 2. Classroom/Lab

Different venue depending on the specific program, mainly at our medical office

## 3. Course Purpose and Outline

The graduates will understand various gastrointestinal diseases and attain the ability to manage these diseases and the problems of patients, through clinical experiences and basic researches.

## 4. Course Objective(s)

1.Understanding of surgical health care system delivery to both inpatients and outpatients. 2.Learning surgical technique of gastrointestinal surgery as an operator or assistants. 3.How to conduct clinical and/or basic research on gastrointestinal disease in collaboration with the other fields of specialists. 4.To promote skills in presentation at scientific meetings. 5.Acquisition of educational methods for junior surgeons. 6.Function as a member of the surgical team.

## 5. Format

With the instructors, clinical questions are discussed, presented, and finally contributed as the original paper.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Our goals are to develop the new methods of diagnosis and treatment of the disease of digestive tract to contribute to the medical progression. Also, we aim to bring up young doctors of gastrointestinal and general surgery.

Available programs:

Lecture, Seminar on every Tuesday, at 6:00 pm.

Conference on every Monday and Thursday, at 7:30 am.

### Practice

Goals/Outline:

Our goals are to learn and study the methodology of the diagnosis and treatment of the gastrointestinal surgery clinically.

Available programs:

Professor's round: every morning, AM 7:30-8:30

Pre- and post-operative Conference: Every Monday and Thursday, AM7:30-9:00

Surgical Operation: Every day

GI Conference: Every Tuesday, PM6:00-7:00

Joint Conference with Pathological Department: Every Thursday PM6:00-7:00

### Lab

Goals/Outline:

Our goals are to analyze the disease of digestive tract physiologically, molecular biologically, and pathologically, and to examine the general surgical technique, post-operative management, preventive medicine, and epidemiology.

Available programs:

Participation in research groups: Esophageal, Gastric and Colo-rectal team

## **7. Grading System**

Grading is performed according to the attending to our lecture, conference and clinical practice. The contents of the research are also graded.

## **8. Prerequisite Reading**

Besides knowledge of surgery and digestive surgery, comprehension of basic anatomy and physiology is required.

## **9. Reference Materials**

Japanese Classification of Esophageal Cancer: 11th edition: Part I. Japan Esophageal Society. Esophagus 2017,14(1):1-36.  
Japanese Classification of Esophageal Cancer: 11th edition: Part II and III. Japan Esophageal Society. Esophagus 2017,14(1):37-65.  
Japanese classification of colorectal carcinoma. Japanese Society for Cancer of the Colon and Rectum, Kanehara & Co., Ltd. Tokyo  
Surgery of THE ANUS RECTUM & COLON. Michael RB Keighley & Norman S Williams, W.B Saunders London  
Japanese gastric cancer treatment guidelines 2014(ver.4) Japanese Gastric Cancer Association. Gastric Cancer 2017,20(1):1-19.  
Japanese classification of gastric carcinoma: 3rd English edition Japanese Gastric Cancer Association. Gastric Cancer 2011,14:101-112.

## **10. Important Course Requirements**

Nothing in particular

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person:

Yutaka Tokairin, M.D., Ph.D. assistant professor of the Department of Gastrointestinal Surgery, E-mail: tokairin.srg1@tmd.ac.jp

Ms. Sakamoto, Secretary of Gastrointestinal Surgery, E-mail: secr.srg1@tmd.ac.jp

## **13. Note(s) to students**

No limitation for participants

# Thoracic Surgery

Lecture	(code: 7 6 8 1	1st year	:6units)
Practice	(code: 7 6 8 2	1st~2nd year	:4units)
Lab	(code: 7 6 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Kenichi Okubo

Contact person: Kenichi Okubo E-mail: okubo.thsr@tmd.ac.jp

## 2. Classroom/Lab

M&D tower, South S2060-2061

## 3. Course Purpose and Outline

Thoracic Surgery is a discipline of medical science which deals the surgical treatment for the disease of lung, mediastinum and diaphragm. The goal of the course is to educate next-age thoracic surgeon with surgical mind and well-trained surgical skills.

## 4. Course Objective(s)

Main objective of Thoracic Surgery in the graduate course is to provide students opportunity to study surgical anatomy, pathophysiology, pharmacology, and advanced treatment. Students are taught basic scientific research regarding the pathogenesis of respiratory diseases.

## 5. Format

Small-group guidance

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Thoracic Surgery deal with surgical diagnosis and treatment for respiratory diseases, such as lung cancer, metastatic pulmonary tumors, infectious diseases, and pleural malignancy. Students are taught the latest basic and/or clinical research for the surgical treatment.

Available programs:

Lab Meeting: Wednesday 17:00-19:00

Special Lecture: As Necessary

Seminar: As Necessary

Journal Club: Tuesday 7:30-8:00

### Practice

Goals/Outline:

Practices on the methods and points of case history, physical examination, imaging diagnosis, and laboratory tests. The treatments and cares of patients are learned in accordance with the disease and cancer stage, as well as the perioperative cares and surgical techniques of thoracic surgery.

Available programs:

Clinical Round: Tuesday 8:00-9:00

Clinical Conference: Monday 18:00 - 20:00

Chest Conference: Monday 17:30-18:00

Clinic-Pathological Conference: Wednesday 17:00-19:00

Operative Days: Monday, Wednesday, Thursday, Friday

## **Lab**

Goals/Outline:

- 1) Developing of novel therapeutics for lung cancer by elucidating invasion/metastasis mechanism of cancers
- 2) Identification of genes as predicting factors in surgically resected specimens
- 3) Development of multimodality treatment for locally advanced lung cancer

Available programs:

Participation in research groups: As necessary

## **7. Grading System**

Routine bench work, laboratory meeting and discussion, and results of each study are graded. In addition, presentation and participation in scientific meetings or conferences are comprehensively graded.

## **8. Prerequisite Reading**

Needs for basic surgical approach in thoracic surgery

## **9. Reference Materials**

Not specifically indicated

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

9:00 – 17:00

## **13. Note(s) to students**

Students who have interest in thoracic surgery are welcome to join us.

# Igakuken Disease-oriented Molecular Biology

Lecture	(code: 9 0 2 1	1st year	:6units)
Practice	(code: 9 0 2 2	1st~2nd year	:4units)
Lab	(code: 9 0 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Afilliated Professor Takahiko Hara (E-mail: hara-tk@igakuken.or.jp)  
Afilliated Professor Makoto Arai (E-mail: arai-mk@igakuken.or.jp)  
Afilliated Professor Masato Hasegawa (E-mail: hasegawa-ms@igakuken.or.jp)  
Afilliated Professor Haruo Okado (E-mail: okado-hr@igakuken.or.jp)

## 2. Classroom/Lab

Please make a contact with the corresponding professor before starting each class.

## 3. Course Purpose and Outline

For the healthy aging, we must reduce the risk rate of cancer and diabetes. We also need to develop novel therapeutic approaches against incurable mental and neurodegenerative diseases. Recently, the iPS technology has been proven to be useful not only for generating functional cells for transplantation but also for establishing patient-based disease models. We will educate graduate students who have sufficient knowledge and experimental techniques in the above described biomedical fields.

## 4. Course Objective(s)

Reading capacity of latest articles in the biomedical fields. Writing and presentation capacity of each participant's own research data obtained by ethically correct procedures.

## 5. Format

All the classes will be interactive with small numbers of participants.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline: By listening to professional lectures, participants are able to understand molecular mechanisms of life-threatening diseases such as cancer, diabetes, schizophrenia, amyotrophic lateral sclerosis, and brain malformations. Such knowledge will eventually lead us to develop novel therapeutic strategies against them. In addition, it is important to establish good animal models (including genetically engineered mouse strains), which faithfully reproduce symptom and progression of the diseases. We will provide such lectures in following programs.

Available programs:

Lecture: Igakuken lancheon seminar (1 per month)

Special Lecture: Igakuken symposium (1 per year), Igakuken lecture series (8 per year)

Seminar: Igakuken international symposia (2 per year), Igakuken seminars (2-3 per month)

Journal club: [Takahiko Hara] Tuessday 16:00-18:00, [Makoto Arai] Wednesday 10:00-12:00,

[Masato Hasegawa] Friday 14:00-16:00, [Haruo Okado] Tuesday 12:00-14:00

### Practice

Goals/Outline: Participant summarizes the results of research activity as a progress report. Through mutual discussion with professors and other lab members, he/she would know a better future direction. Once obtaining sufficient experimental data to draw a definitive conclusion, participant can present his/her paper in a public or closed conference. We will instruct how to make a good poster and understandable presentation files. Meanwhile, participants can learn the newest knowledge and trend in a particular medical research field of their interest by reporting highlights of the conference/symposium to professors and lab members.

Available programs:

Research progress report: [Takahiko Hara] Thursday 16:00-18:00, [Makoto Arai] Wednesday 9:00-12:00,

[Masato Hasegawa] Monday 16:00-18:00, [Haruo Okado] Thursday 12:00-14:00

Rehearsals and reports for conferences (1-2 per year)

Igakuken internal conference for young investigators (1 per year)

## Lab

Goals/Outline:

[Takahiko Hara] We attempt to elucidate how hematopoietic stem cells are developed, self-renewed, differentiated into mature blood cells, and leukemized by utilizing in vitro differentiation systems of ES/iPS cells, conditional KO mouse strains, and in vivo transplantation models. Such a knowledge will be used for developing regeneration methods for blood cells and anti-leukemia drugs. In addition, we advance the molecular biology of CXCL14, which is involved in obesity-induced diabetes, carcinogenesis, feeding behavior, etc.

[Makoto Arai] Our research focuses on unraveling the pathophysiology of mental illnesses using molecular biology tools. Our ultimate goal is to identify new disease mechanisms, leading to the development of novel and more efficacious therapies. We perform genetic association studies, as well as metabolomics studies using blood and iPS cells from patients with mental disorders. Any abnormalities identified from patient samples are investigated further, using in vitro and in vivo systems, such as, cell culture assays to highlight functional alterations and behavioral studies in gene knock-out mouse models.

[Masato Hasegawa] We investigate the molecular pathogenesis and progression of neurodegenerative diseases including Alzheimer's disease, Parkinson's disease and amyotrophic lateral sclerosis. We use biochemistry, immunohistochemistry and molecular biology in all our work of in vitro, cellular and animal models to find effective ways for clinical therapy.

[Haruo Okado] To discover the fundamental cause of various nervous diseases, e.g., brain tumors, brain malformations, and neurodevelopmental disorders, we will study the molecular mechanisms for the regulation of neural development in the cerebral cortex using gene-targeted mice, primary cultures, viral vectors, in-utero electroporation, real-time imaging of slice culture, immunohistochemistry, and transcription analysis.

Available programs:

The corresponding will individually show appropriate programs to participants.

## 7. Grading System

Participants will be evaluated based on their overall attendance rate and enthusiasm to lecture classes and courses (70%), and their research performance and publication in conferences and/or manuscripts (30%).

## 8. Prerequisite Reading

The corresponding professor will individually advise participants according to their research plan and capacity.

## 9. Reference Materials

The corresponding will individually show appropriate references to participants.

## 10. Important Course Requirements

None.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Professor Takahiko Hara: Wednesday 16:00–18:00

Professor Makoto Arai: Upon request.

Professor Masato Hasegawa: Upon request.

Professor Haruo Okado: Upon request.

## 13. Note(s) to students

None.

# Clinical Anatomy

Lecture	(code: 7 6 9 1	1st year	:6units)
Practice	(code: 7 6 9 2	1st~2nd year	:4units)
Lab	(code: 7 6 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Keiichi Akita, Associate Professor: Akimoto Nimura, Assistant Professor: Masayo Harada, Assistant Professor: Hisayo Nasu

## 2. Classroom/Lab

Various rooms will be used depending on the program. Please check by yourself or ask instructors before attending the course.

## 3. Course Purpose and Outline

Clinical Anatomy is a field of study to solve the problems from clinical medicine through formulations of human anatomical and developmental biological bases of diagnoses and surgical procedures. The course is aimed to understand the structure of the human body based on the human anatomy and acquire an ability to describe the human body structures clearly from the findings of observations.

## 4. Course Objective(s)

The course is aimed to understand the spatial arrangements of human body structures from various angles and acquire the observing ability as a medical worker and a researcher.

## 5. Format

Small group instruction will be mainly performed to facilitate free discussion between participants and instructors.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Lectures are aimed to understand clinical anatomy for proper diagnosis and treatment. Comparative anatomy and developmental biology are also applied for better understanding about the spatial arrangement of the organs or vessels.

Available programs:

Lecture The first Monday of each month 18:00 to 20:00

Seminar The second Monday of each month 18:00 to 20:00

### Practice

Goals/Outline:

Practice is aimed to find out the way to understand the facts. This process is designed through the dissected cadavers, or reading papers. Staining or special dissection technique is available depends on the research purpose.

Available programs:

Seminar The third Monday of each month 18:00 to 20:00

### Lab

Goals/Outline:

Lab is aimed to find out the way to reveal the facts. Histological analysis or embryological research is helpful for understanding of the clinical anatomy. These techniques are applied for special part of the body with student's special interest. Especially we are active in the research fields of cloacal development and synovial joint development using genetically modified mouse embryos.

Available programs:

Participation in a research group A/N

### **7. Grading System**

Performance will be generally evaluated considering the content of research reports, presentation status at the meeting or seminar, publication and so on.

### **8. Prerequisite Reading**

Trying to understand the basic anatomical structures and the developmental processes of the parts of the body which each student is interested in. Trying to pick up unclarified and controversial issues on diagnoses and surgical procedures.

### **9. Reference Materials**

Gray's Anatomy for Students, Third Edition, 2014, Elsevier, Langman's Medical Embryology, Thirteenth Edition, 2015, Wolters Kluwer Lippincott Williams & Wilkins, Principles of Development, Fourth Edition, 2011, Oxford University Press

### **10. Important Course Requirements**

none

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

Contact person: Keiichi Akita. e-mail; akita.fana@tmd.ac.jp

### **13. Note(s) to students**

The number of students is not limited.

# Systems BioMedicine

Lecture	(code: 7 7 0 1	1st year	:6units)
Practice	(code: 7 7 0 2	1st~2nd year	:4units)
Lab	(code: 7 7 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Professor Hiroshi Asahara E-mail asahara.syst@tmd.ac.jp

## 2. Classroom/Lab

Not determined yet.

## 3. Course Purpose and Outline

This course covers systems biology, non-coding RNA and epigenetics in medical fields. Our recent accomplishment of a whole-mount in situ hybridization (WISH) database, termed EMBRY5, containing expression data of 1520 transcription factors and cofactors expressed in E9.5, E10.5, and E11.5 mouse embryos led us to identify critical cascade for myogenesis (Rp58; Dev Cell, 2009) and tendon development (Mkx, PNAS 2011). Also, our current study on non-coding RNA provides evidence that microRNA can act not only for cartilage development but also for its homeostasis against arthritis (Genes Dev, 2011). These findings and strategies will be shared in this course.

## 4. Course Objective(s)

Subject1: The function of non-coding RNA in development and diseases will be examined.

Subject2: Genome dynamics during embryogenesis will be monitored by new technique.

Subject3: Novel systems approaches will be established and applied for developmental biology and medicine.

## 5. Format

Concept and techniques of systems biomedicine will be introduced in the seminar series.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Analyze genome network for tissue development and pathogenesis of inflammation by combining multiple systems approaches.

Available programs:

Lecture	irregular
Special Lecture	irregular
Seminar	irregular
Journal Club	irregular
Conference	irregular

### Practice

Goals/Outline:

Mircoarray, Cell-based high throughput screening, etc, will be utilized as critical method for systems biomedicine.

Available programs:

Mircoarray, Cell-based high throughput screening, mice gene targeting experiments irregular

### Lab

Goals/Outline:

Using our techniques, core molecular network for tissue development and inflammatory diseases will be examined.

Available programs:

The function of on-coding RNA in development and diseases will be examined.  
Development and regeneration using ES and iPS will be analyzed.  
Genome dynamics during embryogenesis will be monitored by new technique.  
Novel systems approaches will be established and applied for developmental biology and medicine.

### **7. Grading System**

Individual's acquisition will be carefully evaluated by presentation, report and publication.

### **8. Prerequisite Reading**

None

### **9. Reference Materials**

None

### **10. Important Course Requirements**

None

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

9:00 a.m. - 5:00 p.m.

### **13. Note(s) to students**

The attendee may have to utilize adenovirus and mice samples.

# Comprehensive Pathology

Lecture	(code: 7 7 1 1	1st year	:6units)
Practice	(code: 7 7 1 2	1st~2nd year	:4units)
Lab	(code: 7 7 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Masanobu Kitagawa  
Contact person Masanobu Kitagawa E-mail: masa.pth2@tmd.ac.jp

## 2. Classroom/Lab

Various rooms will be used depending on the program. Please check by yourself or ask instructors before attending the course.

## 3. Course Purpose and Outline

To understand the patho-biological characters of various diseases, comprehensive methods to analyze various morphological/functional disturbances should be learned.

## 4. Course Objective(s)

Students should be able to understand the pathology of various diseases through the experience of clinico-pathological procedures in the hospital and the experimental exercises in the laboratory.

## 5. Format

Small group instruction will be mainly performed to facilitate free discussion between participants and instructors.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Topics on the morphogenesis and functional expression in organogenesis and regulatory mechanisms of organ functions will be introduced and lectured. Then, the discussion will be performed on morphological findings and changes of organ functions in physiological aging process and various diseases from the standpoint of morphology, immunopathology genetics, virology, and molecular biology.

Available programs:

Lecture irregular

Special Lecture irregular

Seminar Tuesday 19:00 ~

Journal Club Tuesday 12:00 ~

Progress meeting Friday 15:00 ~

### Practice

Goals/outline:

To clarify pathogenesis of various diseases from many points of view, students will practice pathological, molecular biological and immunological procedures of analytical methods using surgical specimens, autopsy materials and samples from animal model systems.

Available programs:

Macroscopic pathological diagnosis course Tuesday 9:30  
Clinico-pathological conference Tuesday 17:00  
Pathological conference on neurosurgical specimens 1st Monday 18:00  
Pathological conference on breast tumors 2nd Monday 18:00  
Pathological conference on gynecological specimens 3rd Monday 18:00  
Pathological conference on gastrointestinal specimens irregular  
Pathological conference on kidney biopsy Tuesday 16:00  
Genome cancer board Thursday 18:00

## **Lab**

Goals/outline:

To clarify pathogenesis of various diseases, pathological, molecular biological and immunological analysis will be performed using biopsy samples, surgical specimens and autopsy materials. Experimental approach will also be developed for determining organogenesis and functional development of various organs as well as aging phenomena and pathogenesis of specific diseases.

Available programs:

Participation in project groups below at any time

Projects

- 1) Analysis of the pathogenesis of retrovirus-induced leukemia and development of the therapeutic model against leukemia
- 2) Molecular pathological analysis of myelodysplastic syndromes
- 3) Molecular pathological analysis of cancer progression
- 4) Molecular pathological analysis of hematological malignancies
- 5) Molecular pathological analysis of drug-resistance in tumor cells
- 6) Experimental approach for the mechanisms of leukemogenesis using animal models

## **7. Grading System**

Performance will be generally evaluated considering the content of research reports, presentation status at the meeting or seminar, publication and so on.

## **8. Prerequisite Reading**

Review the studies/lectures/practices of pathology during the under-graduate education.

## **9. Reference Materials**

Robbins Basic Pathology: with STUDENT CONSULT Online Access, 9e (Robbins Pathology), Robbins and Cotran Review of Pathology, 3e (Robbins Pathology)

## **10. Important Course Requirements**

Nothing particular.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Please contact Prof. Masanobu Kitagawa. E-mail masa.pth2@tmd.ac.jp

## **13. Note(s) to students**

The number of students is not limited.

# Molecular Oncology

Lecture	(code: 7 7 2 1	1st year	:6units)
Practice	(code: 7 7 2 2	1st~2nd year	:4units)
Lab	(code: 7 7 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Shinji TANAKA  
Associate Professor Yoshimitsu AKIYAMA, Hiroshi FUKAMACHI  
Assistant Professor Shu SHIMADA

## 2. Classroom/Lab

M&D tower 18th floor

## 3. Course Purpose and Outline

To understand the molecular mechanisms underlying carcinogenesis and cancer progression in patients

## 4. Course Objective(s)

To understand the basic mechanisms underlying carcinogenesis and malignant progression for clinical application of cancer prevention, diagnosis and treatment

## 5. Format

Small group lesson

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

To understand the molecular mechanisms underlying carcinogenesis malignant progression for clinical application of cancer prevention, diagnosis and treatment

Available programs:

Lab Seminar:	Every Thursday 15:00-16:00
Journal Club:	Every Thursday 16:00-17:00
Special Lecture:	as needed

### Practice

The students present their own research data and introduce important papers from newly-arrived journals, which will be thoroughly discussed

Available programs:

Cancer Bioinformatics Conference:	Every Monday 19:00-20:00
Cancer Clinical Conference:	Every Wednesday 7:00-8:00

### Lab

Goals/Outline:

To learn the basic scientific techniques necessary for pursuing cancer research

Available programs:

PCR, RNA analysis, Western blotting, cell culture, DNA transfection, genome-editing technology

## **7. Grading System**

To assess achievements in Lecture, Practice, Lab and Conference by reports and examinations

## **8. Prerequisite Reading**

Robert A. Weinberg: The biology of cancer. 2013, Garland Science.  
Related original papers

## **9. Reference Materials**

Robert A. Weinberg: The biology of cancer. 2013, Garland Science.

## **10. Important Course Requirements**

N/A

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact person: Shinji Tanaka      E-mail tanaka.monc@tmd.ac.jp

## **13. Note(s) to students**

None

# Surgical Pathology

Lecture	(code: 7 7 3 1	1st year	:6units)
Practice	(code: 7 7 3 2	1st~2nd year	:4units)
Lab	(code: 7 7 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Associate Professor Akashi Takumi E-mail akashi.path@tmd.ac.jp

## 2. Classroom/Lab

Lectures, practice, and lab are conducted at B-5floor Pathology center.

## 3. Course Purpose and Outline

The purpose of this programme is to acquire how to morphologically diagnose both neoplastic and non-neoplastic diseases. In addition, it is also very important to recognize the limitations and problems of morphological diagnosis and to learn the morphological and molecular methods which are necessary for the resolution of the problems.

## 4. Course Objective(s)

Diagnose both neoplastic and non-neoplastic diseases according to the guidelines. Acquire the morphological and molecular methods which are necessary for the resolution of the problems.

## 5. Format

Both practical and laboratory exercises are conducted by small members of students when a clinical specimen is available. Students should notify us what method(s) they wish to learn beforehand. We will contact them when the time comes.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The goal is to understand the definition, patho-physiology, classification, anatomical findings including immunohistochemistry, and differential diagnosis of the neoplastic and non-neoplastic diseases through the lectures and conference with clinicians.

Available programs:

Surgical pathology Seminar	Biweekly tuesday 13:30-14:00
Autopsy macroscopical Conference	Every tuesday 9:30-10:30
Autopsy microscopical Conference	Every tuesday 17:00-18:00
Respiratory surgery- Pathology conference	Every Wednesday 17:45-18:45
Neurosurgery-Pathology conference	Once a month (first Monday) 18:30-19:30
Breast surgery-Pathology conference	Once a month (second Monday) 18:30-19:30
Dermatology- Pathology conference	Once a month (fourth Monday) 18:30-19:30

### Practice

Goals/Outline:

The goal is to understand the practice of surgical pathology (how to diagnose a disease and prepare reports) and propose problems concerning to diagnosis and patho-physiology of the diseases.

Available programs:

practive of surgical pathology	everyday 10:00-12:00
practice of histological diagnosis	everyday 15:00-17:00

## Lab

### Goals/Outline:

The goal is to acquire the various methods including morphological and molecular biological technologies to carry out research.

### Available programs:

- 1) Preparation of light microscopic specimens
- 2) Method of immunohistochemistry
- 3) Preparation and observation of electron microscopic specimens
- 4) DNA and RNA preparation from fresh and paraffin-embedded tissues and realtime-PCR analysis
- 5) FISH analysis of paraffin-embedded specimens
- 6) Flowcytometry analysis of malignant lymphoma

## 7. Grading System

The results are assessed according to the situation of participation to the lecture, practice, and lab (30point), the quality of the reports (50point), and presentation and publication of the research works (10point). The report is a part of the practice and should be prepared at the time of the practice with advice of the instructors.

## 8. Prerequisite Reading

Please refer to the following texts. It is also recommended to know which morphological methods is necessary for the research of the participant.

## 9. Reference Materials

WHO: Classification of tumors AFIP: Atlas of the tumor and non-tumor pathology

## 10. Important Course Requirements

Not particular

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Monday-Friday, 9:00-17:00, Contact person: Associated Professor Akashi Takumi, Tel 03-5803-5660, E-mail akashi.path@tmd.ac.jp

## 13. Note(s) to students

The number of participants are not limited, however, two members are desirable in each practice and lab.

# Experimental Animal Model for Human Disease

Lecture	(code: 7 7 4 1	1st year	:6units)
Practice	(code: 7 7 4 2	1st~2nd year	:4units)
Lab	(code: 7 7 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Professor : Masami Kanai      E-mail mkanai.arc@cmn.tmd.ac.jp

## 2. Classroom/Lab

Please contact the instructor in charge before the course.

## 3. Course Purpose and Outline

Aim of this course is to comprehensively understand the research fields using disease model animals. The instructor will give introductory lectures about planning of experiments using experimental animals and methods of analyses based on anatomy, molecular biology and genetics.

## 4. Course Objective(s)

Course objectives are to understand mechanisms of pathogenesis in disease model animals created by gene mutations and to learn basic skills for experimental animal research.

## 5. Format

Lecture, group discussion and experiments

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Translational research, the bridge of bench to bedside, requires experiments not only with stem cells such as ES cells and iPS cells but also with experimental animals. Our goal is to understand the research activities includes the analysis of morphology and genetics with disease model animal, especially focusing on embryonic development in a comprehensive and systematic fashion.

Available programs:

Special Lecture    To be announced

Seminar            To be announced

### Practice

Goals/Outline:

The purpose of our Practice is to learn how to plan experiments, how to analyze and interpret scientific results. In journal club, students will develop skills in reading, presenting and reviewing a research paper that has a high impact and quality in a life science field. For own research, students will weekly discuss about results and future plans in a progress report session. Students also will present their research summary every half-year as a practice for oral talk in a conference.

Available programs:

Progress report    Wednesday 13:00-14:00

Journal Club      Thursday 17:30-18:30

Conference        Twice a year (August and February)

## Lab

Goals/Outline:

Our lab provide an opportunity to learn the developmental biology through the analyses of mutant cell lines and mice as an animal models for human diseases. We analyze mice showing abnormality in the neonatal hepatitis and causal components, angiogenesis (generation of new vessels) and folliculogenesis (oocyte and follicle development in ovary), by using the variety of methods such as morphology, developmental biology, biochemistry and molecular biology. Students acquire those basic experimental skills with cell lines and animal, and find and study their own theme. We encourage and support students to make an entire experiment plan to reach the understanding molecular/cellular mechanism revealing individual development and disease.

- 1) Molecular biological analysis of organ formation using knockout mice and knockout ES cells.
- 2) Application of Sox17 mutant mice as the animal model for human disease.
- 3) Analysis of molecular mechanisms using mice with implantaion defects.
- 4) Analysis of folliculogenesis using disease-model mouse for premature ovarian failure

Available programs:

To be announced

## 7. Grading System

Attendance rate and presentation  
Class Participation/Contribution 70%  
Presentation:30%

## 8. Prerequisite Reading

Understanding the basic biology and the developmental biology

## 9. Reference Materials

"The Developing Human", 10th edition (Moore & Persaud & Torchia).  
"HISTOLOGY, a text and atlas", 6th edition (Ross & Pawlina)  
"Principles of Development", 4th edition (Wolpert)  
"The Guide to Investigation of Mouse Pregnancy" (Croy et al.)

## 10. Important Course Requirements

NA.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Please contact Prof. Masami Kanai-Azuma, VDM, PhD. (Dept. Experimental Animal Model for Human Disease)  
E-mail mkanai.arc@cmn.tmd.ac.jp

## 13. Note(s) to students

Nothing special

# Signal Gene Regulation

Lecture	(code: 7 7 5 1	1st year	:6units)
Practice	(code: 7 7 5 2	1st~2nd year	:4units)
Lab	(code: 7 7 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Noriko Funato E-mail: noriko-funato@umin.ac.jp

## 2. Classroom/Lab

Research Core , Building 8 South (Classroom, 2F; Lab, 4F-6F).

## 3. Course Purpose and Outline

Students will learn molecular genetics by understanding cell survival, proliferation, death, and differentiation.

## 4. Course Objective(s)

Students will understand the implications of signal transduction by observing and/or performing biochemical experiments using cultured cells and gene-engineered mice.

## 5. Format

Participatory classes, in small groups.

## 6. Course Description and Timetable

Kindly check with the Teacher-in-Charge for the program, as it is not specifically scheduled.

### Lecture

Goals/Outline:

Students will learn the basics in life sciences by understanding the regulation of signal transduction involved in cell proliferation, differentiation, and death.

Available programs:

Lecture Every Thursdays, 01:00-02:00 PM.

Journal Club Every Thursdays, 12:30-01:00 PM.

### Practice

Goals/Outline:

Students will learn to handle recombinant DNA molecules and analyze the data obtained from experiments.

Available programs:

Lab Practice: TBA

Progress Conference: TBA

### Lab

Goals/Outline:

Students will learn basic molecular biology and genetic engineering techniques by observing and/or performing biochemical experiments using cultured cells and gene-engineered mice.

Available programs:

You are welcome to participate in our research team, anytime.

## **7. Grading System**

Comprehensive evaluation: Presentation and report (80%), and scientific activity (own research, seminar, meeting, etc.) (20%).

## **8. Prerequisite Reading**

You are recommended to improve your knowledge in molecular, developmental, and bone biology.

## **9. Reference Materials**

None.

## **10. Important Course Requirements**

None.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Weekdays, 9:00 AM–6:00 PM.

## **13. Note(s) to students**

None.

# Biomedical Devices and Instrumentation

Lecture	(code: 7 7 8 1	1st year	:6units)
Practice	(code: 7 7 8 2	1st~2nd year	:4units)
Lab	(code: 7 7 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Prof. Kohji Mitsubayashi E-mail: m.bdi@tmd.ac.jp  
Junior Associate Prof. Takahiro Arakawa

## 2. Classroom/Lab

Dept. of Biomedical devices and instrumentation (Institute of Biomaterials and Bioengineering, 5th floor, BLDG 21)  
Conference room 1, 2 and 3 (Institute of Biomaterials and Bioengineering, BLDG 22- 2F, 1F and 8F)

## 3. Course Purpose and Outline

In advanced medicine, technologies enabling to accurately measure biological information are highly demanded. The development of “human-friendly” non-invasive measurement methods could release patients from the pain and the risks of sampling. The students will learn the basic knowledge and skills of biological information measurement through the lectures, seminars and practical training. Especially research including biochemical measurement, the development of biosensing devices and their applications to medicine will be carried out based on “sensor and biomedical engineering”

## 4. Course Objective(s)

The students will learn the basic technology related to advanced medicine and biological information measurement. Through practical training, they will also engage in research activities for biochemical measurement, the development of biosensing devices and their applications to medicine based on “sensor and biomedical engineering”.  
The objective of this course is to help the students be able to think about and conduct a research by themselves throughout the activities with academic researches.

## 5. Format

This course is taught in an on-the-job training style. You will attend a research project on advanced biomonitoring under the direction of the research staffs.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The lecture is designed to provide a basic understanding of both biosensing devices and bioinstrumentation for advanced medicine. You will learn principles, methods and applications of advanced biomonitoring techniques in detail.

Available programs:

Lecture, Special Lecture

Seminar

Journal Club: Monday 17:00-18:30

### Practice

Goals/Outline:

This session is conducted in presentation, discussion and recitation format. You will learn actual device development and scientific method of solving problem with guidance by biosensors / bioinstrumentation experts.

Available programs:

Conference: Thursday 13:30-15:00

Technical practice

## **Lab**

Goals/Outline:

We will start with some training sessions (research planning equipment operation, data processing) and then you join one of the research projects on biomedical devices and medical applications.

Available programs:

## **7. Grading System**

The overall grading scheme is based on your participation and the final project.

## **8. Prerequisite Reading**

Basic knowledge of biochemistry and bioengineering, English skill, Basic PC skill for research training

## **9. Reference Materials**

Chemical Sensors and Biosensors: Fundamentals and Applications, F.G. Banica, Wiley, ISBN-13: 978-0470710678

Biosensors: Essentials, G. Evtugyn, Springer, ISBN-13: 978-3642402401

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact: Prof. Kohji Mitsubayashi E-mail m.bdi@tmd.ac.jp

## **13. Note(s) to students**

Welcome the students interested in biosensors and biomedical devices. Please contact the instructor.

# Biofunction Research

Lecture	(code: 7 9 7 1	1st year	:6units)
Practice	(code: 7 9 7 2	1st~2nd year	:4units)
Lab	(code: 7 9 7 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Keiji Itaka Associate Professor: Akiko Nagai, Assistant Professor: Kosuke Nozaki  
Contact person: Keiji Itaka TEL 5280-8088 E-mail: itaka.bif@tmd.ac.jp

## 2. Classroom/Lab

Department of Biofunction Research, Institute of Biomaterials and Bioengineering  
<http://www.tmd.ac.jp/i-mde/www/biofunctions/biofunctions-e.html>

## 3. Course Purpose and Outline

The purpose of this course is to study biomaterials for medical system innovation, including for drug delivery system (DDS), gene therapy, nucleic acid medicine, and tissue engineering. The strategy for their clinical application is also the subject of this course.

## 4. Course Objective(s)

To learn the interdisciplinary field of medical, dental, engineering, and pharmaceutical science.

## 5. Format

Small group

## 6. Course Description and Timetable

Check with the teachers in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The objective and principle of the department of Material Biofunctions is to educate students with materials knowledge demanded to medical and dental doctors who are leading medical professionals and bioscientists who are capable of carrying out their own research at an international level in the area of their special fields of science, respectively. Main objective in this graduate course is to provide students opportunity to study the reaction mechanism between materials and living tissues. Students are also taught on investigation of development of new surface modification processes of biomaterials to acquire tissue-affinity.

Available programs:

Lecture Tuesday  
Special Lecture A/N  
Seminar A/N  
Journal Club Tuesday  
Conference Tuesday

### Practice

Goals/Outline:

To learn basic science of biomaterials, and related fields of medicine, biology and pharmaceutical science. High-qualified speciality and broad perspective over the interdisciplinary research fields are equally important.

Available programs:

Lab seminar: Tuesday (18:00-19:00)  
Journal Club: Tuesday (17:00-18:00)

## **Lab**

Goals/Outline:

To learn basic science of biomaterials, and related fields of medicine, biology and pharmaceutical science. High-qualified speciality and broad perspective over the interdisciplinary research fields are equally important.

Available programs:

Experiments (including engineering, pharmacological, and biological approaches): A/N

## **7. Grading System**

Assessment on the final examination or report

## **8. Prerequisite Reading**

Please contact us

## **9. Reference Materials**

Please contact us

## **10. Important Course Requirements**

n.p.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Thursday 10:00–12:00

## **13. Note(s) to students**

Our lab is composed of members from various research fields. Everyone is welcome as long as they are motivated.

# Genetic Regulation

Lecture	(code: 7 8 3 1	1st year	:6units)
Practice	(code: 7 8 3 2	1st~2nd year	:4units)
Lab	(code: 7 8 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Prof. Akinori KIMURA E-mail akitis@tmd.ac.jp

## 2. Classroom/Lab

To be announced upon contacting to the instructor.

## 3. Course Purpose and Outline

The purpose of this course is to deeply understand the genetic regulation of phenotype including disease susceptibility and pathogenesis in humans and animal models. For this purpose, literatures reporting the genetic approaches and molecular investigations on the diseases are used for education of genetics of disease and related discussion.

## 4. Course Objective(s)

To understand the genetic regulation of pathogenesis from the viewpoint of diversity in genome structure and gene expression and to apply the knowledge in developing novel strategy for diagnosis, treatment and prevention of human diseases.

## 5. Format

Studies will be done based on the problem oriented learning.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Both genetic factor and environmental factor are known to interact in the pathogenesis of human diseases. The genetic factor itself is mainly determined by diversity in human genome. In this course, the concept of human genome diversity and its involvement in the pathogenesis of human diseases, especially the intractable diseases, will be lectured for better understanding of human genome research and its use in the development of novel diagnostic, therapeutic and/or preventive methods for the intractable diseases.

Available programs:

Lecture Monday 15:00-18:00  
Special Lecture Thursday 17:00-18:00  
Seminar Monday 14:00-15:00  
Journal Club Thursday 16:00-17:00

### Practice

Goals/Outline:

To learn about the method to analyze the human genome diversity and to practice the experimental planning for the identification and proving the involvement of disease-related human genome information. In addition, analysis and discussion about the experimental data will be provided.

Available programs:

Data meeting Monday 13:00-15:00  
Practical discussion Monday 14:00-16:00

## **Lab**

### Goals/Outline:

Identification of the disease-associated human genome diversity for cardiovascular diseases, autoimmune diseases, malignant tumors, and infectious diseases will be performed. In addition, functional alterations caused by the disease-associated human genome diversity will be investigated in vitro by using genetic, molecular biological, biochemical, and cell biological methods as well as in vivo by establishing genetic engineered mice. These research projects will be done for developing novel diagnostic, therapeutic and preventive methods for the diseases.

### Available programs:

Genetic regulation of disease pathogenesis course: Tuesday, Wednesday, Friday 10:00–17:00

Experimental course: Participation is available upon request. Five days per year 10:00–17:00, Details will be announced upon participation

## **7. Grading System**

Grading is based on evaluation by oral examination (15%), data presentation (15%), discussion (30%) and research performance including presentation in scientific meetings (40%). Reports on specific issue (thema will be announced) will be mandated when it will be needed for evaluation of grade.

## **8. Prerequisite Reading**

Basic principles of genetics should be obtained. Following public databases are useful in understanding the outline of genetics and genome diversities in humans: OMIM (Online Mendelian Inheritance in Man), HGMD (Human Genome Mutation Database), HGVD (Human Genome Variation Database).

## **9. Reference Materials**

Principles of Medical Genetics (Thomas D. Gelehrter, Francis S. Collins eds), Williams & Wilkins

## **10. Important Course Requirements**

No particular issues.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Contact by Email (akit@tmu.ac.jp) is available anytime.

## **13. Note(s) to students**

Small group studies with less than 5 students.

# Applied Gene Medicine

Lecture	(code: 7 8 5 1	1st year	:6units)
Practice	(code: 7 8 5 2	1st~2nd year	:4units)
Lab	(code: 7 8 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Yoshio Miki,  
Contact person: Yoshio Miki E-mail miki.mgen@mri.tmd.ac.jp

## 2. Classroom/Lab

Confirm it to the instructor before attending a lecture because it differs by the program.

## 3. Course Purpose and Outline

The purpose of this course is to understand basic molecular mechanisms from cancer development to invasion and metastasis so that you may apply the knowledge for future developments of novel diagnosis and treatment. Studying the current cancer research including oncogene/tumor suppressor gene, cancer stem cell and cancer microenvironment network, you will learn life science and a variety of cellular functions.

## 4. Course Objective(s)

To understand the latest findings in cancer research from cancer development to invasion and metastasis.  
To devise a research subject, which is translational to clinical use, and design appropriate experiment plan and future plan based on your objective judgment on progress of your study.

## 5. Format

Lecture in a group of a few people. To urge the student's lively participation, a lot of opportunities for questions and debates are set as much as possible.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Cancer is a genetic disease and the study of not only a sporadic tumor but also a hereditary tumor has contributed to the understanding of carcinogenic mechanism greatly. Carcinogenesis is a multistep process in which cells accumulate multiple genetic alterations as they progress to a more malignant phenotype. We lecture on molecular mechanism of the carcinogenesis and diversity of the cancer based on these points of view.

Available programs:

Lecture every Thursday 16:00-17:00  
Special Lecture every Friday 15:00-17:00  
Journal Club every Tuesday 10:00-12:00

### Practice

Goals/Outline:

Aiming to acquire fundamental knowledge and basic skills, such as molecular biology, histochemistry, microbiology, and molecular medicine in order to accomplish the above-mentioned purpose,

Available programs:

Participation in a research group at any time

## **Lab**

Goals/Outline:

Searching for the genes which mutate in process of carcinogenesis. DNA and RNA are extracted from human clinical samples, and the changes on the primary structure of genes and transcripts are screened. Based on the information, carcinogenic mechanism is examined.

Available programs:

Participation in a research group at any time

## **7. Grading System**

We evaluate overall based on the participation situation and the research content to the lecture, the practice, and the experiment.

## **8. Prerequisite Reading**

You are required to search and read through scientific papers relevant to your research or ones selected by the instructor.

## **9. Reference Materials**

Robert A. Weinberg, The Biology of Cancer, Garland Science (English/Japanese)

Bruce Alberts et al., Molecular Biology of the Cell, Garland Science (English/Japanese)

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

10:00-17:00

## **13. Note(s) to students**

Welcome the students interested in cancer research and the carcinogenic mechanism. Please contact the instructor.

# Molecular Cytogenetics

Lecture	(code: 7 8 6 1	1st year	:6units)
Practice	(code: 7 8 6 2	1st~2nd year	:4units)
Lab	(code: 7 8 6 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Johji Inazawa M.D., Ph.D.

Lector Jun Inoue Ph.D.

Assistant Professor Yasuyuki Gen M.D., Ph.D.

Contact person: Johji Inazawa TEL 03-5803-5820 E-mail johinaz.cgen@mri.tmd.ac.jp

## 2. Classroom/Lab

A lecture room is different in a program, so check it for staff beforehand.

## 3. Course Purpose and Outline

The human genome sequence has been unraveled by The Human Genome Project in 2003. Consequently, personalized medicine (PM) has become reality based on the personal genomic information. It is essential to have the enough knowledge of medical genomics and epigenomics not only for the development of medical and dental sciences and technology but also for the clinical implementation of PM. This lecture instructs the basic knowledge and advanced technics to understand the molecular basis underlying cancer and genetic diseases.

establish

## 4. Course Objective(s)

The acquirement of knowledge of basic and leading-edge medical genomics and bioethics.

The understanding of pathogenic mechanism, diagnosis, cure and prevention in genomic and epigenomic disorders.

## 5. Format

Individual guidance in principle.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The principal aim of Department of Molecular Cytogenetics (MCG) is to understand the molecular mechanism underlying cancer and genetic diseases including congenital disorders. Our research interests are as follows; (1) Identification of novel genes including microRNAs responsible for cancer and the clinical development of miRNA-targeting therapeutics in cancer. (2)

Understanding the pathogenesis of intractable cancers and genetic disorders based on the integrative omics including systems

biology. (3) Establishment of diagnostic devices for the implementation of personalized medicine in cancer and genetic disorders.

A series of the relevant lectures is offered on every monday, 9:00 am -11:00 am.

Available programs:

Lecture: Offering lectures on Medical Genetics in May and June

Special Lecture: Offering special lectures of Cancer Genomics in February and June

Seminar: Weekly Monday 10:00 - 11:30

Journal Club: Weekly Monday 9:00 - 10:00

Conference: Anytime

### Practice

Goals/Outline:

The main purposes of our practice are understanding and acquisition about various technologies of genomic/epigenomic analysis, functional analysis, cell biological analysis and biochemical analysis in the scientific research for cancer and genomic disorders.

Available programs:

Progress Meeting Weekly Saturday 9:00 - 12:00

## **Lab**

Goals/Outline:

1) Identification of cancer-related genes, including microRNAs, by genomic and epigenomic approaches, and characterization of these genes using in vitro/ in vivo experimental models reproducing characteristic aspects and behaviors for human cancers; e.g. uncontrolled excess of cell growth, metastasis, epithelial-mesenchymal transition (EMT), and altered autophagy.

2) Molecular cytogenetic investigation of genomic disorders including multiple congenital anomalies and intellectual disability (MCA/ID) using integrative genomics and epigenomics.

3) Development of innovative techniques for genomics and/or epigenomics in medical sciences.

Available programs:

Anytime

## **7. Grading System**

Evaluated based on the following points;

1) Attitude for study, i.e. the independence of mind. (40%),

2) Progress situation in own research and record of attendance at weekly seminar and the meeting for research in progress. (40%)

3) Presentation of progress and results of own research and introduction of journal articles in seminar. (20%)

## **8. Prerequisite Reading**

None

## **9. Reference Materials**

1. The Biology of Cancer. Weinberg RA. Garland Science, Taylor & Francis Group 2nd Ed. 2013.

2. Human Molecular Genetics. Strachan T.& Read AP. Bios Scientific Publisher 4th Ed. 2010

3. The Language of Life: DNA and the Revolution in Personalized Medicine. Francis S. Collins. Harper Publisher 2010.

4. Thompson&Thompson Genetics in Medicine, 8th Edition. Nussbaum R et al. Saunders.2015

## **10. Important Course Requirements**

None

## **11.Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Contact: Department of Molecular Cytogenetics, Johji Inazawa TEL 03-5803-5820 E-mail johinaz.cgen@mri.tmd.ac.jp

## **13. Note(s) to students**

No limited about the number of applicants.

# Biochemical Genetics

Lecture	(code:	1st year	:6units)
Practice	(code:	1st~2nd year	:4units)
Lab	(code:	2nd~3rd year	:8units)

1. Instructor(s)

2. Classroom/Lab

Not offered

# Hematology I

Lecture	(code: 7 8 9 1	1st year	:6units)
Practice	(code: 7 8 9 2	1st~2nd year	:4units)
Lab	(code: 7 8 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Osamu Miura, MD., PhD. Lecturer: Tetsuya Fukuda, MD., PhD.  
Assistant Professor: Masahide Yamamoto, MD., PhD., Tohikaga Nagao, MD., PhD., Ken Watanabe, MD., PhD.  
Contact person: Osamu Miura, MD., PhD. E-mail miura.hemaa@tmd.ac.jp

## 2. Classroom/Lab

As different rooms will be used for each program, contact the lecturer beforehand.

## 3. Course Purpose and Outline

Course purpose is to understand the pathogenesis of hematological malignancies and to learn the diagnostic and therapeutic principles for these diseases. Students learn how to analyze the cellular and molecular mechanisms underlying pathogenesis of hematological malignancies and to diagnose them.

## 4. Course Objective(s)

Course objectives is to obtain basic skills to analyze the pathogenesis of hematological malignancies and to become able to diagnose main hematological malignancies and make appropriate therapeutic plans to treat these diseases.

## 5. Format

A small-group teaching system and discussions with the participants.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Normal functions and abnormalities of proto-oncogenes and intracellular signaling molecules that play important roles in leukemogenesis will be explained. Diagnosis and therapy of hematological malignancies based on this knowledge will be also explained

Available programs:

Lecture 15:00-16:00 on Friday  
Special Lecture 14:00-15:00 once a on Friday  
Seminar 8:30-9:30, 18:00-19:00 on Tuesday  
Journal Club 9:30-10:30 on Tuesday  
Conference 17:00-19:00 on Monday

### Practice

Goals/Outline:

Clinical and morphological features of hematological malignancies and diagnostic skills will be learned. Laboratory tests for hematological disorders and therapeutic strategies for these disorders will be also learned and practiced.

Available programs:

Clinical Conference 18:00-19:00 on Monday  
Research Conference 16:00-17:00 on Thursday  
Clinical Round 13:00-15:00 on Thursday  
Hemato-pathological Conference As occasion demands

## **Lab**

### Goals/Outline:

Abnormalities of proto-oncogenes and intracellular signaling molecules that play important roles in leukemogenesis will be analyzed by cellular and molecular biology methods to develop new diagnostic and therapeutic methods for hematological malignancies.

### Available programs:

Participation in research groups as occasion demands.

## **7. Grading System**

Comprehensively evaluated based on participation in each program and progress in research. Publication of research works as well as presentation at academic meetings will be also evaluated for grading.

## **8. Prerequisite Reading**

Standard reference books in hematology and basic cellular and molecular biology.

## **9. Reference Materials**

Wintrobe's Clinical Hematology, 13th ed. (Lippincott, Williams & Wilkins, 2013)

## **10. Important Course Requirements**

Nothing in particular.

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Friday 16:00–17:00

## **13. Note(s) to students**

Practice and Lab courses will accept not more than 10 students.

# Hematology II

Lecture	(code: 7 8 9 1	1st year	:6units)
Practice	(code: 7 8 9 2	1st~2nd year	:4units)
Lab	(code: 7 8 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor : Norihiko Kawamata, MD., PhD.

Contact person: Norihiko Kawamata E-mail nkawamata.hema@tmd.ac.jp

## 2. Classroom/Lab

As different rooms will be used for each program, contact the lecturer beforehand.

## 3. Course Purpose and Outline

Course purpose is to understand the pathogenesis of hematological malignancies and to learn the diagnostic and therapeutic principles for these diseases. Students learn how to analyze the cellular and molecular mechanisms underlying pathogenesis of hematological malignancies and to diagnose them.

## 4. Course Objective(s)

Course objectives is to obtain basic skills to analyze the pathogenesis of hematological malignancies and to become able to diagnose main hematological malignancies and make appropriate therapeutic plans to treat these diseases.

## 5. Format

A small-group teaching system and discussions with the participants.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Normal functions and abnormalities of proto-oncogenes and intracellular signaling molecules that play important roles in leukemogenesis will be explained. Diagnosis and therapy of hematological malignancies based on this knowledge will be also explained

Available programs:

Special Lecture	Fourth Thursday 18:00-19:00	Regular Lecture	First and Third Monday 13:30-14:30
Research Seminar Series	Second Monday 13:30-14:30		
Journal Club	Fourth Monday 13:30-14:30		
Research Conference	Every Tuesday 18:00-19:00		

### Practice

Goals/Outline:

Clinical and morphological features of hematological malignancies and diagnostic skills will be learned. Laboratory tests for hematological disorders and therapeutic strategies for these disorders will be also learned and practiced.

Available programs:

Clinical Conference	18:00-19:00 on Monday
Research Conference	16:00-17:00 on Thursday
Clinical Round	13:00-15:00 on Thursday
Hemato-pathological Conference	As occasion demands

## **Lab**

### Goals/Outline:

Abnormalities of proto-oncogenes and intracellular signaling molecules that play important roles in leukemogenesis will be analyzed by cellular and molecular biology methods to develop new diagnostic and therapeutic methods for hematological malignancies.

### Available programs:

Participation in research groups as occasion demands.

## **7. Grading System**

1) The students' scores will be determined based on quality of research reports (25 points maximum), attendancy to lectures/seminars (25 points maximum), results of interview (25 points maximum) and attendancy to academic national/international meetings. (both Mater and Doctor courses) 2) The research reports are 8-page-long (minimum) , including abstract, introduction, results, methods and materials, and discussion (both Master and Doctor Courses). 3) In the case, a student attended to International Meeting, extra points will be given based on quality of the meeting. If the student win awards in the meetings, extra points will be given based on the quality of the awards. 4) Comprehensively evaluated based on participation in each program and progress in research.

## **8. Prerequisite Reading**

Standard reference books in hematology and basic cellular and molecular biology.

## **9. Reference Materials**

Wintrobe's Clinical Hematology, 13th ed. (Lippincott, Williams & Wilkins, 2013)

## **10. Important Course Requirements**

Nothing in particular.

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Friday 16:00–17:00

## **13. Note(s) to students**

Practice and Lab courses will accept not more than 10 students.

# Molecular Endocrinology and Metabolism

Lecture	(code: 7 9 0 1	1st year	:6units)
Practice	(code: 7 9 0 2	1st~2nd year	:4units)
Lab	(code: 7 9 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Tetsuya Ymada

Contact person: Testuya Ymaada E-mail yamatetsu-tky@umin.ac.jp

## 2. Classroom/Lab

N/A

## 3. Course Purpose and Outline

This training program is designed to educate and establish 'physician-scientist' in the field of endocrinology and metabolism.

## 4. Course Objective(s)

The research program provides mentor-based training in experimental design, laboratory and clinical research techniques and methodology, and interpretation and analysis of the results obtained from cellular and molecular biology, physiology, clinical physiology, clinical therapeutics, and health sciences.

## 5. Format

Small-group seminar based on discussion with mentor.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Our training program enables PhD students to prepare for their future academic and/or clinical careers in the multidiscipline of endocrinology and metabolism.

Available programs:

Lecture N/A  
Special Lecture N/A  
Journal Club N/A  
Seminar N/A

### Practice

Goals/Outline:

Our clinical training program provides for the practice through comprehensive inpatient and outpatient services in the area of endocrine and metabolic disorders.

Available programs:

Clinical conference Monday 10:00-12:00  
Ward round Monday 15:00-17:00

### Lab

Goals/Outline:

The research program provides mentor-based training in experimental design, laboratory and clinical research techniques and methodology, and interpretation and analysis of the results obtained from cellular and molecular biology, physiology, clinical physiology, clinical therapeutics, and health sciences.

Available programs:

Participation in a research group as needed.  
Research conference N/A

## **7. Grading System**

Comprehensive evaluation based on the participation and achievement in the lecture, practice, and lab.

## **8. Prerequisite Reading**

Depending on the program, always check supervisor in advance.

## **9. Reference Materials**

Williams Text book of Endocrinology 12th edition (ed. Melmed S et al) published from Saunders  
Joslin Diabetes Mellitus 14th edition (ed. Kahn CR et al) published from Lippincott Williams & Wilkins

## **10. Important Course Requirements**

N/A

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

contact person: Takanobu Yoshimoto (Department of Molecular Endocrinology and Metabolism)  
email: tyoshimoto.mem@tmd.ac.jp

## **13. Note(s) to students**

# Hepatobiliary and Pancreatic Surgery

Lecture	(code: 7 9 1 1	1st year	:6units)
Practice	(code: 7 9 1 2	1st~2nd year	:4units)
Lab	(code: 7 9 1 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Minoru Tanabe E-mail bg-secre.msrg@tmd.ac.jp

## 2. Classroom/Lab

Different venue depending on the specific program

## 3. Course Purpose and Outline

The graduates will understand various Hepato-Biliary-Pancreatic diseases and attain the ability to manage these diseases and the problems of patients, through clinical experiences and basic researches.

## 4. Course Objective(s)

Course objectives are: 1. Understanding of surgical health care system delivery to both inpatients and outpatients. 2. Learning surgical technique of Hepato-Biliary-Pancreatic surgery as an operator or assistants. 3. How to conduct clinical and/or basic research on HBP disease in collaboration with the other fields of specialists. 4. To promote skills in presentation at scientific meetings. 5. Acquisition of educational methods for junior surgeons. 6. Function as a member of the surgical team.

## 5. Format

Small-group guidance

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Lectures on biomolecular mechanisms of carcinogenesis, cancer growth, invasion and metastasis in digestive organs, especially liver, biliary duct and pancreas; leading to molecular target therapy. In addition, the general and advanced researches on the diagnosis and treatment of the cancers are expounded, as well as clinical and basic researches on liver transplantation.

Available programs:

Lecture A/N

Special Lecture A/N

Seminar A/N

HBP Conference: Every Monday PM17:00-19:00

Journal Club: Every Wednesday AM8:00-9:00

### Practice

Goals/Outline:

Practices on methods, points of case history, physical examination, imaging diagnosis, and laboratory tests. The treatments and cares of patients are learned in accordance with the disease and cancer stages, as well as the perioperative cares and surgical techniques of liver transplantation.

Available programs:

Preoperative Conference: Every Thursday AM7:30-9:00  
Postoperative Conference: Every Monday AM7:30-9:00  
Surgical Operation: Every Tuesday, Thursday and Friday  
Ward Round: Every Tuesday AM8:00-9:00  
HBP Conference: Every Monday PM18:00-20:00  
Journal Club: Every Wednesday AM8:00-9:00

## Lab

Goals/Outline:

Since poorer prognosis and awful QOL are recognized generally in the patients with cancers of the digestive system, especially liver, biliary duct and pancreas, the development and clinical application of novel cancer treatments are required in this field. Furthermore, the surgical treatments in this area should require the highly skilled techniques, and the intensive cares of severe complications such as postoperative liver failure. There also remain so many problems to be solved in the liver transplantation; for example, immuno-suppression, infectious diseases and organ preservation. The mission of our researches is a breakthrough in these critical matters.

Available programs:

Participation in research groups: A/N

## 7. Grading System

Comprehensive evaluation system: attendance of lecture, remarks in the meetings, assessment of basic/clinical research, and number of presentation at national/international conference.

## 8. Prerequisite Reading

Besides knowledge of surgery and digestive surgery, comprehension of basic anatomy and physiology is required.

## 9. Reference Materials

Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice 19th ed. Saunders, USA 2012年  
Schwartz's Principles of Surgery 9th ed. McGraw-Hill Professional, USA 2009年  
Clinical Oncology : A Multi- Disciplinary Approach for Physicians & Students 8th ed. Saunders, USA 2001年

## 10. Important Course Requirements

Nothing in particular.

## 11. Lectures in English

All lectures are conducted in Japanese.

## 12. Office Hour

Contact person: Minoru Tanabe, M.D., Ph.D. Department of Hepato-Biliary-Pancreatic Surgery E-mail: bg-secre.msrg@tmd.ac.jp Office hour: 9:00~17:00 An appointment is required in advance.

## 13. Note(s) to students

# Orthopaedic and Spinal Surgery

Lecture	(code: 7 9 2 1	1st year	:6units)
Practice	(code: 7 9 2 2	1st~2nd year	:4units)
Lab	(code: 7 9 2 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Atsushi Okawa

Associate Professor: Toshitaka Yoshii,

Assistant Professor: Hiroyuki Inose, Takashi, Koji Fujita, Takashi Hirai, Masato Yuasa

Associate Professor: Shinichi Sotome, Yoshinori Asou

Professor: Shigenori Kawabata

## 2. Classroom/Lab

Orthopaedic Surgery Office Room, Lab room (M&D tower 11F)

## 3. Course Purpose and Outline

The purpose of the course is to build the students' store of knowledge concerning bone and joint disorders and spinal disorders. The students should plan and conduct experiments which will clarify the mechanisms underlying these disorders or will be valuable for developments of treatments.

## 4. Course Objective(s)

To build the ability to discover new questions about bone and spine disorders and to develop the ability to create research plans and execute the experiments.

## 5. Format

We sentence you to small number of people education of independent participation type of a graduate student.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

By reading papers of top-journals, the students should extend their knowledge concerning bone, joint and neurological disorders. Discussion about the students' research will be held in Research Progress Meeting.

Available programs:

Research Progress Meeting	7:30 - 8:00, Tuesday
Journal Club	7:30 - 8:00, Tuesday and Friday
Special Lecture	As occasion demands
Seminar	As occasion demands

### Practice

Goals/Outline:

We practice findings of clinical problem of the locomotorium lesion such as joints, spine, intervertebral disc, spinal cord, peripheral nerve disorders, aging, injury, tumorigenesis mechanism, and image findings.

Through these practices we train to make the clinical diagnosis and to plan the adequate treatment.

Available programs:

Bedside Professor Round	Monday 15:00-16:00
Clinical Conference	Monday 7:30-9:00
Continuous Medical Education	Thursday 7:30-8:00

## **Lab**

### Goals/Outline:

Molecular biologically and using physiological procedure we analyze motor of joints, spine, intervertebral disc, spinal cord, peripheral nerve disorders, aging, injury, tumorigenesis mechanism and definite how to treat these disorders. And also we would do tissue reconstruction or develop an artificial bone.

### Available programs:

Participation in a research group

### Research themes:

Bone and cartilage regeneration  
Peripheral nerve and Spinal cord regeneration  
Muscle regeneration  
Bone and cartilage metabolism  
Neuro physiology  
Metastatic Tumor

## **7. Grading System**

Attendance rate at each program (50%)

Progress of the research, research presentation at research meetings, research publication (50%)

## **8. Prerequisite Reading**

Students should attend the journal clubs three times a week and review the papers read in the journal clubs.

## **9. Reference Materials**

Students should read publications retrieved in accordance with their research themes.

## **10. Important Course Requirements**

Not applicable

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

9:00 – 17:00

## **13. Note(s) to students**

We welcome participation from the other lecture about a graduate school lecture, a particular lecture, a graduate school seminar. We have several cooperation study with other section.

# Diagnostic Radiology and Nuclear Medicine

Lecture	(code: 7 9 3 1	1st year	:6units)
Practice	(code: 7 9 3 2	1st~2nd year	:4units)
Lab	(code: 7 9 3 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Contact person: Ukihide Tateishi, MD, PhD      E-mail ttisdrnm@tmd.ac.jp

## 2. Classroom/Lab

Check for charge instructors beforehand, because it's different depending on programs.

## 3. Course Purpose and Outline

To learn principle and characteristics of various radiologic modality and correlate with anatomic and pathologic information. To establish new imaging findings or diagnostic methods and contribute to the progress of radiology and nuclear medicine.

## 4. Course Objective(s)

i) To learn principle of various imaging modality and explain application for each disease, and understand imaging findings theoretically. ii) To learn correlation between imaging findings and pathologic findings. iii) To learn procedure of emergent IVR.

## 5. Format

Small number system is employed.  
A chance of discussion is held aggressively.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The principles and characteristics of various diagnostic imaging modalities are expounded. Based on the principles, the theoretical methods in interpretation of images are also expounded. And, clinical application and optimal diagnostic procedure for various diseases are also expounded.

Available programs:

Lecture on occasion

Special Lecture on occasion

Seminar on occasion

Conference every Wednesday morning (7:50AM) and every Friday evening (17:00PM)

### Practice

Goals/Outline:

By participating in the various conferences, to learn hands-on how to infer the pathological background from the image

Available programs:

Participation in various clinical conferences Check for charge instructors beforehand

### Lab

Goals/Outline:

To find new imaging findings and develop new diagnostic methods through daily practice

Available programs:

Participation in research groups on occasion

### **7. Grading System**

Estimated overall based on the participation situation to the lectures and the practices and the study contents.

### **8. Prerequisite Reading**

Capability for cross-sectional normal anatomy and basic knowledge of radiation exposure

### **9. Reference Materials**

N/A

### **10. Important Course Requirements**

N/A

### **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

### **12. Office Hour**

9:00AM-17:00PM, Monday to Friday

### **13. Note(s) to students**

No number limitation.

# Disease Genomics

Lecture	(code: 7 9 8 1	1st year	:6units)
Practice	(code: 7 9 8 2	1st~2nd year	:4units)
Lab	(code: 7 9 8 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Shumpei Ishikawa M.D., Ph.D.  
Assistant Professor Hiroto Katoh M.D., Ph.D.  
Assistant Professor Daisuke Komura M.D., Ph.D.

## 2. Classroom/Lab

To be announced upon contacting the instructor.

## 3. Course Purpose and Outline

To learn advanced skills for the research using genomic approaches, through the understanding of the methodologies and applications in disease genomics.

## 4. Course Objective(s)

Using the latest genomic approaches including methods of molecular biology and bioinformatics, students will propose and validate hypotheses raised based on the results of genomic analyses and previous reports. Students also gain an understanding of genomic exploratory research methods through discussions.

## 5. Format

Lectures, discussions and experiments.

## 6. Course Description and Timetable

Check with the instructor(s) about the program which is not specifically scheduled.

### Lecture

Goals/outline:

The purpose of this course is to learn the general flow of disease genomics research, including its application, method, and data mining. One of the main themes is analyzing genomics for cancer tissues, which are composed of not only cancer cells but also stromal cells including fibroblasts, immune cells, etc. Students will learn the application of genomics approach to these complex multi-cellular systems to discover new therapeutic and diagnostic targets and to analyze more details about their mechanisms.

Available programs:

Research Conference : Every Friday 17:30-18:30

### Practice

Goals/Outline:

To learn about advanced genomic technologies and methods of molecular biology and bioinformatics, to read original scientific articles from related fields, and to perform data interpretations and discussions.

Available programs:

Research Conference : Every Friday 17:30-18:30

Participation in a research group any time

## **Lab**

### Goals/Outline:

To be familiar with the basic techniques of molecular biology by learning how to handle DNA/RNA, proteins, culture cells, and lab animals. Also, to be familiar with the analysis of the whole genomics profiling of complex multi-cellular systems using methods of computational biology.

### Available programs:

Research Conference : Every Friday 17:30-18:30

Participation in a research group any time

## **7. Grading System**

Grading will mainly be based on the content of seminar and research presentations.

## **8. Prerequisite Reading**

Not applicable

## **9. Reference Materials**

Molecular Biology of the Cell 5E, Publisher: Garland Science, ISBN-13: 978-0815341116

## **10. Important Course Requirements**

Not applicable

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

Contact : Assistant Professor Daisuke Kommura dkom.gpat@mri.tmd.ac.jp

## **13. Note(s) to students**

Nothing in particular

# Human Genetics and Disease Diversity

Lecture	(code: 7 9 9 1	1st year	:6units)
Practice	(code: 7 9 9 2	1st~2nd year	:4units)
Lab	(code: 7 9 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Toshihiro Tanaka

Project Assistant Professor: Ryo Watanabe

Contact person: Toshihiro Tanaka Tel: 03-5803-4660 E-mail: ttana.brc@tmd.ac.jp

Web: <http://www.tmd.ac.jp/grad/hgdd/>

## 2. Classroom/Lab

Lectures, practices and laboratory components will mainly be held at the Bioresource Research Center (BRC) in the M&D Tower B1F. For further up to date information, please check the website and bulletin board.

## 3. Course Purpose and Outline

Humans are diverse organisms, and one area that this diversity is particularly exhibited is in the medical field such as in the way we develop disease and show resistance to treatment and drug side-effects. In order to understand this diversity, examination of inter-individual variation in our genetics and environment is essential by integrating both DNA and mRNA analysis (wet laboratory-based), together with data-mining and the statistical analytic evaluations of these data (dry lab). The purpose of this course is to provide the necessary foundation required to begin applying this integrative approach to individual research.

## 4. Course Objective(s)

1. Acquire the basic techniques for DNA and mRNA analysis (wet laboratory techniques)
2. Learn the basic procedures for statistical analysis of genetic data (dry laboratory techniques)
3. Understand the relationship between genomic diversity and disease
4. Understand the current state of research of this field and its applications in medical practice

## 5. Format

- Course lectures using powerpoint and/or small-group seminar-style lectures
- Hands-on practicum using clinical samples (e.g. human DNA)
- In silico statistical analysis of genetic data

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline: Lectures on (i) human genome diversity and disease risks, (ii) research progress in the discovery of human disease associated genes, and (iii) basic methods in the statistical analysis of human genetic data

Available programs:

Course Lecture (biweekly Mondays, 10-11am), Research in Progress (biweekly Mondays, 10-11am), Journal club (every Monday, 9-10am), Bioresource Research Center Seminar (invited lectures from outside the university, periodic)

### Practice

Goals/Outline: Practicum in (i) handling of human blood samples and extraction of human DNA / mRNA, (ii) utilizing human genome and epigenome databases, and (iii) statistical analysis of human genetic data obtained from public databases

Available programs:

Course Lecture (biweekly Mondays, 10-11am), Research in Progress (biweekly Mondays, 10-11am), Journal club (every Monday, 9-10am), Bioresource Research Center Seminar (invited lectures from outside the university, periodic)

## **Lab**

Goals/Outline: Work on the (i) extraction of human DNA / mRNA from human blood samples, genotyping of human genome variants, and measuring expression levels of mRNA, (ii) statistical analysis of the generated human genetic data using software packages, (iii) appropriate interpretation of the obtained results, and (iv) "big data" genetic analysis

Available programs:

Journal club (every Monday, 9–10am), Research in Progress (biweekly Mondays, 10–11am), Bioresource Research Center Seminar (invited lectures from outside the university, periodic)

## **7. Grading System**

Evaluation will be made according to participation in the course lectures, discussion, and practicum, and external activities (conferences, papers) with weights placed in the following manner:

- Participation in the course lectures, discussion, and practicum: 80%
- External activities: 20%

## **8. Prerequisite Reading**

It is preferable that appropriate pre-requisite reading be performed as necessary to gain a basic familiarity with genomic analysis

## **9. Reference Materials**

Human Molecular Genetics, 4th edition (Publisher: Garland Science)  
The Fundamentals of Modern Statistical Genetics (Publisher: Springer)

## **10. Important Course Requirements**

None

## **11. Lectures in English**

Lectures will be conducted in English when foreign students registered.

## **12. Office Hour**

For inquiries regarding course content, it is requested that the student contact the head instructor by email and schedule a meeting time accordingly.

## **13. Note(s) to students**

No special notes

# Applied Regenerative Medicine

Lecture	(code: 7 0 0 1	1st year	:6units)
Practice	(code: 7 0 0 2	1st~2nd year	:4units)
Lab	(code: 7 0 0 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Ichiro Sekiya

## 2. Classroom/Lab

Venues are different according to the program.

## 3. Course Purpose and Outline

Our purpose is to support and advance stem cell research and regenerative medicine for the discovery and development of cures, therapies, diagnostics and research technologies to relieve human suffering from chronic disease and injury.

## 4. Course Objective(s)

- # Development of regenerative medicine with stem cells.
- # Realization and industrialization of cell and regenerative therapy.
- # Establishment of safety test for regenerative medicine.
- # Translational research.

## 5. Format

- # Private instruction for laboratory work and paper writing.
- # Discussion in research progress and journal club.
- # Open seminar.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

You can understand advance stem cell research and regenerative medicine through discussions at research progress and journal club.

Available programs:

Monday morning: Presentation by staff.

Tuesday morning: Research progress by staff and graduate students.

Thursday morning: Research progress by staff and graduate students.

Friday morning: Journal club.

### Practice

Research progress and journal club.

Available programs:

Monday morning: Presentation by staff.

Tuesday morning: Research progress by staff and graduate students.

Thursday morning: Research progress by staff and graduate students.

Friday morning: Journal club.

## Lab

- # Development of regenerative medicine with stem cells.
- # Realization and industrialization of cell and regenerative therapy.
- # Establishment of safety test for regenerative medicine.
- # Translational research.

Available programs:

Monday morning: Presentation by staff.

Tuesday morning: Presentation by staff and graduate students.

Thursday morning: Presentation by staff and graduate students.

Friday morning: Journal club.

## 7. Grading System

Grading are performed in a comprehensive way based on the lecture, practice, and laboratory participation situation, reports about research, and conference presentations.

## 8. Prerequisite Reading

We introduce some papers according to your purposes.

## 9. Reference Materials

Arthroscopic transplantation of synovial stem cells improves clinical outcomes in knees with cartilage defects.

Sekiya I, Muneta T, Horie M, Koga H *Clin Orthop Relat Res.* 2015 Jul;473(7):2316-26.

Repetitive allogeneic intraarticular injections of synovial mesenchymal stem cells promote meniscus regeneration in a porcine massive meniscus defect model.

Hatsushika D, Sekiya I et al. *Osteoarthritis Cartilage.* 2014

Arthroscopic, histological and MRI analyses of cartilage repair after a minimally invasive method of transplantation of allogeneic synovial mesenchymal stromal cells into cartilage defects in pigs.

Nakamura T, Sekiya I et al. *Cytotherapy.* 2012

## 10. Important Course Requirements

A positive behavior is required.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Contact person Koji OTABE: [otabe.arm@tmd.ac.jp](mailto:otabe.arm@tmd.ac.jp)

## 13. Note(s) to students

For detailed information of what we do, please search our previous papers with PubMed. Key words are “Sekiya I” and “stem cells.”

# Minimally Invasive Medical Treatment

Lecture	(code: 5 0 4 1	1st year	:6units)
Practice	(code: 5 0 4 2	1st~2nd year	:4units)
Lab	(code: 5 0 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Kazuyuki Kojima k.kojima.srg2@tmd.ac.jp

Kenji Kawashima kawabmc@tmd.ac.jp

Mikito Inokuchi m-inokuchi.srg2@tmd.ac.jp Masatoshi Nakagawa nkgwsrg1@tmd.ac.jp

## 2. Classroom/Lab

MD tower 12F North Minimally Invasive Medical Treatment Lecture room (Extension:4255) Since lecture room will be different by the program, contact the instructor before the program.

## 3. Course Purpose and Outline

1. Investigation and research for the social needs identification of minimally invasive medical treatment in the next generation of medical and dental area
2. Medical equipment and development of treatment to meet the needs of minimally invasive medical treatment in the next generation of medical and dental field
3. Research and development of the education curriculum and evaluation methods of minimally invasive treatment in the medical and dental field
4. Development and operation of minimally invasive treatment of industry-academia cooperation in the medical and dental field
5. Development and operation of technology certification strategy of minimally invasive treatment in medical and dental area

## 4. Course Objective(s)

- 1) To learn the advanced technology of minimally invasive medical treatment in the medical and dental field.
- 2) T study Education of advanced technology, to master the interdisciplinary education technology.
- 3) To overcome the advanced technology, to learn a new treatment method and technology that the medical device can be proposed and developed.

## 5. Format

Clinical Practice: Surgical tours of the patient's disease, and minimally invasive surgery participation in Tokyo Medical and Dental University Hospital,

To delve deeper into the problems through discussions with supervisors, make a paper through a small group discussion and presentations at a large number conference .

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

As well as we understand the current status of minimally invasive medical treatment in each area that is required to consider a minimally invasive medical treatment in the next generation, extracts the challenges for the future in this field.

Available programs:

every Monday 17:00-19:00 Research Workshop: Week 4 Tuesday 17:00- 19:00

### Practice

To know the outline of the treatment through the case, to perform the acquisition of technology. State of the art technology to find the problem of the solution, for the treatment strategy, and exercises from the practical point of view.

Available programs:

every Tuesday 15:00-17:00 Surgery tours and participation: Monday and Thursday

## **Lab**

Treatment methods for solving the problems of the minimally invasive treatment, medical equipment, new developed educational method is verified through the animal laboratory and non-clinical trials, to create the paper.

Available programs:

every Tuesday 13:00–15:00 Research Workshop: Week 1,3Tuesday 17:00– 19:00 Animal laboratory: Thursday when necessary

## **7. Grading System**

Lectures, exercises, external announcement of participation and research content to the research training (conference, paper)

Based on the situation, it is evaluated as a guide to the following proportions. (PhD.)

Lectures, exercises, participation in research and training: 70%

External presentation of research (conference, paper) Status: 30%

## **8. Prerequisite Reading**

nothing special

## **9. Reference Materials**

nothing special

## **10. Important Course Requirements**

nothing special

## **11. Lectures in English**

Lectures will be partially conducted in English.

## **12. Office Hour**

Kazuyuki Kojima E-mail: k-kojima.srg2@tmd.ac.jp

## **13. Note(s) to students**

nothing special

# Medical Science Mathematics

Lecture	(code: 5 0 9 1	1st year	:6units)
Practice	(code: 5 0 9 2	1st~2nd year	:4units)
Lab	(code: 5 0 9 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor Tatsuhiko Tsunoda, Junior Associate Professor Fuyuki Miya, Assistant Professor Jo Nishino

## 2. Classroom/Lab

M&D Tower 25F South, Department of Medical Science Mathematics

## 3. Course Purpose and Outline

Learn how to research Medical Science Mathematics, which should be one of most powerful approaches with whole omic data to (1) exhaustively explore unknown disease etiologies, (2) sub-classify diseases on the basis of molecular profiling, and (3) apply optimum therapy for each patient.

## 4. Course Objective(s)

Master basic methodologies of data-science and mathematical aspects in genomic medicine etc. In addition, acquire logical thinking skills by reading related original papers.

## 5. Format

One-to-one lecture or seminar style for small number of graduate students.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Understand the importance of the mathematical aspects and large-scale data analysis in the field of medicine science, by applying the most advanced method of whole genome/omics analysis with medical big data, by clarifying the cause of disease and realizing precision medicine, and by researching systems medicine on the basis of accumulated knowledge. Also, we will search for therapeutic markers and build models for precision medicine including preemptive medicine by analyzing the omics profiles and clinical information of patients.

Available programs:

Graduate lecture: when necessary

Graduate special lecture: when necessary

Journal club: when necessary

### Practice

Goals/Outline:

Read latest research papers, criticize their issues, and discuss future their directions focusing on (1) latest technologies of whole omic analysis, (2) researches on exploring disease etiologies and realizing precision medicine, and (3) systems medicine with knowledge and inference.

Available programs:

Seminar every monday from 16:00 to 17:30

## **Lab**

Goals/Outline:

Get skills for research planning, analysis, and presentation on the basis of research topics: from next-generation data analysis and so on to systems medicine approach that analyze disease as a whole system.

Available programs:

As needed.

## **7. Grading System**

Total evaluation: how actively contributing to the practice and the lab research, research content, and presentation/attendance to research meetings. As to the lab research, comprehensively evaluated based on grade of Mid-term advice.

## **8. Prerequisite Reading**

It is desirable to survey how genomic medicine, precision medicine, and systems medicine are significant.

## **9. Reference Materials**

Nothing in particular.

## **10. Important Course Requirements**

Nothing in particular.

## **11. Lectures in English**

③ When an international student registers this subject for credits, this course is taught in English.

## **12. Office Hour**

Contact: Tatsuhiko Tsunoda E-mail: tsunoda.mesm@mri.tmd.ac.jp

## **13. Note(s) to students**

Nothing in particular.

# Frontier Biomaterials

Lecture	(code: 5 0 5 1	1st year	:6units)
Practice	(code: 5 0 5 2	1st~2nd year	:4units)
Lab	(code: 5 0 5 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Tsuyoshi Kimura  
Contact person: Tsuyoshi Kimura E-mail kimurat.mbme@tmd.ac.jp

## 2. Classroom/Lab

Lecture room will be informed by contact person.

## 3. Course Purpose and Outline

This course deals with medical materials and devices. Designing medical devices for realizing bio-function and their application are introduced through recent outcome from advanced research field.

## 4. Course Objective(s)

The goal of this course is to understand concept, characteristics and application of various medical materials and the devices and to learn how to control them.

## 5. Format

Start-up training is available. Afterwards, students will be asked to do practice by themselves.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

The objective is to understand the materials, especially polymeric materials, for medical use. In the lecture, material characterization, scaffold for regenerative medicine and tissue engineering, synthetic vector for drug and gene therapy and stem cell engineering are introduced and explained.

Available programs:

Lecture Monday, 18:00-20:00, Oct.15th-

### Practice

Goals/Outline:

The objective is to understand how novel polymeric materials are studied and developed, and to learn how to read, summarize, and write a research paper. Survey of newly published paper related to new materials will be done as required. Student will be asked to read and explain the paper in the research group seminar.

Available programs:

Seminar Friday, Every week, 9:00-12:00

### Lab

Goals/Outline:

The objective is to learn the skill necessary for the research of students own (Contents are; polymer synthesis, characterization, cell culture and animal experiment)

Available programs:

Participation in a research group Any time

### **7. Grading System**

Grading is comprehensively judged from attendance and research achievement.

Attendance and participation to lecture, practice and lab (minimum requirement is 60%): 80%

Presentation in Society Meeting or Publication (minimum requirement is once): 20%

### **8. Prerequisite Reading**

Learn about the text that was instructed by Lab staffs (articles, text book, etc.)

### **9. Reference Materials**

Ratner et al. eds., Biomaterials Science, Academic Press

Lanza et al., eds., Principles of Tissue Engineering, Academic Press

### **10. Important Course Requirements**

Student will be asked to manage themselves, because one should do chemical and biological experiments which takes long time.

Consult with lab staff frequently.

### **11. Lectures in English**

Lectures will be partially conducted in English.

### **12. Office Hour**

Monday to Friday, 9:00-18:00

### **13. Note(s) to students**

None

# JFCR Cancer Biology

Lecture	(code: 9 0 4 1	1st year	:6units)
Practice	(code: 9 0 4 2	1st~2nd year	:4units)
Lab	(code: 9 0 4 3	2nd~3rd year	:8units)

## 1. Instructor(s)

Takuro Nakamura, Kiyotaka Shiba, Kengo Takeuchi, Akihiro Tomida and Toru Hirota

## 2. Classroom/Lab

The Cancer Institute and Cancer Chemotherapy Center of Japanese Foundation for Cancer Research  
3-8-31 Ariake, Koto-ku, Tokyo

## 3. Course Purpose and Outline

Learning the mechanisms of cancer development and progression, and discussing the novel therapeutics and personalized medicine.

## 4. Course Objective(s)

Understanding the biological base of cancer and pathology of human cancer. Proposing possible therapeutic strategies based on molecular biology of cancer.

## 5. Format

Contact with each instructor of interest.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Goals/outline:

Understanding the mechanisms of carcinogenesis and cancer progression. Studying the basics of personalized medicine for innovative cancer therapy.

Available programs:

1. Molecular mechanisms of carcinogenesis and identification of cell-of-origin of cancer (Nakamura, 10:00-11:00 on Thursday)
2. Pathological and genetic analysis of human cancer such as malignant lymphoma and lung cancer (Takeuchi, 17:00-18:00 on 2nd and 4th Tuesday)
3. Application of nanobiotechnology in cancer diagnostics (Shiba, 10:30-12:00 on Thursday)
4. Strategy for innovative drug therapy based on cancer biology (Tomida, 16:00-17:30 on Thursday)
5. Understanding mitotic chromosome dynamics in cancer, to exploit mitotic control to cancer intervention (Hirota, 9:30-11:00 on Thursday)

### Practice

Goals/Outline:

Students are expected to present progress reports and to discuss their data with other researchers in the faculty. When sufficient and convincing data are obtained, scientific presentation at the meeting/workshop/symposium will be encouraged.

Available programs:

Progress report (once per week), oral presentation at the annual meeting of Japanese Foundation for Cancer Research (July) and presentation at the scientific meetings (appropriate occasions).

## Lab

Goals/Outline:

1. Clarify the carcinogenic mechanisms of leukemia and sarcoma by generating original animal models and analyzing patients' samples (Nakamura).
2. Study the basics of nanobiotechnology and participate in development of cancer diagnostic tools (Shiba).
3. Study the pathological and molecular characteristics of human malignant lymphoma. Search the novel cancer disease genes to utilize them as novel drug targets (Takeuchi).
4. Innovate molecular target therapies based on biological and genetic mechanisms in cancer (Tomida).
5. To elucidate origins of chromosomal instability in malignancies, using current techniques in molecular and cellular biology (Hirota)

Available programs:

Contact with each instructor of interest.

## 7. Grading System

Will be evaluated based on the attendance record (~70%) and achievement of knowledge and techniques (~30%). Presentation and discussion activities may also be considered as additional information.

## 8. Prerequisite Reading

Contact with each instructor of interest.

## 9. Reference Materials

Robert A. Weinberg. The biology of cancer. Second ed. Garland Science.

## 10. Important Course Requirements

Contact with each instructor of interest.

## 11. Lectures in English

Lectures will be conducted in English when foreign students registered.

## 12. Office Hour

Takuro Nakamura, Monday to Friday 9 am to 5 pm, Phone: 03-3570-0462, e-mail: takuro-ind@umin.net

## 13. Note(s) to students

# Personalized Genomic Medicine for Health

Lecture	(code:	1st year	:6units)
Practice	(code: 1	1st~2nd year	:4units)
Lab	(code: 2	2nd~3rd year	:8units)

## 1. Instructor(s)

Professor: Kinya Ishikawa  
Associate Professor: Akihiro Araki

## 2. Classroom/Lab

To be announced

## 3. Course Purpose and Outline

Genetics are now widely applied in medicine. This course is provided to understand how genomics is applied in a broad field of medicine. The scope of this course covers both monogenic disorders and polygenic diseases.

## 4. Course Objective(s)

(1) By the end of this course, participants are expected to become able to understand how to identify gene(s) causing monogenic diseases, and uncover mechanism of diseases. (2) Participants are expected to learn how to identify genetic and environmental factors underlying polygenic diseases. (3) Participants are also expected to establish one's own view and position

## 5. Format

Lectures are given in a small group. Laboratory work is personalized.

## 6. Course Description and Timetable

Check with the teacher in charge for the program which is not specifically scheduled.

### Lecture

Didactic lectures are provided through graduate school doctoral and master courses, and seminars. Small lectures and interactive sessions will take place on participants' individual basis.

Available programs:

Lecture: as required

Special Lecture: as required

Seminar: as required

Journal Club: Monday 9:15-11:15

### Practice

Goals /outline

By conducting research under a supervisor, students will obtain knowledge and skills of asking appropriate scientific questions, planning a series of experiments to answer the question, and conducting actual experiments using various experimental techniques.

Students also learn how to present his/her data at scientific meetings and how to write scientific papers.

Available programs:

1) Understanding the mechanisms for the monogenic disease, 2) Developing personalized medicine for health

## **Lab**

### Goals /outline

By conducting research under a supervisor, students will obtain knowledge and skills of asking appropriate scientific questions, planning a series of experiments to answer the question, and conducting actual experiments using various experimental techniques.

Students also learn how to present his/her data at scientific meetings and how to write scientific papers.

Available programs:

- 1) Understanding the mechanisms for the monogenic disease, 2) Developing personalized medicine for health

## **7. Grading System**

Progress reports and the final research paper

## **8. Prerequisite Reading**

Genomic Medicine

## **9. Reference Materials**

Genetics and Genomics in Medicine. Tom Strachan. Medical Science International社

## **10. Important Course Requirements**

Knowledge of genetics, human genetics, molecular biology is required. It is advisable that participants have basic knowledge of Internal Medicine and Surgery of undergraduate level.

## **11. Lectures in English**

Partial classes are taught in English.

## **12. Office Hour**

flextime

## **13. Note(s) to students**

none

## Information for Students

### 1) Contact and Notification

Notifications and other information are posted on university bulletin boards or the TMDU website (Click on the tab for “Current Students” or “Schools/Graduate Schools”).

When emergency measures for natural or weather-related disasters such as typhoons are taken, causing the full suspension of public transportation services, lectures and examinations may be canceled or rescheduled. Notifications of such will be announced on the TMDU website (Click on the tab for “Schools / Graduate Schools-News & Events”).

Bulletin boards are located in front of Bldg. 6, in front of the Educational Planning Section on the 1<sup>st</sup> floor of Bldg. 1 and in front of the Student Support Section on the 3<sup>rd</sup> floor of Bldg. 5. Please check these boards regularly.

When necessary, students will be contacted individually on the phone, via email or by mail. If your address or phone number changes, please update your contact information with the Educational Planning Section.

### 2) Student ID Card

Your student ID card serves as proof of student status and as a nametag. It is also an IC card and will enable you to unlock some school entrances and register your attendance for classes. Please be careful not to damage or lose it.

Additionally, please carry your student ID card with you at all times. You may also be asked to show it when you buy a commuter pass.

#### (1) Reissuance

Students should promptly notify the Educational Planning Section if their ID card has been lost or damaged, and complete the procedures to have the card reissued. Please note that a fee will be charged for reissuance.

#### (2) Return of card

Students should promptly return their ID card to the Educational Planning Section upon graduation, withdrawal or expulsion, or when the card expires. Please note that if the card has been lost and cannot be returned, a fee will be charged equal to that of reissuance.

#### (3) Updating the period of validity

If your enrollment period has been extended and your student ID card has expired, please visit the Educational Planning Section to update your card.

(TEL: 03-5803-5074)

### 3) Certificates

Some certificates and other official documents are issued by the Educational Planning Section, while others may be obtained from automatic document issuing machines.

Place	Items	Service hours	Office
Document vending machine Bldg. 5, 4 <sup>th</sup> floor Student Lounge	Certificate of Enrollment (Japanese)	8:30-21:00 (Student ID card is required.)	Thesis and Dissertation Team, Educational Planning Section TEL : 5803-5074
	Student Discount Card for JR		
Educational Planning Section* Bldg. 1, 1 <sup>st</sup> floor	Certificate of Enrollment (English)	8:30-17:15	Graduate Education Team 1 or 2, Educational Planning Section TEL : 5803-4676 · 4534
	Transcript (Japanese/English)		
	Certificate of Expected Graduation <Master's Program> (Japanese/English)		
	Other certificates (Japanese/English)		
Educational Planning Section* Bldg. 1, 1 <sup>st</sup> floor Educational Planning Section* Bldg. 1, 1 <sup>st</sup> floor	Certificate of Expected Graduation <Doctoral Program> (Japanese/English)	8:30-17:15	Thesis and Dissertation Team, Educational Planning Section TEL : 5803-5074

\*Certificates issued by the Educational Planning Section

Please visit the Educational Planning Section and submit the relevant application form at the counter. It may take a few days to issue a Japanese certificate and about a week for an English certificate.

\*Certificates for those who have already completed a course are also issued by the Educational Planning Section. Available certificates are: Certificate of Awarded Diploma, Transcript, Certificate of Past Enrollment, and Certificate of Degree.

#### How to apply for a certificate by mail

If you need to apply for a certificate that is not available from the document vending machines, you can send the application form by mail to the following address. Please send the application form along with a self-addressed envelope with a 120-yen stamp affixed. The envelope should be at least 240×332 mm in size so that an A4 size document can be inserted without folding.

#### Address

Educational Planning Section, Tokyo Medical and Dental University  
1-5-45 Yushima, Bunkyo-ku, Tokyo  
Postal code: 113-8510

#### **4) Student Discount Card for JR**

- (1) Students can get a 20% discount on JR Line tickets for travel that exceeds 100 kilometers one way. The purpose of this service is to help ease students' financial burden and promote school education. You can use the Student Discount Card at JR for a maximum of 10 tickets per person per year, and the card is valid for 3 months.
- (2) Caution: Please do not use this service in an inappropriate or illegal manner.  
Do not:
  1. Buy a discounted ticket by using the student ID card of another person.
  2. Give someone a ticket that you bought.
  3. Use an expired ticket.

If you commit any of these actions, you may be required to pay a penalty of twice the regular fare. Furthermore, this service for all students at TMDU may be suspended as a result.

- (3) The Student Discount Card for JR is available from the document vending machines in the Student Lounge in Bldg. 5, 4<sup>th</sup> floor.

Service hours: 8:30 a.m. to 9:00 p.m. on weekdays  
Office: Educational Planning Section (TEL: 03-5803-5074)

#### **5) Change of address/surname/ legal domicile/telephone number**

A student who changes his/her address, legal domicile, surname or telephone number must promptly notify Graduate Education Team 1 or 2 in the Educational Planning Section and follow the necessary procedures. A student who has a change in their guarantor's information must also do the same.

If you fail to inform the Educational Planning Section of any changes, the university may not be able to contact you in case of an emergency.

#### Office

Graduate Education Team 1 or 2 in Educational Planning Section (Bldg. 1, 1<sup>st</sup> floor)

**Notification form**

	Form	Necessary documents
Change of surname	Change of name form	Proof of name change
Change of address or legal domicile	Change of address or legal domicile form	Proof of change of address or legal domicile
Change of guarantor	Change of guarantor form	N/A

**6) Request for permission to attend external practical training**

If you would like to attend an external practical training course, you must submit the request form to the Graduate Education Team 1 or 2 in the Educational Planning Section two weeks before the start date. (If you would like to attend training abroad, you must submit your request two months before the start date.)

**7) Lost and found property**

Lost property found on the university campus is handled by the following offices.

- (1) Lost property found inside the building of the Faculty of Medicine:  
General Affairs Section, Administration Division, Faculty of Medicine  
(Bldg. 3, 6<sup>th</sup> floor, TEL: 5803-5096)
- (2) Lost property found inside the building of the Faculty of Dentistry:  
General Affairs Section, Administration Division, Faculty of Dentistry and  
Dental Hospital (Dental Bldg. South, 2<sup>nd</sup> floor, TEL: 03-5803-5406)
- (3) Lost property found in other places: Campus security and building safety  
offices.

**9) Health Service Center**

(Health Service Center: TEL 03-5803 - 5081, <http://www.tmd.ac.jp/hsc/index.html>)

The Health Service Center aims to help students and faculty members stay healthy so that they can pursue their activities effectively. TMDU staff and students visit the center to get counseling for physical or mental issues, physical examinations, and letters of introduction necessary to visit specialists.

(1) Health consultation and counseling for mental health

1. Health consultation is available from 10 a.m. to 12:30 p.m. and 1:30 p.m. to 3:30 p.m. on weekdays.
2. For information concerning which doctors are available, please check the Health Administration Center website.
3. You may consult with doctors or health consultants even after official consultation hours if they are still in the center.
4. You may also freely use the center's scales to measure your height and weight, or the blood pressure machine.

(2) Health checkup

All students are obliged to complete a health checkup. It is the student's responsibility to check the Health Administration Center website for the detailed schedule of examinations.

- |  |                   |
|--|-------------------|
| 1. Annual Health Checkup                                     | May               |
| 2. Detection of HBs Antigen                                  | April             |
| 3. Health Checkup for Radiation Workers                      | April and October |
| 4. Others: Immunization for Hepatitis B or Influenza bacilli |                   |

(3) Health certificate issuance

Health certificates can be issued when needed for taking a qualifying examination, applying for clinical training at a hospital, job hunting or entering a different school. Note that the certificate can only be issued to students who have taken the annual health checkup.

## 10) Student support

Support Center for Students and Female Staff:

[http://www.tmd.ac.jp/cmnm/stdc/index\\_en.html](http://www.tmd.ac.jp/cmnm/stdc/index_en.html))

The Support Center for Students and Female Staff assists students with managing their daily life such as schoolwork and career planning, provides counseling for mental health issues and harassment, and promotes other student support activities. The center also implements plans for supporting research activities and work-life balance for both female and male researchers and graduate students.

If you have problems in your daily life as a student, you can talk to a counselor. Based upon your needs, choose the appropriate contact number below.

<For matters related to student life>

TEL : 03-5803-4959

[http://www.tmd.ac.jp/cgi-bin/stdc/cms\\_reserv.cgi?lang=en](http://www.tmd.ac.jp/cgi-bin/stdc/cms_reserv.cgi?lang=en))

- Personal life: family, financial circumstances, relationship problems, etc.
- Schoolwork: progress in school, continued education, relationships with students or faculty
- Career planning: post-graduation decisions, job hunting
- Mental health: stress, unstable mental condition, interpersonal relationships
- Harassment: Academic dishonesty, power harassment, sexual harassment, etc.

<For matters related to student life or career support and work-life balance>

TEL: 03-5803-4921

(<http://www.tmd.ac.jp/ang/counsel/index.html>)

- Future career decisions and lifestyle
- Work-life balance and events such as pregnancy, childbirth and parenting
- Concerns about nursery schools or nursing care

☆Individual counseling: 10:30 a.m. to 5:00 p.m. on weekdays

Typically, you need to make a reservation for an individual counseling session. However, a counselor will try to respond to your request even when you do not have a reservation.

### 11) Graduate student lounge

Any graduate student can use the lounges located in M&D Tower on the 22<sup>nd</sup> and 14<sup>th</sup> floors.

<Available hours> 8:00 a.m. to 9:00 p.m.

<Notes>

1. Please keep the lounge tidy.
2. Please dispose of your garbage in your laboratory. Do not dispose of it in nearby classroom trashcans.
3. Please do not bother others. For example, avoid talking loudly, sleeping for too long, or bringing outside playthings to the lounge.
4. Please do not leave your belongings in the lounge.

### 12) Others

- (1) If you plan to receive personal mail, please tell the sender to include the name of your department in the address field.
- (2) TMDU imposes traffic restrictions on campus and commuting by car is prohibited. However, an exception may be made for students who have difficulty commuting to campus by train or bus.
- (3) Relevant Offices
  1. Academic affairs:  
Graduate Education Teams 1 and 2, Educational Planning Section (Bldg. 1, 1<sup>st</sup> floor, TEL 03-5803-4676, 4679, 4534)
  2. Payment of tuition:  
Financial Planning Section (Bldg. 1, 3<sup>rd</sup> floor, TEL 03-5803-5048)
  3. Scholarships and tuition exemption:  
Student Support Office (Bldg. 5, 3<sup>rd</sup> floor, TEL 5803-5077)

# Various procedures

You may retrieve all designated forms for TMDU necessary for each procedure from the Graduate Education Team 1 and Team 2 of the Educational Planning Section (Building 1 West, first floor) or the TMDU homepage.

TMDU Homepage (<http://www.tmd.ac.jp/index.html>) → Schools & Graduate Schools → Graduate School of Medical and Dental Sciences → Educational Planning Section → Various procedures

URL: [http://www.tmd.ac.jp/faculties/graduate\\_school/kyoumuka/index.html](http://www.tmd.ac.jp/faculties/graduate_school/kyoumuka/index.html)

## 1) Leave of absence

If you can not attend school for three months or more due to illness or other reasons, you can take a leave of absence or extend the leave period using the following procedures. A leave of absence may not exceed two years in total. Furthermore, a leave of absence shall not be included in the period of enrollment.

### Submission/information window

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

### Items to submit

-Request for leave of absence or Request for extension of the leave period (form designated by TMDU)

\*As a rule, the starting date will be at the beginning of the month.

\*You will be asked to submit a doctor's note if your absence is due to illness.

### Submission deadline

Up until one month before the desired leave of absence date.

By 20<sup>th</sup> of two months before the starting date of leave of absence you desire.

## 2) Re-enrollment

If a student who is absent through leave of absence wishes to return to school during the period of the leave of absence or at the end of a leave of absence, the following procedures shall be carried out.

### Submission/information window

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

### Items to submit

-Request for re-enrollment (form designated by TMDU)

\*You will be asked to submit a doctor's note if your absence is due to illness. Additionally, an inspection from the Health Administration Center is required, so please inquire in advance.

### Submission deadline

By 20<sup>th</sup> of two months before the date of re-enrollment you desire.

## 3) Withdrawal

The following procedures must be carried out in the event that you are unable to continue your studies due to illness or other reasons and you must withdraw as a result.

### Submission/information window

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

### Items to submit

-Request to withdraw (form designated by TMDU)

### Submission deadline

By 20<sup>th</sup> of a month before the desired date of withdrawal.

**4) Commission  
research instruction**

If you wish to receive research guidance at another graduate school, research institute, or a high level hospital (hereinafter referred to as “other institution”), you must conduct the following procedures upon consulting with the other party in advance. Furthermore, the application period may not exceed the school year. You must reapply by the end of January in the event that you continue to take research instruction in the following year. Furthermore, the period in which a Master's course student can commission research instruction is up to one year.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

Application to commission research instruction (form designated by TMDU)

\*As a rule, the start date will be the first of the month.

\*As a rule, the starting date will be at the beginning of the month.

**Submission deadline**

By 20<sup>th</sup> of three months before the starting date of commission research instruction you desire

\*Application for commuter pass for practical training accompanying commission research instruction

If you attend other institution after the application for the commission research instruction is accepted, you may purchase a commuter pass for internships by applying.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

Application for commuter pass for internships (form designated by TMDU)

**Submission deadline**

By 20<sup>th</sup> of two months beforehand (It will take about one month to obtain permission from the railway company.)

**5) Study abroad**

In the case of studying in a foreign graduate school or equivalent higher education institution, the following procedures must be carried out upon consulting with the other party beforehand.

Please make sure to inquire beforehand, as there is a limit on when you may study abroad.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

-Request to study abroad (form designated by TMDU)

-Written statement of reasons from instructor (free formatting)

-Documents such as the acceptance letter of the other party, etc. (copy)

-Japanese translations of documents such as the acceptance letter of the other party, etc.

-Guarantee of length of stay

**Submission deadline**

By 20<sup>th</sup> of two months before the starting date of study abroad you desire

[To change the period of study abroad]

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

- Request to change study abroad period (form designated by TMDU)
- Documents pertaining to the study abroad period (copy)
- Study abroad permission slip (copy)

**Submission deadline**

By 20<sup>th</sup> of two months before the desired date to change the new study abroad period

**6) Extend enrollment period**

Students who intend to attend school (excluding a period of leave of absence) beyond the standard study period shall carry out the following procedure. Students may extend their enrollment period for twice the standard term of study (see table below).

Graduate School	Program	Track	Years
Medical and Dental Sciences	Master's course	Medical and Dental Science and Technology Track (excluding medical care management courses)	4 years
		Medical care management course	2 years
	Doctoral Program	Medical and Dental Sciences Track	8 years
		Life Science and Technology Track	6 years
Health Care Sciences	Doctoral program (first semester)	Nursing Innovation Science Track Biomedical Laboratory Sciences Track	4 years
	Doctoral program (second semester)	Nursing Innovation Science Track Biomedical Laboratory Sciences Track	6 years
	Consecutive doctoral program	Nursing Innovation Science Track Cooperative Doctoral Course in Disaster Nursing Track	10 years

Please note, leave of absences are not included in the enrollment period.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

- Request for extension of enrollment period (form designated by TMDU)

**Submission deadline**

- By 20<sup>th</sup> of two months before the completion of the enrollment period

**7) Change major department**

If you wish to change the research department to which you belong for reasons such as a change in your research content during your enrollment period, the following must be carried out.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

-Request for change of track (form designated by TMDU)

**Submission deadline**

By 20<sup>th</sup> of two months before the desired date of change

**8) Change of course of study**

In the case of employment during the enrollment period, or if you enrolled in an adult graduate school course that ceases to exist, the following must be carried out.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

-Request to change course of study (form designated by TMDU)

\*If you wish to change from a “general course” to an “adult graduate school course”, please also attach the following.

-Employer approval (form designated by TMDU)

-Written statement of reasons for instructor change (free formatting)

**Submission deadline**

By 20<sup>th</sup> of two months before the desired date of change

**9) Transfer**

If you take an transfer examination to transfer to another institution, you must perform the following.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

Request for transfer examination consent form (form designated by TMDU)

**Submission deadline**

By 20<sup>th</sup> of three months before the testing date

If you pass your transfer examination, you must carry out the following.

**Items to submit**

-Request to transfer (form designated by TMDU)

-A copy of your passing results

**Submission deadline**

By 20<sup>th</sup> of two months before your transfer

**10) Death**

In the event that the student passes away, please have a guarantor carry out the following as soon as possible.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Items to submit**

-Notification of death (form designated by TMDU)

**11) Cancelling a course**

If you wish to cancel a course that you have already registered for you must carry out the following.

**Submission/information window**

Educational Planning Section for Graduate Education Team 1 & 2 (Building 1 West, first floor)

**Forms to submit**

-Request for Cancelling a Registered Subject (form designated by TMDU)

**Submission deadline**

-Students placed in Doctoral Program of Medical and Dental Sciences Track

Up until May 31st for first semester courses

Up until November 30th for second semester courses, full year courses, and multiple year courses

Within the course period for intensive lectures

[Notes]

All the above procedures are matters to be discussed by the graduate school promotion committee, with the exception of “cancellation of course”, **so we enforce a strict deadline**. Submissions after the deadline will be permitted after a desired date.

The graduate school promotion committee will not be held in August, students who wish to start in September should give notification one month before the submission deadline.

### Major facilities

Facility name	Location	Extension number
International Exchange Section	Bldg. 1, 4F	4076
Student Support Section	Bldg. 5, 3F	5077
Educational Planning Section	Bldg. 1, 1F	5074 (Thesis and Dissertation Team) 4676,4679,4534 (Graduate Education Team 1, 2)
Admission Section	Bldg. 1, 1F	4924
Financial Planning Section	Bldg. 1, 3F	5042
Library	M&D Tower, 3F	5592
Health Administration Center	Bldg. 5, 2F	5081
Student Lounge (Certificate Vending Machine)	Bldg. 5, 4F	—
University Co-op Cafeteria and shop	Bldg. 5, 1F, B1F	—
Research Center for Medical and Dental Sciences	Bldg. 8, North, South	5788

# Campus/Access Map

