ANNUAL PUBLICATIONS

2012

Graduate School of
Medical and Dental Sciences
Tokyo Medical and Dental University
## CONTENTS

### Oral Health Sciences

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Pathology</td>
<td>1</td>
</tr>
<tr>
<td>Bacterial Pathogenesis</td>
<td>3</td>
</tr>
<tr>
<td>Molecular Immunology</td>
<td>5</td>
</tr>
<tr>
<td>Advanced Biomaterials</td>
<td>6</td>
</tr>
<tr>
<td>Diagnostic Oral Pathology</td>
<td>8</td>
</tr>
<tr>
<td>Organic Biomaterials</td>
<td>9</td>
</tr>
<tr>
<td>Functional Materials</td>
<td>10</td>
</tr>
<tr>
<td>Oral Radiation Oncology</td>
<td>12</td>
</tr>
<tr>
<td>Oral and Maxillofacial Surgery</td>
<td>13</td>
</tr>
<tr>
<td>Oral and Maxillofacial Radiology</td>
<td>15</td>
</tr>
<tr>
<td>Anesthesiology and Clinical Physiology</td>
<td>17</td>
</tr>
<tr>
<td>Orofacial Pain Management</td>
<td>19</td>
</tr>
<tr>
<td>Pediatric Dentistry</td>
<td>20</td>
</tr>
<tr>
<td>Orthodontic Science</td>
<td>22</td>
</tr>
<tr>
<td>Orology and Operative Dentistry</td>
<td>24</td>
</tr>
<tr>
<td>Fixed Prosthodontics</td>
<td>28</td>
</tr>
<tr>
<td>Pulp Biology and Endodontics</td>
<td>30</td>
</tr>
<tr>
<td>Removable Partial Denture Prosthodontics</td>
<td>32</td>
</tr>
<tr>
<td>Oral Implantology and Regenerative Dental Medicine</td>
<td>34</td>
</tr>
<tr>
<td>Complete Denture Prosthodontics</td>
<td>38</td>
</tr>
</tbody>
</table>

### Maxillofacial and Neck Reconstruction

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic and Reconstructive surgery</td>
<td>39</td>
</tr>
<tr>
<td>Head and Neck Surgery</td>
<td>40</td>
</tr>
<tr>
<td>Diagnostic Radiology and Oncology</td>
<td>42</td>
</tr>
<tr>
<td>Maxillofacial Anatomy</td>
<td>45</td>
</tr>
<tr>
<td>Cognitive Neurobiology</td>
<td>46</td>
</tr>
<tr>
<td>Molecular Craniofacial Embryology</td>
<td>48</td>
</tr>
<tr>
<td>Cellular Physiological Chemistry</td>
<td>50</td>
</tr>
<tr>
<td>Metals</td>
<td>52</td>
</tr>
<tr>
<td>Biodesign</td>
<td>54</td>
</tr>
<tr>
<td>Maxillofacial Surgery</td>
<td>55</td>
</tr>
<tr>
<td>Maxillofacial Orthognathics</td>
<td>57</td>
</tr>
<tr>
<td>Maxillofacial Prosthetics</td>
<td>59</td>
</tr>
</tbody>
</table>

### Bio-Matrix

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Biology</td>
<td>60</td>
</tr>
<tr>
<td>Medical Biochemistry</td>
<td>61</td>
</tr>
<tr>
<td>Joint Surgery and Sports Medicine</td>
<td>62</td>
</tr>
<tr>
<td>Biostructural Science</td>
<td>65</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>67</td>
</tr>
<tr>
<td>Connective Tissue Regeneration</td>
<td>69</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>70</td>
</tr>
<tr>
<td>Cell Signaling</td>
<td>72</td>
</tr>
<tr>
<td>Inorganic Materials</td>
<td>74</td>
</tr>
<tr>
<td>Periodontology</td>
<td>77</td>
</tr>
</tbody>
</table>

### Public Health

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Promotion</td>
<td>80</td>
</tr>
<tr>
<td>Environmental Parasitology</td>
<td>82</td>
</tr>
<tr>
<td>Forensic Medicine</td>
<td>84</td>
</tr>
<tr>
<td>International Health and Medicine</td>
<td>85</td>
</tr>
<tr>
<td>Health Care Management and Planning</td>
<td>88</td>
</tr>
<tr>
<td>Molecular Epidemiology</td>
<td>90</td>
</tr>
<tr>
<td>Research Development</td>
<td>91</td>
</tr>
<tr>
<td>Department</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Health Policy and Informatics</td>
<td>92</td>
</tr>
<tr>
<td>Life Sciences and Bioethics</td>
<td>93</td>
</tr>
<tr>
<td>Health Care Economics</td>
<td>95</td>
</tr>
<tr>
<td>Dental Education Development</td>
<td>96</td>
</tr>
<tr>
<td>Oral Health Promotion</td>
<td>97</td>
</tr>
<tr>
<td>Sports Medicine and Dentistry</td>
<td>99</td>
</tr>
<tr>
<td>Educational System in Dentistry</td>
<td>101</td>
</tr>
<tr>
<td>Educational Media Development</td>
<td>102</td>
</tr>
<tr>
<td>Gerontology and Gerodontology</td>
<td>104</td>
</tr>
<tr>
<td>Geriatrics and Vascular Medicine</td>
<td>105</td>
</tr>
<tr>
<td>Gerodontology</td>
<td>106</td>
</tr>
<tr>
<td>Comprehensive Patient Care</td>
<td>109</td>
</tr>
<tr>
<td>Laboratory Medicine</td>
<td>110</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>112</td>
</tr>
<tr>
<td>Liaison Psychiatry &amp; Palliative Medicine</td>
<td>114</td>
</tr>
<tr>
<td>Pharmacokinetics and Pharmacodynamics</td>
<td>115</td>
</tr>
<tr>
<td>Medical Education Research and Development</td>
<td>118</td>
</tr>
<tr>
<td>Acute Critical Care and Disaster Medicine</td>
<td>120</td>
</tr>
<tr>
<td>Clinical Oncology</td>
<td>121</td>
</tr>
<tr>
<td>Dentistry for Persons with Disabilities</td>
<td>122</td>
</tr>
<tr>
<td>General Dentistry</td>
<td>124</td>
</tr>
<tr>
<td>Psychosomatic Dentistry</td>
<td>126</td>
</tr>
<tr>
<td>Behavioral Dentistry</td>
<td>127</td>
</tr>
<tr>
<td>Temporomandibular Joint and Oral Function</td>
<td>127</td>
</tr>
<tr>
<td>Cognitive and Behavioral Medicine</td>
<td>128</td>
</tr>
<tr>
<td>Neuroanatomy and Cellular Neurobiology</td>
<td>129</td>
</tr>
<tr>
<td>Systems Neurophysiology</td>
<td>131</td>
</tr>
<tr>
<td>Pharmacology and Neurobiology</td>
<td>132</td>
</tr>
<tr>
<td>Molecular Neuroscience</td>
<td>133</td>
</tr>
<tr>
<td>Neuropathology</td>
<td>134</td>
</tr>
<tr>
<td>Ophthalmology and Visual Science</td>
<td>139</td>
</tr>
<tr>
<td>Otorhinolaryngology</td>
<td>142</td>
</tr>
<tr>
<td>Neurology and Neurological Science</td>
<td>145</td>
</tr>
<tr>
<td>Psychiatry and Behavioral Sciences</td>
<td>148</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>150</td>
</tr>
<tr>
<td>Endovascular Surgery</td>
<td>151</td>
</tr>
<tr>
<td>NCNP Brain Physiology and Pathology</td>
<td>151</td>
</tr>
<tr>
<td>Bio-Environmental Response</td>
<td>154</td>
</tr>
<tr>
<td>Immune Regulation</td>
<td>156</td>
</tr>
<tr>
<td>Molecular Virology</td>
<td>158</td>
</tr>
<tr>
<td>Immunotherapeutics</td>
<td>160</td>
</tr>
<tr>
<td>Cellular and Environmental Biology</td>
<td>161</td>
</tr>
<tr>
<td>Biodefense Research</td>
<td>163</td>
</tr>
<tr>
<td>Pathological Cell Biology</td>
<td>165</td>
</tr>
<tr>
<td>Immunology</td>
<td>167</td>
</tr>
<tr>
<td>Pediatrics and Developmental Biology</td>
<td>178</td>
</tr>
<tr>
<td>Medicine and Rheumatology</td>
<td>182</td>
</tr>
<tr>
<td>Dermatology</td>
<td>184</td>
</tr>
<tr>
<td>Systemic Organ Regulation</td>
<td>186</td>
</tr>
<tr>
<td>Human Pathology</td>
<td>188</td>
</tr>
<tr>
<td>Physiology and Cell Biology</td>
<td>190</td>
</tr>
<tr>
<td>Molecular Cellular Cardiology</td>
<td>191</td>
</tr>
<tr>
<td>Molecular Medicine and Metabolism</td>
<td></td>
</tr>
<tr>
<td>Stem Cell Regulation</td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td>Page</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Genome Structure and Regulation → Refer to Biochemical Genetics (page250)</td>
<td></td>
</tr>
<tr>
<td>RIKEN Molecular and Chemical Somatology</td>
<td>290</td>
</tr>
</tbody>
</table>

**Endowed Departments**

<table>
<thead>
<tr>
<th>Department</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Pharmacovigilance</td>
<td>292</td>
</tr>
<tr>
<td>Department of Nanomedicine</td>
<td>294</td>
</tr>
<tr>
<td>Department for Hepatitis Control</td>
<td>295</td>
</tr>
<tr>
<td>Department of Joint Cartilage Regeneration → Refer to Joint Surgery and Sports Medicine (page62〜64)</td>
<td></td>
</tr>
<tr>
<td>Department of Advanced Therapeutics for GI Diseases</td>
<td>297</td>
</tr>
<tr>
<td>Department of Sleep Modulatory Medicine</td>
<td>299</td>
</tr>
<tr>
<td>Department of Joint Reconstruction → Refer to Joint Surgery and Sports Medicine (page62〜64)</td>
<td></td>
</tr>
<tr>
<td>Department of Women's Health</td>
<td>300</td>
</tr>
</tbody>
</table>

**University Hospitals**

<table>
<thead>
<tr>
<th>Department</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Laboratory</td>
<td>301</td>
</tr>
<tr>
<td>Radiological Center → Refer to Diagnostic Radiology and Oncology (page42〜44)</td>
<td></td>
</tr>
<tr>
<td>Hospital Blood Transfusion Center</td>
<td>303</td>
</tr>
<tr>
<td>Department of Blood Purification</td>
<td>304</td>
</tr>
<tr>
<td>Department of General Medicine/Center for Postgraduate Medical Education → Refer to Medical Education Research and Development (page115〜117)</td>
<td></td>
</tr>
<tr>
<td>Center for Cell Therapy</td>
<td>306</td>
</tr>
<tr>
<td>Hyperbaric Medical Center</td>
<td>309</td>
</tr>
<tr>
<td>Temporomandibular Joint Clinic → Refer to Temporomandibular Joint and Oral Function (page127)</td>
<td></td>
</tr>
<tr>
<td>Clean Room</td>
<td>311</td>
</tr>
</tbody>
</table>

**Center for Development of Devices and Drugs in Dentistry**

<table>
<thead>
<tr>
<th>Center for Development of Devices and Drugs in Dentistry</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>312</td>
</tr>
</tbody>
</table>

**Center of Sports Medicine and Sports Dentistry**

<table>
<thead>
<tr>
<th>Center of Sports Medicine and Sports Dentistry</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>313</td>
</tr>
</tbody>
</table>

**Oral Health Care Science**

<table>
<thead>
<tr>
<th>Oral Health Care Science</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime Oral Health Care Sciences</td>
<td>315</td>
</tr>
<tr>
<td>Oral Care for Systemic Health Support</td>
<td>316</td>
</tr>
<tr>
<td>Preventive Oral Health Care Science</td>
<td>317</td>
</tr>
<tr>
<td>Oral Health Care Science for Community and Welfare</td>
<td>318</td>
</tr>
<tr>
<td>Oral Health Care Education</td>
<td>319</td>
</tr>
<tr>
<td>Basic Sciences of Oral Health Care</td>
<td>320</td>
</tr>
</tbody>
</table>

**Oral Health Engineering**

<table>
<thead>
<tr>
<th>Oral Health Engineering</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fundamental Oral Health Engineering</strong></td>
<td></td>
</tr>
<tr>
<td>Basic Oral Health Science</td>
<td>322</td>
</tr>
<tr>
<td>Comprehensive Oral Health Engineering</td>
<td>323</td>
</tr>
<tr>
<td>Oral Clinical Science</td>
<td>324</td>
</tr>
<tr>
<td><strong>Oral Materials Science and Technology</strong></td>
<td></td>
</tr>
<tr>
<td>Oral Health Information Technology</td>
<td>325</td>
</tr>
<tr>
<td>Oral Biomaterials Engineering</td>
<td>326</td>
</tr>
<tr>
<td><strong>Oral Prosthetic Sciences</strong></td>
<td></td>
</tr>
<tr>
<td>Fixed Prosthetic Engineering</td>
<td>327</td>
</tr>
<tr>
<td>Oral Prosthetic Engineering</td>
<td>328</td>
</tr>
</tbody>
</table>
Oral Pathology

1. Staff and Students

**Professor**  Akira YAMAGUCHI

**Associate Professor (GCOE)**  Tadahiro Iimura

**Lecturer**  Ken-ichi Katsube

**Assistant Professor**  Kei Sakamoto

**Tokunin Assistant Professor**  Sadahiro Tamamura

**JSPS fellow**  Ji-Won Lee

**Technician**  Miwako Hamagaki

**Graduate Students**

**Ph.D. Course**  
- Samir Kumar Pal  
- Yuji Makino (Juntendou University)  
- Akiko Himeno (Periodontology)  
- Yuji Matsushita (Maxillofacial Surgery)  
- Zhao Xin  
- Yasuyuki Shimada (Oral and Maxillofacial Surgery)  
- Rumana Khanom  
- Zayar Lin (Implant)  
- Rei Touyama  
- Masita Mandasari  
- Ryuusuke Nakamura (Maxillofacial Surgery)  
- Kenji Ogura (Maxillofacial Orthognathics)

**Secretary**  Yumi Tanaka

2. Purpose of Education

Oral Pathology section lectures the Module “Pathology” to 3rd grade students. This Module is comprised of two categories; General Pathology and Oral Pathology. Main objective of General Pathology is to provide students various opportunities and knowledge about general aspects of various diseases. Oral Pathology provides details of pathogenesis, pathophysiology and histopathological characteristics in various oral diseases.

3. Research Subjects

1) Clinico-patological research on oral and maxillofacial regions
2) Molecular mechanism of bone formation and bone regeneration
3) Roles of Notch signaling in skeletal formation and regeneration
4) Molecular mechanism of bone destruction by oral cancers
5) Evolutional changes in skeletal formation

4. Clinical Services

Our Dental Hospital has over 2,000 biopsy cases a year. Oral Pathology Section is involved in histopathological diagnosis of these biopsy cases.

5. Publications

**Original Articles**


Review

# Bacterial Pathogenesis

1. **Staffs and Students (March 2013)**
   - Professor: Ichiro Nakagawa
   - Associate Professor: Fumito Maruyama
   - Assistant Professor (Tenure Track): Takashi Nozawa
   - Postdoctoral Student: Chihiro Aikawa
   - Graduate Student: Takayasu Watanabe
   - Bijaya Haobam
   - Amonrattana Roobthaisong
   - Tejaswini Vaman Kulkarni (from Oct 2012)
   - Shingo Hosomi
   - Akiko Endo (Section of Periodontics)
   - Noriko Maruyama (Section of Periodontics)
   - Akira Goda (Section of Craniofacial Surgery)
   - Ayako Kawabe (Section of Orthodontic Science)
   - Seiichiro Oda (Section of Maxillofacial Surgery)
   - Keiko Muramoto (Section of Maxillofacial Orthodontics)
   - Yoshihiko Shiba (Section of Periodontics)

2. **Purpose of Education**

   **Research education for postgraduate students**

   Our major research interests are to elucidate the bacterial evolution to escape from the host immune responses, and cellular defence mechanisms against bacterial infections. Especially, we focus (1) comparative genomics analysis of pathogenic bacterial evolution by acquisition of foreign genes, and the experimental demonstration of the unique hypothesis from bioinformatics information (2) analysis of molecular dynamics of recognition systems and inflammatory induction against bacterial pathogens. To achieve our mission, we are analyzing complete genomic sequences of various bacterial pathogens and comparative genomics, including genus streptococci (*Streptococcus pyogenes and S. mutans*), *Porphyromonas gingivalis*, etc..., and cellular and molecular biological analyses for host responses.

   These studies are collaborated not only with the other section of Tokyo Medical and Dental University, but also with Tokyo University, Tohoku University, Osaka University, and Nihon University.

   **Education for Undergraduate students**

   We took part in an education module “Infection and Host Defenses” for 3rd year students in School of Dentistry, and 1st and 2nd year students in School of Oral Health Care Sciences, and teaching pathogenic bacteriology and virology. In the dental field, infectious diseases such as dental caries and periodontitis are still major concerns. In addition, the prevention of iatrogenic infections such as HIV, Hepatitis B and C viruses are also important for dentistry. Therefore, our mission is not simply to give knowledge of microbiology but give talent to apply knowledge to lead appropriate diagnosis and treatment at the clinics. On this point of view, our lectures covered not only oral microbiology but also systemic microbiology and clinical microbiology to understand the variety of infectious diseases.

3. **Research Subjects**

   1. Bacterial whole genome analysis.
   2. Analysis of bacterial survival strategy based on bacterial whole genome gene expression.
   3. Comparative genomics for bacterial gene acquisition and evolution systems.
   4. Molecular analysis of recognition system and inflammation responses against bacterial infection.

4. **Publications**

   **Original articles**

   2. Jorquera M*, Saavedra N, Maruyama F, Richardson A, Crowley D, Catrilaf R, Henriquez E, Mora M. "Phytate addition to soil induces changes in the abundance and expression of Bacillus β–propeller phytase genes in the
Molecular Immunology

1. Staffs and Students (April, 2012)

Professor
Miyuki AZUMA

Associate Professor
Yoshiko IWAI

Assistant Professor
Tatsukuni OHNO

Adjunct instructor
Hiroshi KIYONO
Masaaki HASHIGUCHI

Yosuke KAMIMURA

Graduate Students (Doctor)
Chenyang ZHANG
Arundhati C BHINGARE

Siwen KANG (Oct. ~)
Syougo MAEKAWA

Graduate Student (Master)
Yuichi KODAMA

Research Student
Doan Thi TOA (Oct. ~)

Secretary
Hatsue TADANO

2. Purpose of Education

Main objective of Molecular Immunology in the graduate course is to understand and study how the immune system works for biological defense. Students also learn immunopathology and immunophysiology of systemic and organ-specific immune diseases and how the immune diseases control and regulate.

3. Research Subjects

1) Mechanisms of immune responses in oral diseases
2) Studies on lymphocyte functional molecules
3) Immunotherapy by molecular targeting

4. Publications

Original Article


Advanced Biomaterials

1. Staffs and Students

Professor  Motohiro Uo
Associate Professor  Toshio Hongo
Assistant Professor  Hideo Nakamura, Takahiro Wada
Graduate Student  Maho Shiozawa, Yuya Asakawa, Koottathape Natthavoot
Special Non-matriculated Graduate Student  Tomoko Sugiyama

2. Purpose of Education

1. Lecture of unit “Biomaterials and Dental Materials”
A series of lectures on the “science on biomaterials”, “properties of dental and biomedical materials”, “application of dental materials” will be taught through the lecture and practice.

2. Lecture of unit “Advanced Biomaterials” (graduate school)
Evaluation methods of various dental and biomedical materials will be taught.

3. Research subjects:

   Research is aimed to develop and evaluate the new glass and ceramics based materials as the dental and biomedical materials, e.g. composite resins, glass ionomer cements, dental porcelains and zirconia ceramics.

2. Analysis of Dental and biomedical materials and biological tissue using the synchrotron radiation.
   Research is aimed to apply the new analysis method using synchrotron radiation for the estimation of various properties of the dental and biomedical materials.

4. Publications

Original Articles


Diagnostic Oral Pathology

1. Staffs and Students (Apr. 2012)

Associate Professor Toshiyuki IZUMO
Visiting Lecturer Norihiko OKADA, Kou KAYAMORI
Hospital Stuff Cheko MICHIKAWA, Yuuichi YAMADA, Kiyoko NAGUMO,
Kana NANBA (IDA), Akino INOUE, Kana ENDOU,
Akiko ASANO, Mayuko MINAMI, Yukiko KUROKI
Research Students Yuka HIROTA

2. Purpose of Education

Diagnostic oral pathology is a branch of pathology which studies human pathology, and aims at practice and development of the oral science as clinical medicine. The main object is to bring up graduate students and post-doctoral residents for pathology specialist to the great oral pathologists through the lecture of surgical pathology and pathology diagnosis and research instruction of oral and general diseases for the time being.

3. Research Subjects

1) Surgical pathology of oral cancer.
2) New diagnostic approach and reconstruction of oral diseases.

4. Clinical Services

Diagnostic oral pathology has played two roles, pathology diagnosis and clinical laboratory for clinical examinations which deal with hematological, biochemical, bacteriological and histopathological samples in the dental hospital.

5. Publications

Original Article


Review Articles

Organic Biomaterials

1. Staffs and Students (April, 2012)

Professor Nobuhiko YUI
Associate Professor Yoshihiro SASAKI
Assistant Professor Ji-Hun SEO
Research Assistant Professor Atsushi TAMURA
Secretary Nanae NISHI
Graduate Student Yuji TSUCHIDO, Nanako Yokoyama, Hajime TANAKA

2. Purpose of Education

Courses: Biomaterials, Advanced Medical Materials, Advanced Organic Materials

3. Research Subjects

1) Design of Dynamic Biomaterials Surfaces
2) Modulation of Cellular Functions by Dynamic Ligand-Polymers
3) Design of Intracellularly Functionalizing Biomaterials
4) Design of Liposomal Device and Hybrid Nanomaterials

4. Clinical Services

5. Publications

Original Article

Functional Materials (Material-based Medical Engineering)

1. Staffs and Students
Associate Professor  Yoshinori KADOMA
Graduate Student   Jun NEGISHI, Kwang-il KIM,
                     Naoko NAKAMURA, PingLi WU,
                     Mitsuki UEKI, Rie MATSUSHIMA,
                     Satoshi Honda, Ayumi TANZAWA
Research Student   Takuya IWATA

2. Purpose of Education
In order to develop technology which may contribute to the advance in the medical science, lectures on functional molecules from basic to advanced knowledge on molecular design for specific purpose, mainly concentrated on medical application would be executed. Theories on functional molecules and overviews on medical system would be lectured in Graduate School of Medical and Dental Sciences. Students would have chances to learn about Genomics and Bio-intelligent system in Graduate School of Biomedical Science.

3. Research Subjects
1) Decellularization of native tissue for regenerative medicine
   In order to obtain a novel scaffold which can be applied for regenerative tissue, ultra-high pressurization method was developed for the complete elimination of the cells and inactivation of the viruses.

2) Inducing molecular aggregation using ultra-high pressurization
   The basic and applied science on molecular aggregation triggered by hydrogen bonding at over 6,000 atm is studied. This technique is being applied for hybridization of DNA with polymer for drug delivery system.

3) Bio-interface
   To investigate how the materials interact with biological cues such as phospholipids, proteins, or cells, precisely controlled surface via atomic transfer radical polymerization was prepared. The basic research on physical and biological properties of this surface is being investigated.

4) Control of cell functions by physical stimuli.
   Using physical stimuli such as nano-vibration or pressure, the technology for the control of cell functions such as the proliferation and differentiation is being developed.

5) Development of high functional adhesive
   For the development of stable adhesive for precious metal and resin, high functional monomer possessing adhesivity to the precious metal is being developed.

4. Clinical Services
   The development of functional molecules can provide novel materials for the clinical application such as blood vessel, cornea, skin, or bone. Unlike the conventional materials which have been used in clinics so far, it would be possible to promote or suppress specific biological response using functionalized materials. Furthermore, the screening essential drug compound for certain purpose, it would help the patients to be treated with higher efficiency and less pain.

5. Publications
Original Article


4. Yukio Murakami, Akifumi Kawata, Yuuya Seki, Teho Koh, Kenji Yuhara, Takehisa Maruyama, Mamoru Machino,
Oral Health Sciences


Oral Radiation Oncology

1. Staffs and Students

Professor: Masahiko MIURA
Tokunin Assistant Professor: Yu DUNG, Yoko MORI
Graduate Students (Doctor): Atsushi KAIDA, Asumi HONDA, Chisato YAMADA, Eri TUCHIDA
Graduate Students (Master): Shifumi DEGUCHI, Itumi OOMORI
Research Associate: Rieko MATSUDA
International Resercher: Lian Xue

2. Purpose of Education

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 mechanism of tumor radioresistance, the state of the art technology of radiotherapy, and basis of individualized radiotherapy depending on each student’s research projects.

3. Research Subjects

1) Visualization of radioreponse by molecular imaging
2) Tumor radiosensitization and antiangiogenic mechanism by sulfoglycolipids
3) Signal transduction of insulin-like growth factor I (IGF-I) receptor
4) Radiotherapy for oral cancer

4. Clinical Services

Oral Radiation Oncology clinic provides radiotherapeutic treatment for head and neck cancer patients, especially brachytherapy for oral cancer, in cooperation with Diagnostic and Therapeutic Radiology clinic in the Medical Hospital.

5. Publications

Original article

6. Patent

1. Patent No.5046150 (USA), Registration date: July 27 2012
2. Patent No.154847(SINGAPORE), Registration date: July 13 2012
3. Patent No.1136601(KOREA), Registration date: April 6 2012
Oral and Maxillofacial Surgery

1. Staffs and Students (April, 2012)

Professor: Ken OMURA
Associate Professor: Hiroyuki HARADA
Junior Associate Professor: Yusuke NAKAJIMA, Jinkyo SAKURAI
Assistant Professor: Yuji KABASAWA, Hiroaki SHIMAMOTO, Eriko MARUKAWA, Fumihiko TSUSHIMA, Kae TANAKA, Hirofumi TOMIOKA
Project Junior Associate Professor: Keiichi MORITA
Graduate Student: Toshimitsu OSAKO, Yasuyuki SHIMADA, Ichiro HATAKEYAMA, Sho MATSUWA, Takahide TAGUCHI, Shinsuke YAMAMOTO, Yukiko TAKAHASHI, Junpei SHIRAKAWA, Atsushi KIMURA, Pradit RUSHATAMUKAYANUNT, Namiaki TAKAHARA, Aya NAKANO, Seiichiro ODA, Dilruba AKTER

2. Purpose of Education

The program is designed for acquiring the broad knowledge and basic skills of oral and maxillofacial surgery, mainly concerning the diagnostic procedure, treatment technique and the perioperative patient care. Also throughout the professional education, we promote the system in which each graduate student can select his or her special field in the full scope of oral and maxillofacial surgery in the future.

3. Research Subjects

1) Development of multidisciplinary treatment of oral cancer.
2) Clinical study on sentinel node navigation surgery for oral cancer.
3) Study on molecular markers for lymph node metastasis of oral cancer.
4) Clinical study on early detection of oral cancer by mouth washing.
5) Clinical study on skeletal and dental changes after distraction osteogenesis in patients with cleft lip and palate.
6) Clinical study on maxillomandibular skeletal and dental changes after orthognatic surgery.
7) Study on neurosensory disturbances using the heat flux technique.
8) Clinical study on pre-surgical nasoalveolar molding in patients with cleft lip and palate.
9) Clinical study on alveolar bone grafting with platelet rich plasma.
10) Multidisciplinary treatment of temporomandibular disorders.
11) Clinical and experimental studies on bone regeneration using β-TCP and/or platelet rich plasma.

4. Clinical Services

The Oral and Maxillofacial Surgery Clinic examines yearly more than 6,000 new patients with various diseases arising in oral and maxillofacial regions. The clinic has diplomat of the Japanese Society of Oral and Maxillofacial Surgeons and accepts many referrals from dentists and medical doctors. We provide a full range of services including extractions, removal of wisdom teeth and management of facial trauma, jawbone defect, facial deformity, temporomandibular joint disease, cleft lip and palate, oral mucosal disease, and benign and malignant tumors. The special outpatient clinics are organized by the specialists to offer the best service, especially for patients with malignant tumor, temporomandibular joint disease, cleft lip and palate, facial deformity and oral mucosal disease which need high degree of specialty and long term follow up. We also prepare some groups for inpatients with an emphasis on specialties, to provide the recent and advanced treatment.

5. Publications

Original Article

Oral and Maxillofacial Radiology

1. Staffs and Students (April, 2012)

Professor
Tohru KURABAYASHI

Associate Professor
Hiroshi WATANABE

Junior Associate Professor
Naoto OHBAYASHI, Norio YOSHINO

Assistant Professor
Akemi TETSUMURA, Shin NAKAMURA, Kiyoshi OKOCHI, Ami KURIBAYASHI

Hospital Staff
Natsuko TAKATSUKA, Tadanobu ARAGAKI, Yoshikazu NOMURA, Atsushi KAIDA

Graduate Student
Yosuke KAMIYAMA, Kretapirom KORNKAMOL, Kamrun NAHAR, Madoka SUZUKI, Akira TAKAHASHI, Yoshihiro OZAKI

Secretary
Izumi MOTOHASHI

2. Purpose of Education

Oral and maxillofacial radiology is a branch of dental science which deals with the effective application of radiation energy to the diagnosis and treatment of oral and maxillofacial diseases. Main objective of oral and maxillofacial radiology in the graduate course is to provide students opportunity to study advanced imaging modalities including digital imaging, cone-beam CT, multi-detector row CT and MRI, and also to study image processing and image analysis technology. Students are also taught on basic radiation oncology and its related laboratory technology depending on their research project.

3. Research Subjects

1) Diagnosis of maxillofacial diseases by CT, MRI and PET imaging
2) Advantages of cone-beam CT for clinical dentistry
3) Development of high resolution MRI technology.
4) Novel MRI techniques for TMJ disorders.
5) Factors determining radioresistance of oral and maxillofacial cancers.

4. Clinical Services

Oral and maxillofacial radiology clinic provides a full spectrum of imaging examinations and diagnosis, including CT and MRI. Non-invasive, interventional radiology for patients with salivary gland stone is also performed in the clinic.

5. Publications

Original Article


Anesthesiology and Clinical Physiology

1. Staffs and Students (April, 2012)

Professor               Haruhisa Fukayama
Associate Professor     Hikaru Kohase
Junior Associate Professor  Shigeharu Jinno
Assistant Professors     Fumihiro Yoshikawa, Tomoka Matsumura
                       Kazumasa Kubota, Yuka Oono,
                       Youhei Fukumori, Yukiko Baba,
                       Haruka Haida, Reina Ichikawa,
                       Yoko Takusagawa.
Hospital Staffs          Kazumasa Kubota, Yuka Oono,
                       Youhei Fukumori, Yukiko Baba,
                       Haruka Haida, Reina Ichikawa,
                       Yoko Takusagawa.
Graduate Students        Atsushi Nakajima, Kanako Saji,
                       Tomoko Ebisawa–Matsushita,
                       Takuya Funayama, Katsuhiro Matsumoto,
                       Yoko Sasaki.
Research Students        Manami Yajima, Hironari Ando.
Secretary                Natsu Sato

2. Purpose of Education
The goal of the section is to give to the undergraduate students; the knowledge and techniques of general anesthesia, local anesthesia, systemic management of medically compromised patients, and pain management of clinic in the oral and maxillofacial regions. Within a fiscal year the lectures include 1) general and local anesthesia, 2) psychosedation, 3) cardiopulmonary resuscitation. General anesthesia is composed of physiology of respiration and circulation, pharmacodynamics of inhalation anesthetics, intravenous anesthetics, and muscle relaxants. Psychosedation includes theory and technique for dentally phobic patients and medically compromised patients. Since local anesthesia is often used in routine dental procedures, pharmacology of local anesthetics, techniques and complications are given to the undergraduate students. Cardiopulmonary resuscitation has principles of CPR, updated guidelines of CPR, in addition to simulated training. Out training systems also include infiltration anesthesia, conduction anesthesia, and nitrous oxide inhalation sedation.

3. Research Subjects
1) Noninvasive drug delivery system
2) Development of local anesthesia techniques for dentistry
3) Neuropathic pain in oral and maxillofacial regions
4) Diffuse noxious inhibitory control
5) Clinical applications of psychosedation and systemic management

4. Clinical Services
1) Systemic management of medically compromised patients using psychosedation
2) Ambulatory anesthesia service for disabled patients
3) Emergencies in the hospital
4) Low invasive local anesthesia

5. Publications
Original Article


Congress


Books


Editorial Comment

Orofacial Pain Management

1. Staffs and Students (April, 2012)
   Professor Masahiko SHIMADA
   Assistant Professor Yoko YAMAZAKI
   Hospital Staff Tomoko NIIMI, Yuko ANDOH,
   Daisuke TOMIZAWA
   Graduate Student Akitoshi HOSODA, Hiroko IMURA

2. Purpose and Education
   Orofacial Pain Management is a branch of dental science which deals with dental anesthesiology. Main objective of orofacial pain management in the graduate course is to provide students opportunity to study the pain, abnormal sensation, sensory paralysis, abnormal movement and motor paralysis in the orofacial area and the treatment for the patients of orofacial pain.

3. Research Subjects
   1) New Treatment methods for neuropathic pain
   2) Analyses of abnormal orofacial pain
   3) Study on Biological Response to Dental Interventions
   4) Analyses and new treatment of dysgeusia

4. Clinical Services
   Orofacial Pain Clinic is concerned with the pain, abnormal sensation, sensory paralysis, abnormal movement and motor paralysis. Management of orofacial pain clinic is pharmacotherapy, nerve block, stimulation of the peripheral nerves including acupuncture and psychotherapies.

5. Publication
   Original Article & Clinical report
Pediatric Dentistry

1. Staffs and Students (April, 2012)

Junior Associate Professor  Yoshiaki ONO, Zenzo MIWA
Assistant Professor  Yoshiaki HASHIMOTO, Michiyo MIYASHIN,
Haruko FUJITA, Mizuho MOTEGI
Hospital Staff  Satoko KAKINO, Yuki IMAMURA,
Makiko TAKASHI, Yukie NAKAJIMA (April~),
Atsushi OISHI (April~), Sachi GOTOH
Secretary  Mai INOUE
Graduate Student  Yukie NAKAJIMA (~March), Atsushi OISHI (~March),
Sun MEINA (~March), Isidro Sharon YAMBAO (~March),
Seiko OHBA, Ayako NAKANE,
Kaori SHOI, Taki SEKIYA,
Sachiko ITOH, Daiki HORIKAWA,
Tomoki UEHARA (April~)

2. Purpose of Education

Pediatric dentistry is a subject of clinical dentistry that deal with education and research of not only developmental oral health sciences but also prevention and treatment methods of the diseases which disturb oro-facial growth and development of children. The main objective of pediatric dentistry in this graduate course is to provide students an opportunity to study the theory and the method for the guidance of the oro-facial growth and development and for the diagnosis, prevention and treatment of diseases and malfunctions which disturb the oro-facial growth and development during the period of childhood.

Oral pediatrics is a subject of clinical dentistry that deal with education and research of not only maintenance and promotion of the oral health for growing children but also prevention and treatment methods of diseases and malfunctions which disturb oral health of growing children. The main objective of oral pediatrics in this graduate course is to provide students an opportunity to understand that a child is a living body with mental, physical, and physiological characteristics which are different from those of adults and to study the pathogenesis, prevention, and treatment of the particular oral diseases in childhood. Students are also taught the theory and the method of ongoing health care that is necessary for maintaining and promoting oral health from infant to adult. In addition, they are taught the clinical significance and importance of the behavioral management of child patients and the necessity and importance of understanding and cooperation of the parents to it.

3. Research Subjects

1) Physiological and biological studies on the stomatognathic function of children
2) Studies on the development and developmental disturbance of the teeth
3) Studies on the growth and development of the maxillofacial cranium and the dentition
4) Development of the new materials for endodontic treatment of deciduous and immature permanent teeth
5) Basic research on clinical pediatric dentistry

4. Clinical Services

The pediatric dentistry clinic in the department of oro-facial development and function provides the comprehensive dental treatment for a child while growing. The examination, diagnosis, and treatment of the oral diseases and the oral abnormalities are performed in the clinic. In addition, health guidance, preventive measures, and the long-term oral health management by the periodical checking system are carried out, in order to keep and promote oral health from infant to adult.

5. Publication

Original Article

2. Nakajima Y, Shimada Y, Miyashin M, Takagi Y, Tagami J, Sumi Y. Noninvasive cross-sectional imaging of


Orthodontic Science

1. Staffs and Students

Professor          Takashi ONO
Associate Professor
Junior Associate Professor
Assistant Professor
Graduate Students

2. Purpose of Education

Orthodontics is one of the dental sciences which propose to control the 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.

Subjects of Education:

**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.

**Pathophysiology for Malocclusion**
To understand the alteration of occlusal function and morphology with aging, and to explain the pathological condition of malocclusion from the viewpoint of physiology, biomechanics, biology and sociology.

**Biology for Functional Adaptation**

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.

### 3. Research Subjects

1. Biomechanical study of occlusion
2. Studies on biological response and functional adaptation followed by orthodontic and occlusal stimulation
3. Clinical application of autotransplantation in orthodontic treatment
4. Studies on interrelation between malocclusion and temporomandibular joint
5. Studies on occlusion and age-related changes in cranio-maxillofacial morphology and function
6. Studies on interrelation between cranio-maxillofacial complex and whole body
7. Development of mechanics and materials for orthodontic treatment

### 4. Clinical Service

In the field of practical orthodontic, with the development of materials and treatment techniques, we have taken initiatives in two big turning points at all time. Namely, one is the Direct Bonding System which has made it possible to attach brackets directly to the teeth surface without orthodontic metal bands. Another is the development of Super-Elastic Ti-Ni Alloy Wire, and following Improved Super-Elastic Ti-Ni Alloy Wire. With these new wires, we have provided an epoch-making orthodontic technique, where teeth could be moved more efficiently and safely with light continuous forces, and in consequences, the limits for teeth movement are expanded and the treatment outcomes are also improved. On the other hand, in order to determine the scientific basis for the needs of orthodontic treatment, we are engaging in the study of pathophysiology of malocclusion, and these research results are getting feedback to the orthodontic practices as soon as possible to stimulate the development of new treatment protocols.

Students in the graduate course not only pursue their scientific researches but also being educated in accordance with our curriculum for the post-graduated clinical program. In this program, we aim to bring up the leading persons of next generation who have highly specialized knowledge and skills of orthodontics as well as prominent minds of clinical researches.

With the cooperation of related field, we also provide comprehensive treatments for those patients with cleft lips and palates and other congenital anomalies, jaw deformities, maxillofacial functional disorders, periodontal diseases, impacted teeth, autotransplantation combined cases, and usages of implant anchorages.

### 5. Publications

**Original Articles**

Cariology and Operative Dentistry

1. Staffs and Students (April, 2012)

Professor
Junji Tagami

Associate Professor
Masayuki Otsuki, Yoshiyuki Sasaki

Junior Associate Professor
Toru Nikiado, Masatoshi Nakajima

Assistant Professor
Takako Yoshikawa, Yashi Shimada,
Yuichi Kitasako, Ryuzo Kishikawa,
Go Inoue, Eitetsu Cho,
Keiichi Hosaka, Tomohiro Takagaki,
Naoko Harada

Specially Appointed Junior Associate Professor (GCOE) Shoji Nakashima
Specially Appointed Junior Associate Professor Alireza Sadr
Specially Appointed Assistant Professor Noriko Hiraishi
Specially Appointed Assistant Professor NHM Khairul Matin

Hospital Staff
Masahiro Takahashi, Rena Takahashi,
OtoAramaki, Hidenori Hanba,
Tomoko Maeda

Secretary
Shiori Ogi, Miura Noriyoomura

Graduate Student
Tomoyuki Takai, Hamid Nurrohman,
Amir Nazari, Ilnaz Hariri,
TaweesakPrasansuttiporn, Kanako Imai,
Yumi Imamura, Sachiko Utaka,
Iori Gando, Masaru Kirihara,
Emi Kuribayashi, Wakae Sakano,
Hitomi Mita, Turki Abdulsam Bakhsh,
Gerardo Jose Joves Mendez, Suppason Thittaweerat,
Turki Abdul Sam Bakhsh, Azusa Tanaka,
Kiminori Kinose, Mona Mohammad Mandura,
Md. Sofiqui Islam, Haisachi Nakagawa,
Haidil Akmla Mahdan, Ena Lodha,
Upama Guha, Shigeyuki Nagai,
Naoko Matsu, Ikumi Wada,
Yumiko Uesugi, Nariaki Yoshimine,
Emi Oshima, Ornchna Thanavarakorn,
Alaa Turkistani, Teerapong Mamanee,

Research Student
Shinji Ogura, Maria Jacinta Rosario Hernandez Romero

Intern
Masahiro Ono, Kanako Shida

2. Purpose of Education

Cariology and Operative Dentistry section offers a four-year graduate program. First-year graduate students attend lectures and seminars given in the graduate school and are expected to gain an understanding of the fundamentals about
methodology and the knowledge necessary for their research. The contents of the classes given in our section include topics related to cariology and operative dentistry: caries diagnosis, biocompatibility, caries treatment and restoration, prevention and control, dental materials, new instruments and equipment. In keeping with the internationally orientated philosophy of this section, lectures are conducted in English and are open to all foreign students. First-year graduate students also undergo clinical training the procedures of modern adhesive restorations. Laboratory work, which commences in the first year, is performed under the supervision of our faculty staff. During the four-year program, several papers are required to be presented in domestic and/or international conferences and submitted to journals. The minimum requirements are completing the prescribed courses, a supervised research project and a dissertation for the degree published in a top international journal.

3. Research Subject

Mechanism of dentin bonding
Adhesive of resin restoration systems to tooth substance and other restorative materials
Structure, diagnosis and treatment of dentin caries
Physico-chemical and manipulative properties of restorative materials
Durability of restorative materials
Compensation of resin composite polymerization contraction stress
Pulpal response to restorative materials
Improvement of various restorative techniques for direct and indirect restorations
Improvement of various esthetic treatment techniques
Caries risk assessment and prevention of recurrent caries
Development and introduction for clinical works of OCT (Optical coherence tomography)

4. Clinical Service

Operative Dentistry clinic provide restoration of teeth with fillings for dental cavities, trauma and tooth wear, and root canal treatments.

5. Publications

Original Articles

6. Review Articles

Books
Fixed Prosthodontics

1. Staffs and Students (April, 2012)

Professor
Hiroyuki MIURA

Associate Professor
Keiichi YOSHIDA

Junior Associate Professor
Daizo OKADA, Wataru KOMADA (from May)

Assistant Professor
Wataru KOMADA (to April), Chiharu SHIN, Kumiko KAWASHIMA, Yuji FUKUI (to March), Shiho OTAKE, Kenichi GOSHIMA, Koichiro YUSA (from April), Naosuke KUMAGAE (from April)

Graduate Student
Reiko OGURA, Naosuke KUMAGAE (to March), Ning XU, Satoshi OMORI, Reina NEMOTO, Sachi MAKINO, Yoji UEDA, Izumi KATAOKA, Tasuku INAGAKI, Rie FUJITA, Hiroyuki OKAMOTO, Miho SATO, Fujino OSHIMA, Kyoshi MATSUKAWA

2. Purpose of Education
The major subjects of the studies are occlusion of Cr-Br prostheses (fixed restoration such as crown and fixed partial denture), analysis of mandibular movement, influence of crown and periodontal tissue and its systemic affect, accuracy of manufacturing processes of crown (i.e. casting, soldering, luting and adjustment of occlusion), functional analysis of stomatognathic system and development of apatite ceramic implant. The research themes are investigated with measurement systems of mandibular movement, measuring instruments of tooth micro-displacement, electromyography, measurement apparatus of dimensional accuracy, EPMA (electron probe microanalyzer) for analyzing very small amount of dental alloy and histopathological methods. Clinical training and general lecture on prosthodontics are prepared for the graduate students in the first year. After the second year they will have special training for their research methods and experiments will be performed according to the research plan. In the last year the students will write the paper for thesis under the direction of the professor.

3. Research Subjects
1) Occlusion and Mastication (mandibular position, mandibular movement, articulator, masticatory efficiency)
2) Influence of mechanical stress caused by occlusal contact on stomatognathic system. (Tooth displacement, distortion of alveolar bone, occlusal contact, proximal contact etc.)
3) Relationship of main occluding area and occlusal contact
4) Research on post and core materials, stress analysis etc.
5) Clinical application of latest technology and development of new materials (CAD/CAM, Zirconia, optical impression etc.)
6) Influence of occlusal contact for an important prosthesis on the periodontal tissues of the antagonist.
7) Application of laser welding in crown and bridge restorations.
8) Influence of dental materials for periodontal tissues and biological body.
9) Functional analysis of abnormal stomatognathic function.

4. Clinical Services
1) Clinic for prosthodontics (Prosthodontics practice clinic)
This clinic is organized by clinical teams, and 4 to 8 dentists compose 1 team working in cooperation between teams. Here offers a complete range of restorative, rehabilitative, and esthetic dentistry, treatment types include since simple one teeth to complete oral rehabilitation using the latest technologies.

2) Clinic for dental allergy (Dental allergy clinic)
This clinic provides allergy tests test for dental alloys and dental materials on potential patients before dental treatment, besides, patients with skin and/or oral desease histories induced by previous dental restorations. The causal
allergen/s is/are identified by patch tests or if some metal restoration is allergy set on, is analyze by Electron Probe Micro Analyzer (EPMA), removing out only restoration such content allergens.

5. Publications

Original Article


Pulp Biology and Endodontics

1. Staffs and Students (April 2012)

Professor
Hideaki SUDA

Associate Professor
Chihiro KOBAYASHI, Mitsuhiko SUNAKAWA

Junior Associate Professor
Atsushi TAKEDA, Hidetaka IKEDA

Assistant Professor
Arata EBIHARA, Nobuyuki KAWASHIMA,
Hiroyuki MATSUMOTO, Reiko WADACHI,
Noriyuki SUZUKI, Hitomi HANADA

Clinical staff
Satoshi WATANABE, Jun KAWAMURA,
Yu KOIZUMI, Chizuko KOKUZAWA,
Toshihiko YOSHIOKA, Tetsu SATO

Graduate Student
Kouyou TAKIMOTO, Mengyu ZHOU,
Ying LI, Kei KOMATSU,
Kana MIYARA, Mioko YAMAMOTO,
Ahmed Osama JAMLEH, Jindan PIAO,
Kazuto HURUHATA, Saliman AIERKIN,
Jie GU

2. Purpose of Education
The aim of the course is to train and educate graduate dental students so that they can act as leading clinical scientists, researchers or practitioners of endodontics in the world. Since recent progress of pulp biology and endodontics is remarkable, the students are educated to acquire the newest knowledge on modern endodontology and its related subjects, such as pulp biology, neuroscience, bacteriology, immunology and material sciences, and are trained to master the newest technology of endodontics. All the students are asked to add new findings to the field of endodontics based on their own original research. The graduates from this course are expected to disseminate new principles and techniques on endodontics among general dental practitioners and endodontic specialists.

3. Research Subjects
1) Defense systems in the dental pulp/periapical tissue
2) Regulation of periapical bone destruction in apical periodontitis
3) Dental pulp stem cells/ Differentiation of pulp cells/ Horizon of pulpal regeneration
4) Root canal irrigation
5) Improvement of new apex locators
6) Strain produced in the root canal wall dentin
7) Application of medicaments to endodontics
8) Evaluation of endodontic technique using computational fluid dynamics(CFD)
9) Histochemical study using cultured mandible tissue model
10) Application of laser to endodontics
11) Application of optical coherence tomography
12) Analysis of nickel-titanium endodontic instruments
13) Electrophysiological approach to cell-to-cell couplings between odontoblasts
14) Diffusion through enamel and dentin
15) Evidence for an innocuous sensation in the dental pulp
16) Lymphangiogenesis in the dental pulp
17) Neuro-scientific research for dental pain
18) Molecular biological approach to the alveolar bone resorption associated with pulpal diseases
19) Three dimensional analysis of periapical bone loss using CBCT
20) Effect of motion artifacts on dental CT images
21) Global Center of Excellence (GCOE) Program
   “International Research Center for Molecular Science in Tooth and Bone Diseases”

4. Clinical Services
Oral Health Sciences

Pulp Biology and Endodontics is in charge of the Endodontic Clinic in our Dental Hospital, and offers the global standard of endodontics to our patients. The representative treatments provided in our clinic are as follows:

- Diagnosis and treatment of pulpal and periapical diseases
- Protective procedures for the dental pulp
- Nonsurgical endodontic treatment
- Surgical endodontic treatment
- Bleaching discolored teeth
- Restoration of endodontically treated teeth

The latest development of endodontics is remarkable as seen in root canal instrumentation by super-elastic NiTi rotary files, root canal length measurement with newly developed electronic apex locators, diagnosis by cone beam computed tomography, and microendodontics by using a surgical microscope. Especially, microendodontics has dramatically changed conventional “blind” endodontics into more predictable endodontics by efficient and reliable procedures under a lightened and magnified view. Also, we seek to provide evidence-based endodontic treatment based on our clinical research.

5. Publications

Original articles


Review articles

Removable Partial Denture Prosthodontics

1. Staffs and Students (April, 2012)

Professor
Yoshimasa IGARASHI

Associate Professor
Noriyuki WAKABAYASHI

Junior Associate Professor
Masayuki HIDESHIMA, Kenji FUEKI

Assistant Professor
Masayuki SATO, Takeshi UENO,
Ichirou MINAMI, Teruyasu NAKAMURA,
Jyuurou WADACHI, Syusuke INUKAI,
Eiko YOSHIDA

Hospital Staff
Yuka ABE, Kouta OKANO,
Junichirou WADA, Aiichirou AO,
Yuuki IWAKI, Kengo FUJIKI

Secretary
Yoko FUKI

Graduate Student
Kazuhiro SHOUI, Atsushi TAKAICHI,
Natsuko MURAKAMI, Takashi SEKINISHI,
Yuusuke TOYOSIMA, Ryo HAYASHI,
Tooru SAITO, Natsuki SUZUKI,
Ryousuke HARAKAWA, James LEE,
Yuuki ARAI, Hiroyuki ISHIYAMA,
Yuka KAJIMA, Hayato KUMAGAI,
Chiaki TSUTSUMI, Yasuha NOGAWA,
Kazuyuki HANNDAY, Teisuke AKIMOTO

2. Purpose of Education

Removable partial denture prosthodontics is a branch of Oral Health Science that deals with replacement of missing teeth and oral tissues to restore and maintain oral form, function, appearance, and health. Main objective of removable partial denture prosthodontics is to provide students in the graduate course opportunity to master standard method of diagnosis, technical skill, applied skill in lectures and practical works. Students are also taught on how to adapt removable prosthesis in the mouth with missing teeth from a biological and science and engineering standpoints.

3. Research Subjects

1) Evaluation of and factors for jaw movement smoothness.
2) Effects of delayed-onset muscle soreness (DOMS) on masticatory function.
3) Genetic, psychological, and behavioral factors for sleep bruxism.
4) Reproducibility of pocket depth measurement by experimental periodontal probe incorporating optical fiber sensor.
5) Dimensional accuracy of optical bite registration in single and multiple unit restorations.
6) The influence of mechanical stimulation on osteoclast localization in the mouse maxilla.
7) The influence of elastic modulus mismatch between tooth and post and core restorations on root fracture.
8) Bone integration capability of surface-treated titanium implants.
9) Effects of chromium and nitrogen content on the microstructures and mechanical properties of Co-Cr-Mo alloys.

4. Clinical Services

Patients with missing teeth have increased in step with the aging of the population, so improving their quality life has been required. Dental prosthesis clinic provides removable partial dentures to patients with missing teeth by the best treatment technique. The dentures are individually designed from mobility of dentures, oral sense, pronunciation and aesthetic points of view.

5. Publications

Original Article

2. Iwaki Y, Wakabayashi N, Igarashi Y. Dimensional accuracy of optical bite registration in single and multiple unit...


Oral Implantology and Regenerative Dental Medicine

1. Staffs and Students (April 2012)

Professor Shohei KASUGAI
Associate Professor Makoto SHIOTA
Associate Professor (Lecturer) Noriko TACHIKA
Assistant Professor Shinji KURODA, Motohiro MUNAKATA
Clinical Professor (Faculty of Dental) Toshiro SUGAI
Clinical Visiting Associate Professor Kouji HAGINO
Clinical Visiting Instructor Tunezi OKADA
Visiting Lecturer (Graduate School) Hideaki KATSUYAMA, Yuzou TAKAHASHI, Takashi OTSUKA.
Visiting Lecturer (Faculty of Dental) Sawako YOKOYAMA, Nariyuki MAEZAWA, Hidemichi KIHARA, Maho OZEKI, Daisuke SATO, Tatsuya FUJIMORI, Hisatomo KONDO, Toru KANAI, Katsuhiro MARUO, Yuki DATE
Dentists in Dental Implant Clinic Hidemi NAKATA, Takahiro NAKAMURA, Maho AKATSUKA, Ai YAMAMOTO, Aoi SAKUYAMA, Hiroshi KOBAYASHI, Kazuhisa TSURUMI, Kei FUCHIGAMI
Specially Appointed Assistant Professor Osama ZAKARIA
Graduate Students Shang GAO, Masahiro SHIMOGISHI, Ken YUKAWA, Marwa MADI Ibrahim, Maiko YAMAMOTO, Kaori TAKAYA, Zayar LIN, Miao YU, Pluemsakunthai WARUNEE, Yu YAMASHITA, Yuki KUSUMOTO, Minoru SANDA, Taiji HAMADA, Hiroki MAEDA, Munemitsu MIYASAKA, Kui ZHANG, You-kyoung KIM, Kuppusamy MAHESWAR, Mizuki SATO, Masaki SHIBASAKI, Tsuyoshi MATSUURA, Songtao Wu, Xin WANG, Khaing Nyein Soe, Moe Htet, Clinical research Student Shuichi KOYAMA, Takayuki KOMATSU, Hitoshi SAITO, Tadamas YOSHIDA, Takeaki KITAZUME, Toshimitu SHIGEMATSU, Toshihiko MORIKAWA, Kazuhiro INOUE, Takeshi WATANABE, Noriko OSADA, Kensuke FUKUTOMI, Shuuko TAKEYAMA, Hiroko HAYASHI, Arihiro IWATA, Kihwoo AHN, Narumi SATO, Yoshihiko YOKOYAMA, Haruka KUBOTA, Chiharu IMAKITA, Masahiro ISHIWADA, Tomoya MATSUMOTO, Hidekazu KOTAKE, Haruka ITOH, Gou INOUE, Seiji OHARA, Akihiro SUZUKI, Tatsuya HOTTA, Norio AKINO, Tomoko NAGAYAMA, Masaki FUJII, Akiko FURUICHI, Takayuki MIYAHARA, Ding LIN, Foreign research Student Hao JIA
Registration Specialist Trainee  Yuki SHIMIZU,  Yuko OYOYABU,
Yoshiyuki SASAKI, Tomoto TERAMAE,
Yoko YAMAGUTI, Youta IIDA

2. Purpose of Education
Currently, oral rehabilitation with dental implant is very effective and predictable. It is absolutely important for the dental student to understand dental implant treatment compared to other modalities. Nine hours lectures for the 5th year dental students are the introduction part. Each of these students has a chance to see patient examination process and several steps of treatment planning for half a day in the dental implant clinic. Furthermore, each of the 6th year students have a chance to see surgical procedures, prosthodontic treatments and maintenance procedures. In the residential program, we accepted 9 dentists and teach them more advanced contents of dental implant treatment.

In the doctoral course of Implantology Biomaterial sciences, structural engineering, anatomical structures, diagnosis and technical innovations are overviewed. In the doctoral course of Regenerative Dental Medicine, tissue engineering concept, regeneration of soft tissue and bone and recent technological advancements in these field are overviewed.

3. Research Subjects
Materials and structures of dental implant prostheses
Implant design and surface modification of dental implant
Dental implant and its surrounding tissues
Regeneration of soft tissues
Regeneration of bone

4. Clinical Services
In Dental Implant Clinic in the dental hospital, we treat partially or fully edentulous patients with dental implants. If soft tissue management and/or bone augmentation procedures are required, we also do these surgeries. Number of patients in Dental Implant Clinic is increasing every year and approximately 120 patients per day are treated, which is extremely over our capacities. Approximately 2,000 implants were installed in 2012. Patients with some clinical problems, who are treated in other clinics, are increasing and this is a great concern.

5. Publications
Original Articles

6. Conference Presentation
11. Kusumoto Y, Kon K, Munakata M, Nakamura T, Tachikawa N, Shiota M, Kasugai K: Clinical outcome of sinus bone augmentation without graft; radiological analysis. Annual Scientific Meeting of the European Association of


Complete Denture Prosthodontics

1. Staffs and Students (April, 2012)

Professor  Shunsuke MINAKUCHI
Assistant Professor  Tatsuro UCHIDA, Norihisa AKIBA,
Manabu KANAZAWA, Yusuke SATO,
Maiko IWAKI
Hospital Staff  Mai OKUBO, Yuriko KOMAGAMINE,
Shin TAKESHITA, Hiroshi KATASE,
Sachi MASTUDA, Tomomi ONODERA
Graduate Student  Megumi OCHI, Yohei HAMA,
Marie MURATA, Eijiro YAMAGA,
Tomonori KAGAWA, Minoru INOUE,
Yoshihito HOSHINO, Takeshi HORIE,
Keisuke KIKUCHI, Shinta YAMAMOTO,
Mariko TANOUYE, Yuri OMURA,
Ayami JO, Daisuke HIRAYAMA,
Ayako FUJIMOTO, Toshinari Nakamura,
Hiroyuki TANIMOTO, Ken ODA,
Taro YOSHIZAKI, Yui FUJIMOTO

2. Purpose of Education

Complete denture prosthodontics is a discipline which contributes to better quality of life for edentulous patients by full mouth reconstruction treatments with complete denture prosthesis. The purpose of education is to get the knowledge about the dynamic state of soft tissues around dentures during oral functions, occlusion, and technical skills required to fabricating complete dentures.

3. Research Subjects

1) Relationship between denture treatment and body function
2) Palatal coverage disturbance in masticatory function
3) Stress analyses of implant overdenture
4) Factorial analysis of complete denture prosthesis
5) Resilient denture lining material
6) CAD/CAM system for fabricating complete dentures
7) Evaluations of masticatory performance using color-changeable chewing gum

4. Clinical Services

Complete denture prosthodontics clinic provides edentulous patients with planned prosthodontic treatments, and maintains the restored function for long periods. In addition, we set original criteria and objectively evaluate effect of our prosthetic treatments.

5. Publications

Original Article

Plastic and Reconstructive surgery

1. Staffs and Students (April, 2012)
Professor: Mutsumi Okazaki
Junior Associate Professor: Hiroki Mori
Assistant Professor (Hospital Staff): Kentaro Tanaka
Graduate Student: Tomoyuki Yano, Noriko Uemura, Yuhki Wakimura, Makiko Inoue, Takuya Higashino, Ktsuya Gorai, Aki Takada

2. Purpose of Education
Plastic surgery is a specialized branch of surgery concerned with the repair of deformities and the correction of functional deficits. The specialty of plastic surgery covers a wide range of procedures, and unlike other medical specialties which concentrate on one particular area of the body, plastic surgeons are involved in the reconstruction and remodeling of nearly all external body structures.

3. Research Subjects
Basic research
1. A mechanism and prophylaxis of the post-inflammatory pigmentation
2. A scarless wound healing
3. The blood circulation study of the flap using indocyanine green
4. Donor specificity on various flaps or full thickness skin
Clinical research
1. Sensory recovery and contour prediction in the breast reconstruction
2. The algorithmic development and the evaluation of various reconstructions in the skull base reconstruction
3. The development of reconstructive method after an oral cavity / pharyngeal cancer resection - Aiming at the functional preservation
4. The classification of the symptom and static and dynamic reconstruction of the facial paralysis
5. A classification and the algorithmic development in blepharoptosis surgery
6. The objective evaluation for the ischemic limb and therapeutic strategy utilizing wound healing mechanism
7. The prospective studies about the color reproducibility of the medical tattoo in the nipple areola reconstruction

4. Clinical Services
We cover the whole field of plastic surgery. In particular, we deal with the following field: congenital anomaly (cleft lip and palate, microtia blepharoptosis or polydactyly etc), LASERs, cutaneous malignant tumor, skin ulcer, breast reconstruction, head and neck reconstruction, facial palsy, axillary osmidrosis.

5. Publications
[Original article]
Head and Neck Surgery

1. Staffs and Students

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor</td>
<td>Seiji Kishimoto</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>Yosuke Ariizumi(March), Takuro Sumi(April)</td>
</tr>
<tr>
<td>Hospital Staff</td>
<td>Fuminori Nomura, Takao Tokumaru(April)</td>
</tr>
<tr>
<td>Secretary</td>
<td>Mariko Tosa</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>Masakazu Miyazaki, Zenda Sadamoto, Toru Sasaki, Tatsuo Masubuchi, Yosifumi Fukushima, Takao Tokumaru(April)</td>
</tr>
<tr>
<td>Foreign student</td>
<td>Paiboon Sureepong(April)</td>
</tr>
</tbody>
</table>

2. Purpose of Education

In the Department of Head and Neck Surgery, our goal is to deliver the highest possible clinical care for patients with benign and malignant tumors of the head and neck.

Postgraduate residents participate in a variety of head and neck surgeries. Weekly clinical rounds help to extend the experience beyond the operating room. Tumor conference is held weekly with a lively interdisciplinary discussion including otolaryngology, plastic surgery. They are also offered opportunity to participate in various clinical research projects.

3. Research subjects

1) Anatomy of the skull base.
3) Clinical application of new device of endoscopic examination.
4) Surgical treatment of pediatric head and neck tumors.
5) Human papilloma virus infection and head and neck cancer.

4. Clinical Services

Our team treats patients with tumors of the thyroid gland, salivary glands, oral cavity, larynx, pharynx, paranasal sinus, and skull base, and sarcomas of the soft tissue and bone.

5. Publication

Original Article


International Congress

1. T Sugimoto, S Kishimoto, Y Ariizumi, T Tokumaru, F Nomura, Y Kiyokawa: Symposium. Recent advances in head
and neck surgery: The diagnosis and management of parapharyngeal tumors: from the perspective of predictive factors of malignancy. 14th Japan-Korea Joint Meeting of Otorhinolaryngology-Head and Neck Surgery, Kyoto, April, 2012


10. T Yano, M Okazaki, K Tanaka, M Aoyagi, S Kishimoto: A flap binding technique to prevent postoperative titanium mesh exposure for the skull base reconstruction. 4th Congress of the World Union of Wound Healing Societies, Yokohama, 2012, September


Diagnostic Radiology and Oncology

1. Staff and Students (2012)

Professor Hitoshi Shibuya
Associate Professors Isamu Ohashi and Ichiro Yamada
Lecturers Kaoru Hanafusa and Mitsuhiro Kishino,
Research Associates Ryoichi Yoshimura (~ Jul.),
Rin Chaou (~ Feb.), Yoshio Kitazume,
Tomoko Makino, Keiji Hayashi,
Akira Toriihara, Kaori Okazawa (Nov. ~)
Hospital Staff members Kaori Okazawa (~ Oct.), Keiko Nakagawa,
Naoki Harata, Rina Fujisawa (~ Sep.),
Masashi Nakadate, Runa Kakubari (Apr. ~)
Resident Tomoyuki Fujioka
Graduate Students Youichi Machida, Satoko Hayashi,
Mais M Abd-Alamear
Research Students Kiyomi Amemiya (~ Mar.), Syuichi Yanai

2. Purpose of Education

The Diagnostic Radiology and Oncology section covers the fields of diagnostic radiology, nuclear medicine, radiation oncology and biology, and radiation physics. The objectives of our institution of the graduate course are to study radiological medicine from the area of human anatomy and pathology, physiology, and clinical medicine. Our section is composed of over 70 members; about 45 of them are serving as heads or rotating staff members of general hospitals in the metropolitan area and approximately another 20 of them are studying and working as members of the university and/or university hospital staff. Postgraduate courses are made to study basic/clinical radiation medicine in order to obtain license as a specialist from the Japan Radiological Society (JRS). JRS specialist licenses are granted in two fields: diagnostic radiology and radiation oncology. Doctors of our section are also expected to obtain Ph.D. and 34 students had obtained a degree of Ph.D. under the guidance of Prof. Shibuya and stuff.

3. Clinical Services and Research Subjects

A. Diagnostic Radiology

CT section:
After the introduction of two sets of multi-slice CT machines (MDCT: 64 arrays), number of patients examined has been markedly increased, and MDCT has enabled CT angiography of coronary artery as well as the cerebral artery. MDCT has offered a chance of on the day examination and early image diagnosis of disease. The clinical CT studies for liver diseases have offered the chance to get doctor degree for three doctors.

MRI section:
Three sets high speed MRI (1.5T and 3T) are enable to detect early findings of cerebral infarction by DWI (diffusion weighted image). Calculation of apparent diffusion coefficients (ADCs) of the kidney and liver has provided data for studying the physiology and pathology of these parenchymatous organs.

Interventional Radiology:
TAE (trans-catheter arterial embolization) for liver cell carcinoma and PTA (percutaneous trans-catheter angioplasty) for peripheral arterial occlusive disease have been routinely done to-date. Emergency angiography can be carried out at any time at any time as occasion calls.

Ultrasoundography:
Breast disease and soft tissue ultrasonography is performed in the radiological center. Combined ultrasonography and MRI examinations have provided precise information for the diagnosis and treatment of breast cancer.

B. Nuclear Medicine

On Nov. 2006, two sets of PET/CT examination have been introduced and started operation. About 15 patients a day are examined using 16F-FDG/CT. SPECT examinations have been performed in about 10 cases of disease every day. Clinical data obtained in the diagnosis of head and neck and breast cancer have offered the chance to study pathology of head/neck cancer and breast cancer.
C. Radiation Oncology

Low-dose rate brachytherapy for head/neck as well as prostate cancer is a unique character of the radiation oncology section. The 720 new patients referred for radiotherapy in 2010 included 250 cases of head and neck cancer patients, 120 prostate cancer patients and 110 breast cancer patients. Over 160 oral/oropharynx cancer patients were treated by brachytherapy in 2009. The results of brachytherapy were compatible to the results obtained by surgery, and post-treatment quality of life was better than after surgery.

We have remened Linear accelerating machines this year, and we had three Linear accelerating machines equipped IMRT intersiting-modulated radiation therapy and IGRT(image-guided radiation therapy).

4. Manuscript


5. Congress

3. M. Kishino, Y. Takeguchi, T. Takeguchi, A. Matsuhsia, Y. Himeno, H. Shibuya The diagnostic value of super-selective left adrenal venous sampling for primary aldosteronism. CIRSE September 2012 Lisbon Portugal
7. Yoshio Kitazume, Isamu Ohashi, Shinichi Taura, Osamu Noguchi, Hitoshi Shibuya. Diffusion weighted imaging for focal liver lesions: Is there difference in the diagnostic capability using the apparent diffusion coefficient measurement between b-value 1500 and 1000 s/mm2 ? The 63rd Annual Meeting of the American Association for the Study of Liver Diseases (AASLD). Boston, USA, November 9-13 2012
Maxillofacial Anatomy

1. Staffs and Students (April, 2012)
Professor Shunichi SHIBATA
Associate Professor Tatsuo TERASHIMA
Assistant Professor Shun-ichi SHIKANO, Tatsuhiko ABE

2. Purpose of Education
Main educational purpose of maxillofacial anatomy in graduate course is to provide students opportunity to understand
the function of various oral organs in a morphological viewpoint and ability to evaluate various vital phenomenon
encountered in medical practice.

3. Research Subjects
1) Structural features of mandibular condylar cartilage.
2) Mechanism of epithelial attachment of junctional epithelium in human gingiva.
3) Comparative histology and embryology of teeth.
4) Observation on the structural features of oral mucous
5) Anatomical names of the structures of human skeletal system.
6) Biological analysis of root formation of mouse molars by long-term organ culture method.
7) Mechanisms of enamel formation in amelogenesis imperfecta rat (ami).
8) Role of the dental sac in the formation and the development of the dental and periodontal tissues.
9) Morphological researches on Sinus maxillaris.
10) Studies on regeneration of jaw bone.

4. Publications
Original Article
measurement accuracy of dental CT images obtained by 64-slice multidetector row CT: the effects of mandibular
immunoreactive cells in the midline epithelial seam of the human fetal secondary palate. Cleft Palate-Craniofac J,
transporters, fructose-1, 6-bisphosphatase, and glycogen in gas gland cells of the swimbladder: is a metabolic futile
rapid loss of follicular dendritic cell-secreted protein in the junctional epithelium. Journal of Periodontal Research,
7. Suzuki Y, Obara N, Shibata S; Gene expression of insulin-like growth factor family during tooth development of the
8. Suzuki Y, Tsunekawa H, Obara N, Irie K, and Shibata S: Expression and activation of β -catenin in developing and

Review Article

Book
Cognitive Neurobiology

1. Staffs and Students

Professor Masato Taira
Junior Associate Professor Hisayuki Ojima
Assistant Professor Narumi Katsuyama
Research Associate Nobuo Usui
Part-time Instructor Mari Kumashiro
Graduate Student Eriko Tachi, Saneyuki Mizutani, Yuko Imai
Researcher Chisato Yamate, Mayumi Yamamoto

2. Purpose of Education

For D3 course students

1. Lectures of unit "Nerve and Sense"
   A series of lectures on the conduction/transmission of neuronal excitation, somatic sensation, vision, gustation, olfaction, audition, and sense of equilibrium will be taught. Basic mechanisms of the nervous system and the mechanisms of sensation and perception will be learned.

2. Lectures of unit "Motor System"
   A series of lectures on the mechanisms of muscle contraction, its regulation and the related reflexes will be taught. Basic structure of the skeletal muscle and the physiological mechanism of its contraction, together with the deep sensation and skeletal muscular reflexes will be learned.

3. Lectures of unit "Central Nervous System"
   A series of lectures on the behavior, emotion, sleep and higher brain functions will be taught. Functions of the central nervous system will be learned.

4. Lectures of unit "Biology of Mastication and Deglutition"
   A series of lectures on the neural mechanisms of mastication and deglutition will be taught. Regulatory mechanisms of the mastication system will be learned.

5. Lecture of unit "Eating, Digestion, and Absorption"
   A series of lectures on the mechanisms of salivation as well as those of the motility, digestion, and absorption of digestive organs will be taught. Functions of a series of digestive organs starting with the oral cavity will be learned.

6. Unit of "Practice in Physiological Functions"
   The purpose of the practice is to learn about the physiological mechanisms underlying the normal functions of human body through experiments. The goal is to master the basic experimental procedures, and to experience how to capture and analyze the data in order to draw conclusions.

For D2 course students

1. Lectures of unit "Functions of Nervous Systems I (Introduction to Neurophysiology, and Motor Functions)"
   Basic knowledge of neurophysiology will be lectured as an introduction together with the motor functions.

2. Lectures of unit "Functions of Nervous Systems II (Perception, Emotion, Instinct, Sleep, and Higher functions)"
   A series of lectures will be taught on functions of the sensation, perception, and motion as well as the neural mechanisms of higher brain functions.

3. Lectures of unit "Homeostatic Functions for Life Support"
   Lectures will be taught on the structure of the autonomic nervous system and its regulatory mechanisms in the circulation, respiration, digestion/absorption, humor/body temperature, metabolism, excretion, and internal secretion/reproduction.

4. Lectures of unit "Oral Physiology"
   Lectures will be taught on the structure and function of various somatosensory organs in the oral cavity. Neural regulations of mastication and deglutition as well as the secretion mechanism of saliva will also be learned.

5. Unit of "Practice in Physiological Functions"
   See above.
3. Research Subjects

1. Neural Mechanisms of motor control.
   Research is aimed at understanding the brain mechanisms of execution and control of the motion and behavior of animals and human.

2. Neuronal mechanisms for perception and cognition.
   Research is aimed at understanding the brain mechanisms of perception and cognition of objects through vision and tactile senses of animals and human.

3. Processing of natural sounds in auditory cortex
   Research is aimed at understanding the brain mechanisms of hearing and vocalization of animals.

4. Publications

   Original Article

   Review articles

   Books
Molecular Craniofacial Embryology

1. Staffs and Students

Professor Sachiko Iseki
Associate Professor Masa-Aki Ikeda
Lecturer Masato Ota
Part-time lecturers Hirofumi Doi, Shumpei Yamada, Shigeru Okuhara
Visiting Researcher Yuichiro Ninomiya
Graduate Students Teng Ma (until May), Widya Lestari (until May), Khandakar Abu Shameem MD Saadat (until May), Tomoko Nagayama (Oral Implantology and Regenerative Dental Medicine) (until May), Akihiko Machida (Maxillofacial Surgery), Prasitsak Thanit, Endrawan Pratama, Zhang Kui (Oral Implantology and Regenerative Dental Medicine), Ryohei Takahashi, Masako Fujioka (The University of Tokushima) (until October)
Research Student Toshiko Furutera (from April)
Foreign Researcher Khandakar Abu Shameem MD Saadat (from April)
Secretary Kaori Morinaka

2. Research subjects

1) Molecular mechanisms of mammalian craniofacial development
2) Application of developmental mechanisms to regenerative medicine
3) Identification of tissue stem cells in craniofacial region and molecular mechanism of the mechanism of their stemness
4) Regulation of gene expression in cell growth and stress response
5) Nuclear architecture and function in regulating gene expression
6) Dysregulation of tumor suppressors in oral cancer

3. Publications

Original articles


**Review Articles**

Maxillofacial and Neck Reconstruction

Cellular Physiological Chemistry

1. Staffs and Students (April, 2012)

Professor Ikuo Morita
Associate Professor Ken-ichi Nakahama
Junior Associate Professor Hiroshi Fujita, Mayumi Abe, Chieko Yokoyama
Assistant Professor Kotaro Kato
Tokuninn Assistant Professor (GCOE) Olga Safronava
Tokuninn Assistant Professor Masako Akiyama, Jinying Wang
Graduate Student Prnween Wayakanon, Takeshi Watanabe,
Research Student Yukihiro Hashida, Kaori Shimizu, Yu Hatano, Chikako Morioka
Keiko Akasawa, Masayuki Tooi, Asuka Okitoh, Kazuki Aisaka,
Kensuke Kojima, Naoyuki Hirota

Associate Professor (Nano Medicine DNP) Motohiro Komaki
Assistant Professor (Nano Medicine DNP) Kengo Iwasaki
Visiting Researcher (Nano Medicine DNP) Naoyuki Yokoyama, Hirohito Ayame
Research Student (Nano Medicine DNP) Yasuyuki Kimura

2. Purpose of Education

For undergraduate students. We have some classes in biological chemistry for the third grader. In these classes, the students should understand basic biochemistry and physiology under healthy/diseased conditions.

For graduate students. These students can choose the one of themes in our lab. These students are expected to solve the problems by themselves. However, appropriate suggestions will be given by at least three supervisors whenever you want.

3. Research Subjects

1. Regulatory mechanism of angiogenesis and application to regenerative medicine
2. Bone remodeling and cell communication
3. Inflammation under hypoxic conditions (epigenetic control of gene expression)
4. Life of gap junction

4. Publications

Original Article


Metals

1. Staffs and Students

Professor    Takao HANAWA
Associate Professor Naoyuki NOMURA
Assistant Professor Hisashi DOI, Yusuke TSUTSUMI
Research Assistant Osamu FUKUSHIMA
Project Assistant Professor SUYALATU, Satoshi MIGITA
Secretary Toshie NAKANISHI, Yasuko SEKI
Graduate Student Ryota KONDO, Takahiro SAKAI

2. Purpose of Education

Metallic biomaterials play an important role as medical devices. Our laboratory mainly deals with effects of crystal structure, process, and thermal treatment on mechanical properties (e.g. strength or toughness). We also focus on structure and property of nanometer-scaled surface phenomena: Formation of living tissue on metals, especially, reactions between biomolecules or cells and metals, changes in surface oxide layers in living tissues, and electrochemical property of metallic biomaterials. The aim of the education is perfect understanding of metallic biomaterials, enabling students to select a proper material for medical treatments or researches.

3. Research Subjects

1) Bio-functionalization of metals with electrochemical surface modification

Bio-functionalization of metals is investigated with surface treatment techniques such as molecule immobilization and anodic oxidation. These surface treatments make it possible to inhibit protein adsorption, platelet adhesion and biofilm formation, and to enhance wear resistance and hard-tissue compatibility.

2) Development of novel alloys and porous composites for biomedical applications

Novel alloy systems for biomedical applications are designed from the viewpoints of mechanical properties and biocompatibility. Co-Cr-Mo alloys having high strength and ductility for dental applications are developed. The porous alloys having low Young's modulus are obtained with selective laser melting technique.

3) Development of Zr-based alloys for minimizing MRI artifacts

Zr-based alloys with low magnetic susceptibility, high strength and corrosion resistance are investigated for minimizing MRI artifacts by controlling their microstructure and constituent phase for aneurysm clips, artificial joints, and dental implants, etc.

4) Effort to minimalize metal allergy

Countermeasure techniques for metal ion release from metallic biomaterials which causes metal allergy are investigated. Novel reagents of patch testing for the detection of sensitization to metal ions are developed.

4. Publications

Original Articles


Biodesign
(Medical and Dental Device Technology Incubation Center)

1. Staffs and Students

Professor Kazuo TAKAKUDA
Assistant Professor Wei WANG
Research Assistants Shukan OKANO
Graduate Students Takao IRIBE, Yuki SAITO, Hazuki KOSHI TOMAE, Ryo KOKUBUN, Yutaka FUKUDA, Masahiro WATANABE, Atsushi MITA, Tetsuro WATANABE, Kimihiro OKANO, Ryoichi SUZUKI, Katsunari MURAKAMI, Hiroki IKEDA, Tarou KIMURA, Hiroyuki KUSABA, Hisaya NOMICATA, Eiko MARUKAWA

2. Purpose of Education

Biodesign. The class is for the understanding of fundamental concepts of mechanics, and introduction to the advanced studies including the biomechanics of living bodies, tissues, and cells. Some applications to the basics design of medical devices with mechanical functions are also discussed.

3. Research Subjects

1. Remodeling of structural and supporting tissues under mechanical stimuli

Biomechanical studies on structural/supporting tissues such as bones, ligaments and tendons are carried out. In particular, to elucidate the adaptation mechanism of these tissues, the effects of controlled mechanical stimuli applied to living cells and tissues are investigated.

2. Development of Bone Regeneration Device with Bioabsorbable Organic/Inorganic Composite Materials

Devices for bone regeneration with the use of bioabsorbable Organic/Inorganic Composite materials are developing. In vitro and animal experiments are carrying out for pre-clinical experiments. Furthermore, bone regeneration mechanism when implanting Organic/Inorganic composite materials is examined by in vitro and in vivo tests.

3. Development of Regeneration Devices for Soft Tissues with the use of bioabsorbable materials

Regeneration technology for structural/supporting tissues such as ligaments, tendons, dura mater, peripheral nerves and small blood vessels are investigated utilizing bioabsorbable polymers. Our strategy is based on the regeneration by the self-healing mechanism achieved through the optimum milieu provided by biomaterials. We already have promising results in the animal experiments for the cases of dura mater and peripheral nerves.

4. Publications

Original Articles

Presentations
Maxillofacial Surgery

1. Staffs and Students (2012)

Professor
Kiyoshi HARADA (from April)

Emeritus Professor
Teruo AMAGASA

Clinical Professor
Hiroshi IWAKI

Junior Associate Professor
Masashi YAMASHIRO, Narikazu UZAWA

Assistant Professor
Satoshi YAMAGUCHI, Yutaka SATO,
Hiroyuki YOSHITAKE, Yasuyuki MICH,
Kazuto KUROHARA, Kouichi NAKAKUKI

Hospital Staff
Itaru SONODA, Kunihiro MYO (from April),
Shigeiho ABE (until March), Miho SUZUKI,
Misa MISHINA (HOSOKI), Chikako HAYASHI (until September),
Mayuko MURASHIMA (until March), Aya KAWAMATA (until March),
Kenichiro TAKAHASHI, Junichi TSUGAWA (until March),
Nobuyoshi TOMOMATSU, Junya KUMAGAI (from April),
Hiroyuki NAKACHI (from April),
Jun SUMINO (from April)

Graduate Student
Hironori ENDO (until March), Daisuke MIYAJIMA (until March),
Yoshimi NAKATA (until March), Erika OUE (until March),
Jun SUMINO (from March), Takashi WATANABE (until March),
José-María SHINDOI, Yuki MATSUSHITA,
Yosuke HARAZONO, Akihiko MACHIDA,
Asumi UEZONO (HONDA), Akira GOUDA,
Norihiko HASHIDA, Yuijiro MORIYA,
Eri TSUCHIDA, Ryosuke NAKAMURA,
Takayuki YAMADA, Li KEI,
Uyannga ENKHBOLD (from April), Takuma MORITA (from April),
Chihiro YOSHIDA (from April), Takeshi OKAMURA (from April),
Masahiko TERASUHI (from April), Hirokazu KACHI (from April),
Kouhei OKUYAMA (from April),
Yuuta KONDO (from April)

Student
Junya KUMAGAI (AOYAGI) (until March),
Ryosuke NAGAOKA (until March), Nami OGAWA (until March),
Chika MIURA (until September), Yumi KOYAMA (until March),
Machiko KOSUGI, Yashiro ARAKI (from April),
Reiko HOSHI (from April)

Post graduate trainee
Ming-Chin Mark CHANG (until February)

2. Purpose of Education

Oral and maxillofacial surgery is a surgical specialty involving the diagnosis, surgical treatment and management of defects and injuries related to the function and aesthetics of the face and jaws. In order to practice the full scope of the specialty, oral and maxillofacial surgeons are required education in dentistry, medicine and surgery for regional requirement.

3. Research Subjects

1) Head and Neck Surgery: Innovation of management patients with benign and malignant tumors and cysts in oral and facial region.

2) Reconstructive Surgery: Developing method of correcting jaw, facial bone and facial soft tissue trouble left as the result of removal of disease or previous trauma.

3) Correction of Birth Defects: Improving surgically correction of birth defects of the face and skull, including cleft lip and palate.

4) Dentofacial Deformities and Orthognathic Surgery: Development of new surgical techniques to improving reconstruct
and realign the upper and lower jaws.

5) Temporomandibular Joint Disorders: Renewing skills in the diagnosis and treatment due to temporomandibular joint problem.

6) Oral Mucosa Disease: Creation new method with light and color for diagnosis of oral mucosa disease, including leukoplakia and cancer

4. Clinical Services

1) Diagnosis, removing and reconstruction of jaw, oral or facial tumor or cyst.
2) Diagnosis and treatment of cleft lip and palate.
3) Treatment of jaw aligned with orthognathic surgery.
4) Therapy of temporomandibular disorder with or without temporomandibular joint surgery.
5) Diagnosis and treatment of oral mucosa disease.
6) Treatment of inflammation in the region jaw and facial trauma.
7) Extraction tooth including wisdom tooth.

5. Publication

Original Article


Maxillofacial Orthognathics

1. Staffs and Students (April, 2012)

Professor Keiji MORIYAMA
Associate Professor Shoichi SUZUKI
Junior Associate Professor Tatsuo KAWAMOTO,
Assistant Professor Michiko TSUJI, Takuya OGAWA,
Norihisa HIGASHIHORI, Jun MIYAMOTO,
Hiroki FUKUOKA

GCOE Research Associate Professor Naoto HARUYAMA
Hard Tissue Genome Research Center, Research Assistant Professor Yukiho KOBAYASHI
Graduate Student Yousuke ITO, Naomi KAWAKUBO,
Jympei MORITA, Yuko KOMAZAKI,
Chiho WATANABE, Masayoshi UEZONO,
Ryo MARUOKA, Masako YOSHIZAKI,
Carolina DUARTE, Pavneenarat AUKKARASONGSUP,
Takayuki UMEZAWA, Kenji OGURA,
Keiko MURAMOTO, Naomi YAMAMOTO,
Thunyaporn SURAPORNSAWASD,
Seiei RYU, Kouhei YAHIRO,
Maki Morishita, Naoki Kouda,
Akitsu Ikeda, Tsasan Tumurkhuu

2. Purpose of Education

The goal of the 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.

Comprehensive care by a team of specialists including maxillofacial surgeons, orthodontists, 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.

3. Research Subjects

1) Basic and clinical studies of cleft lip and/or palate and other congenital craniofacial conditions
2) Morphological and physiological studies of facial deformity
3) Physiological study about control mechanism of stomatognathic function
4) Functional MRI study in the craniofacial region
5) Clarify the factors of malocclusion with epidemiological technique

4. Clinical Services

In the Clinic, we treat a large number of patients presenting a variety of malocclusions to be assigned to group practice in order to gain valuable experience in diagnosis, treatment planning, orthodontic therapy, and patient management. Especially for patients born with cleft lip and/or palate and who need craniofacial and orthognathic surgery, we have clinical meetings and conferences for the comprehensive care through a team approach with maxillofacial surgeons, maxillofacial prosthodontists and speech therapists. We also provide supportive counseling to families who have members with congenital anomalies before the treatment.

5. Publications

Original Article


Books


Maxillofacial Prosthetics

1. Staff and Students (April, 2012)

Professor    Hisashi TANIGUCHI
Junior Associate Professor    Yuka SUMITA
Assistant Professor    Mariko HATTORI, Takafumi OTOMARU
Hospital Staff    Taiji HOSIAI, Mihoko HARAGUCHI, Mai MURASE
Secretary    Ikuko ICHINOHE
Graduate Student    Moe KOSAKA, Yiliyaer AIMAIIJANG, Sigen YOSHI

2. Purpose of Education
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. 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.

3. Research Subjects
1. Diagnosis and treatment for patients with maxillofacial defects
2. In vivo application of modal analysis for maxillofacial prosthodontics
3. Acoustic analysis of speech
4. Medical and dental art

4. Clinical Services
Maxillofacial Prosthetic clinic provides the restoration of functional and esthetic disorders of maxillofacial areas that are caused by congenital developmental or acquired diseases by means of the high-advanced dental and medical cares.

5. Publications
Original Article

Books
Cell biology

1. Staffs and students (April 2012)

Professor Takao NAKATA
Associate Professor Akihiro INOUE
Assistant Professor Tomohiro ISHII
Research Technician Satoko NAKAMURA
Graduate Student Toshiyuki KAKUMOTO

2. Purpose of Education

We teach histology to 2nd and 3rd year medical students. The courses are composed of sets of lecture and laboratory study of tissues and organs. Our goal in undergraduate course is to provide students with fundamental knowledge and skill to analyze microscopic samples of normal human body.

3. Research Subject

We started a new laboratory from April 2009. We are interested in the cellular responses to spatio-temporal activation of signaling molecules. For this purpose, we took synthetic approaches combined with optogenetics. We introduce the photo switches into cells, and analyze signaling systems quantitatively. Research will be conducted by using molecular biology, molecular genetics, cell biology, theoretical biology, and live-imaging techniques.

4. Presentation

1. Tomohiro Ishii, Toshiyuki Kakumoto, Takao Nakata. Photo-regulation of intracellular Ca2+ signals. Workshop on Neural basis of olfactory information processing : From Odors to Neural Circuits and Behavior (Comprehensive Brain Science Network), University of Tokyo, Japan. 2012.9.15.
Medical Biochemistry

1. Staffs and Students (April, 2012)
Professor Yutaka Hata
Assistant Professor Kentaro Nakagawa
Assistant Professor Mitsunobu Ikeda
Assistant Professor Hiroaki Iwasa
Other two staffs and seven students

2. Purpose of Education
1) Undergraduate
   We organize “Medical Biochemistry”. The students are requested to obtain a comprehensive integrated knowledge of medical biochemistry, which is important to understand how health is maintained and which molecular and biochemical events cause human diseases and underlie the rational treatments.

2) Graduate and others
   We are studying the cell adhesion-related signaling pathway which is involved in the regulation of cell proliferation, cell polarity, and apoptosis. This pathway is well conserved from fly to human. The mutations of the components lead to oncogenesis and organ malformation. Several recent studies suggest that this pathway is implicated in inflammation and cell differentiation such as adipogenesis, osteogenesis, myogenesis, and keratinocyte differentiation. The pathway plays an important role in various human diseases and could be a new therapeutic target. We give lectures about our current studies to graduate students and others, and provide graduate students with the opportunity to participate in them. For more information, please visit our Web site [http://www.tmd.ac.jp/english/mbc/index.html](http://www.tmd.ac.jp/english/mbc/index.html).

3. Research Subjects
1) Study of the mammalian Hippo pathway
2) Study of cancer stem cells
3) Study of RASSF proteins
4) Study of sarcopenia

4. Clinical Services
N/A

5. Publications
Joint Surgery and Sports Medicine

1. Staffs and Students
Professor Takeshi MUNETA
Professor Ichiro SEKIYA (Department of Cartilage Regeneration)
Associate Professor Tomoyuki MOCHIZUKI (Department of Joint Reconstruction)
Junior Associate Professor Kunikazu Tsuji (GCOE)
Assistant Professor Hideyuki KOGA
Assistant Professor Toshifumi Watanabe (Department of Cartilage Regeneration)
Graduate Student Kazumasa MIYATAKE, Daisuke HATSUSHIKA,
Hiroki KATAGIRI, Koji OTABE,
Jun YAMADA, Arata YUKI,
Yusuke NAKAGAWA, Yu MATSUKURA,
Mio UDO, Shinpei KONDO,
Ryusuke SAITO, Katsuaki YANAGISAWA

2. Purpose of Education
We are operating at the “department of orthopaedic surgery in the medical university” in corporation with section of orthopaedic surgery in the graduate school. After postgraduate training, students are given opportunity for basic education and acquire the comprehensive knowledge of the orthopaedic surgery and traumatology in the associated hospitals. In concretely terms, students mainly take traumatology training as a basis for clinical medicine for 2 years. Training also includes anesthesiology, emergency medicine, rehabilitation, and neurology. Subsequently, students will take training of joint surgery and neurosurgery in the specialized hospitals for at least 2 years. After basic training of 6 years, students are required to be an orthopaedic specialist which was certificated by Japan Orthopaedic Association. As for an admission to a graduate school, students will be allowed depending on the personal desire and individual achievements after 4 years’ education.
We also accept extramural and international students, doctors, and veterinarians who are interested in the research at our graduate school.

3. Research Subjects
Following studies have been extensively carried out in out 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

4. Clinical Services
- Promotion of treatment about diseases of lower extremity from children to elderly people
- Development of program for early social recovery after total hip and knee arthroplasty patients
- Development and education of treatment which accommodates sports fields
- Regenerative medicine for cartilage disease

5. Publications
Original articles


Biostructural Science

1. Staffs and Students (as of April, 2012)
Professor Yoshiro TAKANO
Associate Professor Makoto J TABATA
Assistant Professor Otto BABA
Technician Hachiro ISEKI
Graduate Student Ravindra Kumar RATNAYAKE, Dawud ABDUWELI

2. Purpose of Education
[Undergraduate Education]
Provide dental students with the essential knowledge and methods of studies necessary to understand fundamentals of structure and function of the human body, based primarily on macroscopic- and microscopic anatomy (Histology), including dissection lab works which lasts nearly 3 months. Emphasis is placed on the structure and function of oral and maxillofacial regions including teeth, periodontal tissues, salivary glands and temporomandibular joints, as well as muscles and nerves related to these structures. These comprise major part of the largest teaching module of the 3rd-year dental education curriculum and are expected to build solid basis for future studies of advanced dental science and clinical medicine.

In addition to the current curriculum, a novel curriculum also started from April 1, 2012 in which most of the subjects listed above had been transferred to the 2nd-year program where dental students and medical students are supposed to study together.

[Graduate School]
Provide graduate students with updated information of mechanisms of biological mineralization, structural features, as well as ontogenic and evolutional aspects of the development of biological hard tissues, and give a lab course of essential methods for structural analyses of hard tissues, particularly of teeth and periodontal tissues.

3. Research Subjects
The mechanisms of dental and periodontal tissue formation and their regeneration is the central focus of our research. Followings are rough description of current research subjects in our laboratory.
1) Biological mineralization.
2) Induction and/or regeneration of dental and periodontal tissues.
3) Reaction-diffusion phenomenon in biological systems
4) Origin and evolution of tooth
5) Molecular mechanisms of tooth development
6) Role of dentin matrix proteins in the development of root and periodontal tissues
7) Sensory apparatus in masticatory systems.

4. Publications
Original Article
Abstracts


[Invited Lectures]


Pharmacology

1. Staffs and Students (April, 2012)

- Professor: Keiichi OHYA
- Associate Professor: Kazuhiro AOKI
- Assistant Professor: Yukihiko TAMURA
- Researcher (JSPS): Noriko KOMATSU (Cell Signaling)
- Researcher: Miki MAEDA, Kenichi NAGANO, Kengo FUJIKI (Removable Prosthodontics), Nobuyoshi TOMOMATSU (Maxillofacial Surgery), Yasuhiro SHIMIZU (Orthodontic Science)
- Graduate Student: Toshimi SATO, Md. Abdulla Al Masud KHAN (GCOE Advanced Super Student), Md. Abdullah Al MAMUN, Atsushi KIMURA (Oral and Maxillofacial Surgery), Genki KATO, Yasutaka SUGAMORI, Makiri KAWASAKI (Molecular Pharmacology)

2. Purpose of Education

Pharmacology is situated between the basic and clinical sciences and is important for dental students. There is a growing demand on the dental clinicians to know huge knowledge of drugs and how to use them for patients. For these purpose, the first lecture is aimed to teach the scientific aspects of pharmacology and how drugs act on the various body system. The second lecture deals with drugs of medical and dental fields and the last with drugs of special importance of dentistry. Dental students learn the principle of pharmacology through laboratory practice. Following these learning, they must acquire an adequate background for drug use in general practice.

3. Research Subjects

1) Pharmacological analysis of the formation and resorption mechanisms of teeth and bone
2) Drug effects on the differentiation of the cells that participate formation and resorption process of the hard tissues
3) Identification of the new drug targets for hard tissue diseases
4) Translational research for the hard tissue regeneration
5) Analysis of side effects of the drug that appear in oral tissues

4. Publications

Original Article


Bio-Matrix

Connective Tissue Regeneration

1. Staff (April, 2011)
   Associate Professor Tamayuki SHINOMURA

2. Purpose of Education
   Our laboratory is interested in the molecular mechanisms underlying the formation and maintenance of connective tissues including cartilage and periodontal tissues. Our goal is to control the restoration and regeneration of the tissues. To achieve this goal, we are focusing on extracellular matrix molecules specifically expressed in the tissues and transcription factors regulating their expressions. Therefore, in our graduate course, we provide students opportunity to study molecular biology and extracellular matrix biology.

3. Research Subjects
   1) Study on transcription factors necessary for the maintenance of chondrogenic phenotype.
   2) Study on novel genes actively expressed in periodontal tissues.
   3) Study on the molecular dynamics of extracellular matrix in connective tissues.

4. Publications
   Original Articles
Bio-Matrix

Biochemistry

1. Staffs and student (April, 2012)

Professor
Masaki Yanagishita

Associate Professor
Miki Yokoyama

Junior Associate Professor
Yasuhiro Kumei

Assistant Professor
Katarzyna Anna Podyma-Inoue

Research Assistant Professor, Global Center of Excellence Program
Hiroyuki Nakamura

Technical staff
Kazue Terasawa

Part-time instruction
Akira Asari

Graduate student
Hiroko Yamanokuchi,
Rajapakshe Mudiyanselage Anupama Rasadari Rajapakshe

2. Purpose of education
Extracellular matrix is a critical constituent of multicellular organisms by functioning as scaffold for body structures and providing internal environment for cell activities. Our section focuses on the research and education on molecular composition, biological functions and pathological processes involving extracellular matrices.

3. Research subjects
a. Studies on the biological functions of heparan sulfate proteoglycans
b. Roles of sphingolipid metabolism on cell death progression
c. Cell-surface assembly of transmembrane proteins on the plasma membrane
d. Sensing and response mechanisms of cells toward gravity

4. Publications

[Original Article]


4. Presentation at Meetings


glands, 71st Annual Meeting of the Japanese Orthodontic Society, Morioka, September 26-28, 2012
6. Shuji Aou, Yuuki Watanabe, Akira Masuda, Katsuya Hasegawa, Tomomi Kawasaki, Yasuhiro Kumei “Reproductive and social behaviours of mice in 0.3G and 0.15G parabolic flight conditions”, ESA Life in Space for Life on Earth symposium, Aberdeen-UK, June, 2012
Cell Signaling

1. Staffs and Students

Professor Hiroshi TAKAYANAGI (~May)
Assistant Professor Masahiro SHINOHARA (~Sep)
Tomoki NAKASHIMA, Satoru HARUMIYA
Kazuo OKAMOTO (~May)
Research Associate Professor Masatsugu OHORA (~Sep)
Visiting Assistant Professor Takako KOGA
Adjunct Junior Associate Professor Mikihiro HAYASHI, Yusuke NAGAI
Eriko SUMIYA
Postdoctoral Fellow Noriko KOMATSU, Ayako SUEMATSU,
Asuka TERASHIMA, Matteo GUERRINI,
Lynett DANKS
Graduate Student Abdul Alim AL-BARI(~Sep), Takehito ONO

2. Purpose of Education

Organized signal networks in the body are crucial for the higher physiological functions and the tissue organization. To understand the regulation of signal events, we take on cell signaling course including the molecular mechanism of both the “intra” cellular and the “inter” cellular signal transduction. Especially, the course will be focused on the molecular networks of signal transduction in osteoclasts and osteoblasts, but also on the osteoimmunology, which is a new integrated field of bone homeostasis and immunology. Besides, to promote the practical and clinical understanding, the course will deal with the molecular mechanism of osteoporosis and inflammatory bone destructed diseases, such as periodontal disease and rheumatoid arthritis, in parallel with the basic molecular biology.

3. Research Subjects

1) Function and transcriptional regulation of NFATc1, a master regulator of osteoclast differentiation
2) Transcripomte and Proteome of cytokine-induced genes
3) Regulation of bone homeostasis by immunoglobulin receptors
4) Identification of bone-derived systemic regulatory factors (osteokines)
5) Mechanism of sensing and adapting to mechanical stress
6) Functional analysis of genes by gene manipulations, RNAi and gene-disrupted mice
7) Development of clinical application by experimental animal disease models

4. Publications

[Original Article]


[Review Article]


[Presentation]

5. Hiroshi Takayanagi: Molecular basis for communication among bone cells. 4th International Conference on Osteoimmunology, 2012.6.21, Corfu, Greece.
11. Hiroshi Takayanagi: Immune Signalling in Osteoclasts. 15th International and 14th European Congress of Endocrinology (ICE / ECE 2012), 2012.5.6, Florence, Italy.

[Award]

3. Matteo Guerrini: 4rd Osteoimmunology Travel Award 2012,Jun
4. Mikihito Hayashi:4rd Osteoimmunology Travel Award 2012,Jun
**Inorganic Biomaterials**

1. **Staffs and Students**

   - **Professor** Kimihiro Yamashita
   - **Associate Professor** Akiko Nagai
   - **Assistant Professors** Miho Nakamura, Nahohiro Horiuchi, Kosuke Nozaki
   - **Students** Seiko Oba, Yu Tsuchiya

2. **Education**

   Biomaterial engineering

3. **Research Subjects**

   (1) **Development of Electrovector ceramics**

   Some ceramics, such as hydroxyapatite, are able to be ioniically polarized by thermoelectrical treatments. Consequently, the polarized ceramics have large and time-durable induced electrostatic charges on their surfaces. The effects of the induced charges profoundly dominate the proximate few millimeter regions. We named the effects “Electrovector effects” and develop “Electrovector ceramics” defined as ceramics emitting the Electrovector Effects.

   (2) **Control of electrical space on Electrovector ceramic**

   To translate the Electrovector ceramics into practical applications for medical devices, electrical space on Electrovector ceramics should be suitably controlled under the poling process. We are evaluating the poling mechanisms of some bio-ceramics, based on the various disciplines. In particular, we are putting emphasis on the relationship between the origin of electrical space and the crystal structure on the surface of the polarized bio-ceramics. The crystal defect, crystal distortion and fine change of ion composition of Electrovector ceramics polarized under various conditions are systematically investigated.

   (3) **Manipulation of biological responses by Electrovector ceramics**

   The electrostatic energies of the Electrovector effects aforementioned dominate the limited proximate areas and can control reactions locally. Therefore, the Electrovector ceramics can manipulate biological responses in a target space by both of the surface character and the electrostatic energies of the Electrovector ceramics at ion and tissue levels. We have demonstrated that the Electrovector ceramics enhanced protein adsorption, proliferation, adhesion, and differentiation of cultured cells on the ceramics as well as osteoconductivities in vivo by molecular biological and immunological detections.

   (4) **Development of applicable devices by ceramic technologies**

   We apply the Electrovector ceramics aforementioned to implant systems, such as artificial bones, bone joints, tooth roots, and are developing implantable devices with autograft-like osteoconductivities. We are undergoing improvements of sol-gel method for hydroxyapatite thin film coating and materials for vascular regeneration. We are extending our researches based on ceramic technologies farther, such as a control of oral environment, an improvement of oral esthetics, more effective and precise diagnosis systems for clinical laboratory medicine.

4. **Publications**

   **Original Article**


Books

Conferences

Invited

General
1. Staffs and Students

Professor
Yuichi IZUMI

Associate Professor
Hisashi WATANABE

Lecturer
Satsuki HAGIWARA, Akira AOKI

Research Associate
Shinichi ARAKAWA (~June), Hiroaki KOBAYASHI,
Yasuho TAKEUCHI, Tatsuya AKIZUKI,
Sayaka KATAGIRI (~April), Koji MIZUTANI (July ~)
Tomonari SUDA (Aug. ~)

GCOE AI Supper Students
Azusa YAMADA, Chui CHANTHOEUN,
Mayumi OGITA, Norihiko ASHIGAKI,
Ye CHANGCHANG, Supreda SUPHANANTACHAT

Graduate Students
Bhati PARIKSHA (~Sep.), Marika TAKAHASHI,
Masanori SAWABE, Naho KOBAYASHI,
Kaori FUJIWARA, Tomoya HANATANI (~Sep.),
Yasuho ITO, Kenichiro EJIRI,
Asuka SEKINISHI, Yuichi IKEDA,
Yasuyuki KIMURA, Akiko ENDO,
Noriko MARUYAMA, Akiko TSUNO,
Takahiko SHIBA, Kuniha KONUMA,
Shogo MAEKAWA, Takanori MATSUURA,
Takashi HOSHII, Keiko AKAZAWA (April ~),
Masayuki TOI (April ~), Masahiro NODA (April ~),
Takahiro IKAWA (April ~), Ayano UEKUBU (April ~),
Masaru ONIZUKA (April ~), Makoto KANEKO (April ~),
Misa GOKYU (April ~), Yuka SHIHEIDO (April ~),
Taicheng Lin (April ~)

Hospital Staff: 7, Research Student: 18, Registered dentist: 33

2. Purpose of Education

Periodontology is a branch of dental science which deals with supporting structures of teeth, diseases and conditions affect them. Main objectives of periodontology in the graduate course is to provide students basic knowledge of etiology of periodontal diseases, its treatment modality and prognosis, and also to study advanced regenerative therapy.

3. Research Subjects

1) Periodontopathic bacteria and their pathogenicity
2) Inflammatory and immunological factors in periodontal disease
3) Analyses of growth factors and bio materials in periodontal regeneration
4) Clinical applications of laser in periodontics
5) Influence of periodontal disease on general health

4. Clinical Services

Periodontal clinic provides diagnosis, treatment and prevention of periodontal disease. Periodontal surgery and regenerative therapy are also performed in the clinic.

5. Publications

Original Article
   Histological and SEM analysis of root cementum following irradiation with Er:YAG and CO2 lasers. Lasers Med Sci
   (e-pub May 15th, 2012).
   Clarithromycin Suppresses the Periodontal Bacteria-Accelerated Abdominal Aortic Aneurysms in Mice. J Periodontal


Book


Publication, World Congress for Oral Implantology, Published in June 25th, Tokyo, Japan, pp33-40, 2012. (Short communication)

Health Promotion

1. Staffs and Students

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor</td>
<td>Takehito Takano</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>Masashi Kizuki, Masafumi Watanabe</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>Satoshi Suyama, Pham Luu Hong (till September), Stephen Kibusi Mathew (till September), Chau Darapheak, Aya Anzai, Miho Ito, Azusa Okada</td>
</tr>
<tr>
<td>Research Student</td>
<td>2 students</td>
</tr>
</tbody>
</table>

2. Purpose of Education

Graduate School Programs

The objective of postgraduate education in the field of public health is to pursue professional qualifications of high caliber who exhibit leadership in the advancement of public health and promotion of health on an international scale. The department helps students attain knowledge, skills, attitude, and experiences that are necessary to become a competent public health specialist. With the expansion of the new graduate programs in the university, greater attention is now given to making commitments and contributions in the international arena. Presently, the phrase “think globally and act locally” has become a global movement. The advancement of public health demands an increase in professionals who possess a global perspective yet appreciate the importance of local activities.

[Master Programs]: Masters degree students receive a systematic intensive training that leads to the acquisitions of broad expertise in the fields of public health, immunology, and medicine of health promotion. This program now consists of students with backgrounds in various majors.

[Doctoral Programs]: Our doctoral program provides a flexible curriculum that allows students to customize their research goals, methods, and activities based upon their own interests and preferences. A rich variety of educational activities are arranged in the course of the program. These include, among others, individual discussion sessions with professors and other faculty members, field investigations, seminars on various topics such as community health care, community medicine, public health policy, biostatistics, academic presentation, development of foreign language skills, and communication skills. Students work closely with faculty members on an individual basis in setting the right direction for research and confirmation on each of their progress.

[Public Health Leaders (PHL) Program]: Students in the PHL program achieve in attaining the skills required for public health professionals with an international perspective, particularly for leadership roles in public institutions. Advanced students from many countries around the world are now enrolled. All the classes are conducted in English, thus, facilitating the acquisition of international communication skills.

Public Health Education Program for Medical School Student

The Graduate School of Medicine aims to prepare its medical students for future careers as physicians who will recognize the societal importance of their medical services and have the ability to fulfill both the scientific and social roles of their possessions.

[Social Medicine] The Medical Education at Tokyo Medical and Dental University can be broken down into three fields. They are 1) experimental, 2) clinical, and 3) social medicine. Social medicine emphasizes on the social aspects of medicine, which primarily has to do with the mechanisms of health, the occurrences of diseases, prevention methods, and the role of healthcare. It strives to identify the causes and mechanisms underlying the health problems confronting society, as well as to engineer solutions backed by a systematic and organized approach. Changes in the modern social atmosphere of medicine and healthcare are closely linked to several changes within the international society. The Social Medicine department follows the Medical Education Core Curriculum as its base, and also uses it as a benchmark study for the national examination for medical practitioners. Studies covered in this curriculum include critical issues that may or may not be new, but are relevant to the field of social medicine.

[Public Health] The Public Health education program is comprised of courses in public health, researches on public health related topics, off-campus internships pertaining to public health, and small group seminars. The topics in the Public Health education are the following:


The courses in the Public Health education program are limited in time, and thus, cannot cover all the topics listed above in full detail. Nonetheless, in demands presented by the national exam for medical practitioners, their post-graduate research, and for their future roles as physicians, students will need to thoroughly study the subjects on their own. In addition to these and counting, there is close to one hundred different topics that can be considered as topics for student’s research papers. In this paper, each student will be expected to develop and analyze an in-depth understanding about the subject they choose from the list. As part of the research, students will gather requisite materials and documentation, conduct surveys, analyze data, and prepare reports based on their topic. Internships and participation in small group seminars involve students working in small teams to investigate common subject matters. These programs are designed to help students reinforce their ability to engage in multifaceted investigations concerning with specific problems in the field of public health. Furthermore, students are to actively pursue in independent study, apply scientific reasoning, and be able to present their reasoning and conclusions to a broader audience in a structure that is comprehensive and explicit. Classes are taught by Tokyo Medical and Dental University Graduate School professors in the field of environmental, social, and clinical medicine.

3. Research Subjects
- Urban environments, lifestyles, and health
- Urbanization and its impact on health in developing countries
- Socioeconomic conditions, social inequalities, and health
- Standards and determinants of health
- Monitoring and evaluation of healthy cities development
- Information technology applications in Public Health
- The utilization of geographic information systems for Public Healthy policies
- The measurement of disease infection risks in urban societies
- The lifestyles and growth of children in urban areas
- Globalization of health care service and migration of medical professionals
- End of Life in the community healthcare system
- Working conditions of medical doctors
- Reconstruction support of disaster-affected areas

4. Publications

Original Article
Environmental Parasitology

1. Staffs and Students

Professor Nobuo Ohta
Associate Professor Nobuaki Akao
Assistant Professor Takashi Kumagai, Rieko Shimogawara,
Mitsuko Suzuki, Takenori Seki
Project Professor Takashi Suzuki
Senior Technical staff Misato Tomoda
Graduate Student (PhD) Takenori Seki, Toshie Taniguchi,
Keisuke Nakayama, Toshihiro Tokiwa,
Yuki Miyazawa, Katarina Macuhova,
Katsumi Maezawa, Toshio Arai,
Nobuhide Hata, Francis Ekow Dennis,
Ripa Jamal
Graduate Student (Master) Masafumi Yamabe, Emi Wada

2. Purpose of Education

Because of the recent development and the global changes in social system and life style, parasitic infections are becoming more heterogeneous. When we consider about factors promoting spreading parasitic diseases, multidisciplinary approaches are needed: medical, zoological and sociological.

Our laboratory mainly deals with pathophysiology and epidemiology of parasitic infections. Immunology, molecular biology and clinico-pathology are approaches employed. Main subjects in our laboratory are schistosomiasis, zoonotic helminthiases, malaria and trypanosomiasis, all of which include laboratory and field investigations. In the schistosomiasis research, we focus on developing new diagnostic method by DNA detection in the sample, and uncovering immunopathogenesis of the typical hepatic inflammation. For zoonotic helminthiases, developments of diagnostic tools are urgent matters to be studied. Our laboratory is one of the reference stations for the diagnosis in Japan.

Since 2008, TMDU started collaboration project on research on infectious diseases at Noguchi Memorial Institute for Medical Research. At the collaboration center at NMIMR, molecular approaches to discover new drug targets for African trypanosomiasis are underway.

3. Research Subjects

(1) Pathological Research on zoonotic parasitoses: Toxocariasis, Dilofilaria
(2) Epidemiological survey of parasitic diseases: Toxocariasis, Angiostrongyloïdiasis, Spirurine larva, Schistosomiasis
(4) Immunopathology of schistosomiasis: Regulation of egg-granuloma formation in schistosomiasis japonica.
(5) Drug development against parasitic infection: New drug candidates for schistosomiasis
(6) Regulation of gene expression in parasitic helminthes: RNAi and parasitism in schistosome parasites.
(7) Molecular and epidemiological research on parasitic infections in West African sub-region: Special

4. Clinical Services

Clinical services for the diagnosis of parasitic infections are our routine activities.

5. Publications

Original articles


Forensic Medicine

1. Staff and Students

Professor Koichi UEMURA
Junior Associate Professor Toshihiko AKI
Assistant Professor Takeshi FUNAKOSHI
Assistant Professor Kana UNUMA
Graduate Student Kyoko UCHIDA, Mayumi WATANABE,
Kanako NORITAKE, Naho HIRAYAMA,
Izumi FUNAKOSHI, Atsushi YAMADA,
Yumi WATANUKI, Marie BESSYO,
Yusuke FUJII, Haruka KOJIMA

2. Purpose of education

Forensic medicine provides fundamental human rights, public safety and nation's welfare to make a fair judgment on the items on the law which requires the medical knowledge. Education of forensic medicine is included forensic medicine in a narrow sense and medical law. Purpose of education in forensic medicine is to provide students opportunity to study the essential knowledge of the relationship between medical and society (include law, ethics, suit and administration). Students are also taught a blood type and an alcohol medicine in a practical training.

3. Research Subjects

1) Toxicology
2) Alcohol medicine
3) Forensic pathology

4. Practical services

Forensic Medicine provides the expert opinion on a living body and a corpse to clarify causes of wound and death, mainly entrusted by a public prosecutor or the police, thereby, contributing fair trial in a court.

5. Publications

Original Article

1. Staffs and Students

Associate Professor
Keiko Nakamura, MD, PhD

Junior Associate Professor
Kaoruko Seino, MMs, PhD

RONPAKU (Dissertation PhD)
Tayphasavanh Fengthong, MD, MPH

Program Fellow
Graduate Student [Public Health Leaders Course]
Suresh Babu Munuswamy, MD, MPH; Molina Honeyfaith Alteza, MPH; Al Rifai Rami Hani, DVM; Adam Izzeldin Fadl, MSc; Ghadah Al-khulaidi, MA; Mosiur Rahman MPH, Nguyen huu Chan Duc, MD Rasheed Abdul, MD
Rakprasit Jutarat, MPH; Shagdarsuren Tserendulam, MA

2. Purpose of Education

The objective of our postgraduate education is to provide professional qualifications to high-caliber people who exhibit leadership in the advancement of public health and promotion of health on an international scale. The department helps students attain the knowledge, skills, attitude, and experiences that are necessary for competent health specialists.

By the end of the completion of the doctoral course, the participants are expected to be able to

• Access health and well being the populations in local, national, and international settings,
• Assess evidence to show effectiveness of health interventions, programs and strategies,
• Think strategically to develop local, national, and international policies,
• Manage projects to successful completion
• Demonstrate leadership in local, national, or international public health programs
• Communicate properly when listening, presenting, writing, and negotiating
• Pursue a full-cycle of academic, public health research
• Facilitate learning of staff, students, and colleagues, and
• Practice and respect professional ethics in a socio-culturally diverse environment.

Master Programs

Master degree students receive systematic intensive training that leads to the acquisition of broad expertise in the fields of public health, immunology, and medicine of health promotion. This program is open to students who have majored in any field.

PhD Programs

Our doctoral program provides a flexible curriculum that allows students to customize their research goals, methods, and activities based upon their own interests and preferences. A rich variety of educational activities are arranged in the program. These include: individual discussion sessions with professors and other faculty members; field investigations; and seminars on various topics such as community health care, community medicine, public health policy, biostatistics, academic presentation, development of foreign language skills, and communication skills. Students work closely with faculty members on an individual basis in setting the right direction for their research and confirmation of their progress.

Public Health Leaders (PHL) Program

Students in the PHL program attain the skills required for public health professionals with an international perspective. The program prepares them for leadership roles in public institutions. Advanced students from many countries around the world are now enrolled. All the classes are conducted in English, thus facilitating the acquisition of international communication skills.

3. Research

The department’s major research interest is to elucidate physical, social, economic and cultural factors determining inequity in health. Our research investigates local, national and international policies and programs to redress health inequalities. The department works closely with WHO and other international agencies to help develop guidelines of scientific evaluation and recommended practices.
Major Research Topics:
1) Measuring population health to identify inequity in health and determinants thereof
2) Use of geographic information systems for evaluation of public health
3) Transfiguration of the ecosystem and its interaction with human health
4) Socio-cultural factors determining health
5) Outcome and process evaluation of health-development programs
6) Use of information technology to improve public health

4. Publications
[Original Articles]

[Review Articles]

[Books]
[Conferences]

[International collaboration in research/education]

[Collaboration with international organizations]

[Collaboration with local and national public health programs]
1. Nakamura K. Commission on optimal application of Healthy Cities in Owariasahi City, Owariasahi City

[JSPS program]
1. Fengthong T. Spatial environmental health monitoring model by using interactive associations among various health determinants and health status in Lao PDR.
Health Care Management and Planning

1. Staffs and Students (April, 2012)

Professor  Kazuo KAWAHARA
Assistant Professor  Makiko SUGAWA (December~)
Graduate Student  Hidehito TAKENAKA,  Daiske IKEDA,
Youichi SHIMA,  Eiko SHIMIZU,
Souichirou MOCHIZUKI,  Takeo NIGA,
Mutsumi UESUGI,  Kenjiro IDE,
Sawako OKAMOTO,  Keiko YOSHIDA,
Md. Ismail Tareque,  Taro TOMIZUKA,
Towfiqua Mahfuza Islam,  Woonkwan Hyun,
Masakazu KIKUCHI,  Yoko KOMURA,
Jian CHEN,  Masao MURATA,
Takamichi KOGURE,  Daisuke MUMAZAWA

2. Purpose of Education

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.

3. Research Subjects

In the academic areas mentioned above, we conduct research under the following topic areas:

1) The significance of public healthcare planning, its challenges, and influences on the healthcare system

We conduct research on issues related to new healthcare policies including planning, analysis, issue resolution, and making positive changes to the healthcare plan. This research area includes the Japanese emergency medical service and the impartial evaluation of the travel distance of aid agents and the time required for them to reach their destination.

2) Structural analyses and policy choices concerning national blood services

In Japan, we experienced HIV infection from tainted blood products. There were various causes for this event, and improvements are required in all processes: collecting blood, screening blood, manufacturing blood products, and following-up on the usage of these products. By analyzing background information related to the adverse events and their causes, we can propose the most appropriate policies related to blood services, thus ensuring safety, and securing a stable supply. To achieve a stable supply of blood products, we also conduct epidemiological studies to review guidelines on collecting blood.

3) The government role in preventing medical errors

Issues related to medical errors and adverse events have recently attracted a great deal of attention in Japan. We study the role that the government should play regarding various medical errors and their prevention as well as review and address the financial loss caused by blood-related adverse events and policies on prevention.

4) Local healthcare system

By reviewing and analyzing activities related to disease prevention and health promotion conducted by local healthcare centers, we research the role of the local healthcare system and its effectiveness and efficiency.

5) Systemizing and evaluating public health policies

We review the processes of creating public health policies and systems, address the association with the creating processes and stakeholders such as political parties and lobby groups, evaluate their policies, and then suggest improvements to these policies and systems.

6) The role of healthcare communication to fill in gaps between medical providers and patients, and to share the uncertainties related to medicine and healthcare
7) The influence of healthcare communication on patient and medial safety

8) Reviewing communication tools and skills, and their systematic introduction into the healthcare system in order to realize patient participation and proactive involvement in treatment processes

4. Clinical Services
   None

5. Publications
   
   **Original Article**

   **International conference**

   **Review Article**
   None

   **Book**
   None
Molecular Epidemiology

1. Staffs and Students

Professor Masaaki MURAMATSU
Associate Professor Noriko SATO
Assistant Professor Shinobu IKEDA
Adjunct Instructor Katsuko SUDO
Graduate Student Miki Yamada, Kyo Chan Ko, Nay Chit Htun, Cuneyd Palrayan, Atsuko Hiraishi, Sae Masuda, Zhao Chen-xi, Sariya Dechamethakun, Mia Sawabe, Kaung Si Thu, Research Students Khin Thet Thet Zaw, Azusa Sengoku

2. Education

We focus on common diseases such as diabetes, hypertension, obesity, metabolic syndrome, and atherosclerosis which are caused by multiple genetic and environmental factors, and aim to decipher these factors as well as their interactions by applying the technology and information of human genome to epidemiology. Our goal is not only to identify disease genes and polymorphisms but also to elucidate gene-environment interactions that contribute to the onset and progression of the diseases. Epigenetic changes in common diseases are also in our scope. A new project has been started to study methods for educating genome-based health literacy by employing information generated from personal genome sequences.

3. Research Subjects

1. Gene-environment interaction that affects the onset of metabolic syndrome and its related phenotypes.
2. Genetic factors that affect the severity of pathological atherosclerosis.
3. Severe cutaneous adverse response (Stevens-Johnson’s Syndrome) and HLA genotypes.
4. The role of epigenetic regulation and fetal programming in common diseases.
5. Application of personal genome to preemptive & preventive medicine.

4. Publications

Research Development

1. Staffs and Students (April, 2012)

Professor Kozo TAKASE

Graduate Students

Doctor course
- Yuko OJIRO
- Naoko MIAKE
- Akemi HIRABAYASHI
- Kiyoshi KOMIYA
- Hidehiro ANDO
- Hideki TERUYA

Yuji HIGASIDE
Keisuke YOSHIHARA
Tomoko IZUGAMI
Akira MIURA
Yasumasa OOSHIRO
Masakazu HARAMO

Master course (Master of Medical Administration)
- Haruhisa INABA
- Taku SAWANOBORI
- Tomomi YOSHIMURA

Kazushige ENDO
Yasunori MATSUZAKI

2. Education

1) Hospital Information Management
2) Medical Informatics, statistics
3) TQM in medicine
4) Biological bias and data management
5) Medical Law and Ethics
6) Medical induction course for Judges and Prosecutors (collaborated with the Supreme Court and Department of Justice)
7) Medical Engineering special program with Tokyo Institute of Technology
8) Health Promotion Policy program (General Medicine, Risk Management in Medicine) with Hitotsubashi University

3. Research Subjects

1) Introduction of Clinical Pathway in hospital
2) Medical law suit and professional information
3) Quality management of medical law suit
4) Organizational logic for hospital
5) Health care policy and rational
6) Management of medical information and privacy
7) Hospitality in medicine
8) Clinical guideline and medical quality
9) Development of medical engineering apparatus

4. Publications etc.

1) Original Papers

Health Care Informatics

1. Staffs and Students (April, 2012)

Professor          Kiyohide FUSHIMI
Graduate Student   Daisuke SATO, Sayuri SHIMIZU,
                   Takahiro INOUE, Chihiro TAKAHASHI, 
                   Ayako ODA,  Kenjiro MATSUFUJI, 
                   Asako TUKASAKI, Tsuyoshi KANEKO, 
                   Kyoko SHINODA, Ayako MATSUO, 
                   Motoko SANO,  Toshihiro TAMAKI, 
                   Shiho OHAMA

2. Purposes of Education

Health care informatics is a branch of health policy science which deals with the application of information technology to health policy research. Main objective of health care informatics in the graduate course is to acquire ability to independently design, manage and accomplish researches in health policy and health informatics fields.

3. Research Subjects

1) Functional differentiation and coordination of healthcare facilities
2) Development and application of patient case mix system for Japanese healthcare settings
3) Application of information technology to standardization of health care and sharing of health care information.

4. Publications

Original Article

Life Sciences and Bioethics
(Bioethics Research Center)

1. Staffs and Students (April, 2012)

Director & Professor  Masayuki YOSHIDA
Junior Associate Professor  Masumi AI, Yuka OZASA
Assistant Professor  Mizuko OSAKA
Tokunin Assistant Professor  Miwa SUZUKI
Visiting Associate Professor  Hideto ISHII
Visiting Junior Associate Professor  Eiichiro KANDA
Nurse  Naoko NII
Research Associate  Michiyo DEUSHI
Doctoral student  Kôtaro AIHARA, Katsuhiko HAMADA, Shunsuke ITO, Yuya MATSUE, Hakubun KYO, Midori SHUHARA

2. Purpose of Education

Department of Life Sciences and Bioethics (Bioethics Research Center) offers classes and seminars regarding bioethics, research ethics, and clinical ethics in Graduate School of Medical and Dental Sciences, Graduate School of Health Care Sciences, and School of Medicine. Our lecture includes fundamental bioethics and research ethics so that students can absorb the current concept of the bioethics and research ethics. We try to include clinical materials such as cases of genetic counseling, where ethics-based approach is critically important.

Apart from class for juniors, we give bioethics seminars for hospital staff and faculties based on the research ethics guideline revised 2008, in which attendance of bioethics lecture is mandatory for any person who conducts medical research.

We dynamically participated in extra-campus activities; such as the ethical committee members of the National Institute of Health etc.

3. Research Subjects

Department of Life Sciences and Bioethics actively conduct biomedical basic research described below:

1) MCP-1/CCR2 signals in Metabolic Syndrome
2) A role of YY1 in atherosclerosis
3) Anti-atherosclerotic effect of lactotripeptide
4) A role of lipid absorption in intestine and subsequent metabolic pathways

4. Clinical Services

Department of Life Sciences and Bioethics is responsible for Department of Clinical Genetics Division at the Medical Hospital of TMDU. Our clinical department provides counseling to individuals and families regarding actual and/or potential genetic concerns. We also offer laboratory services including cytogenic testing and molecular genetic testing. Our Genetic Medicine department is approved by the Japanese Medical Genetics Society for the Genetics Board.

5. Publications

Original Article


**Oral/Poster Presentation**


**Invited Speaker**

Health Care Economics

1. Staffs and Students (April, 2012)
Professor Koichi KAWABUCHI
Assistant Professor Isao IGARASHI
Graduate Students Mohammad Touhidul ISLAM, James Tumaini KENGIA, Masae AOTA
Research Student Sadao WATANABE

2. Purpose of Education
The purpose is to provide students with education and training in theoretical as well as practical approaches necessary in conducting economical analysis of various phenomena and reality found in healthcare field.

3. Research Subjects
1) Economical analysis of the prevention program for metabolic syndrome and counter-programs against onset and progress of age-related conditions
2) Study on measurement of non-market output of the service industry (healthcare)
3) Quantitative analysis of big data in healthcare and review of related policies
4) Research on cost-effectiveness analysis of proton radiotherapy for pediatric tumor such as medulloblastoma
5) Impact assessment of OTC use on healthcare cost and the society

4. Publications
Original Articles

Review Article
Dental Education Development

1. Staff and Students

Professor                  Ikuko MORIO
Junior Associate Professor Jun TSURUTA
Graduate Student           Rei MUROGA, Akira TAKINAGA, Chinatsu MATSUWAKA (since April 2012)

2. Purpose of Education

Main educational goal of this section as part of graduate school is to help students in health care sciences learn the basics of medical/dental curriculum: educational objectives, strategies and evaluation. This section is currently involved in the undergraduate dental education as the coordinators of multiple modules: the PBL-tutorial, the students’ research project, and the electives including various English courses for dental students.

3. Research Subjects

1) Comparative study of medical/dental education in Japan and overseas.
2) Study of research projects for medical/dental students
3) Development of English education programs for medical/dental students
4) Development of multimedia teaching materials for medical/dental students
5) Development of Japanese language learning materials for international students

4. Clinical Services

Clinic of Oral Diagnosis and General Dentistry (Dr. Tsuruta)

5. Publications

Oral Health Promotion

1. Staffs and Students

Professor
Yoko Kawaguchi

Associate Professor
Masayuki Ueno

Assistant Professor
Takashi Zaitsu (~March), Sayaka Furukawa (April~)

Project Assistant Professor
Sachiko Takehara (~November)

Hospital Staff
Mari Ohnuki

Registered Resident
Hiromi Nishiyama, Yukiko Fujishiro

Part-time Lecturer
Akiko Ohshiro (October~)

Graduate Student
Akiko Ohshiro (~March), Susumu Takeuchi (~March),
Melissa Adiatman (~September),
Ayumi Takayama (~March), Haslina Binti Rani,
EiEi Aung (April~), Anastasiya Blizniuk (October~)

Research Student
Motoko Ariake, EiEi Aung (~March),
Anastasiya Blizniuk (April~September)

2. Purpose of Education

1) Graduate School, Oral Health Promotion
   The educational purpose is to foster professionals in dental public health and preventive dentistry who can think oral health problems as related issues with living environment, life style, health policy and social condition, and can conduct innovative, academic and international research on oral health for maintaining and improving oral health.

2) Graduate School, International Oral Health Cooperation
   The educational purpose is to foster dental professionals who can conduct innovative, academic and international research that can contribute to health promotion in an international society, and can work as a leader of the international health cooperation.

3) Undergraduate Education
   The department is in charge of module units of “Introduction to dentistry”, “Environment and society II” and “Comprehensive problem exercise” for the third year dental students, and module units of “Basis for dentistry”, “Prevention and health management I”, “Prevention and health management II” and “Dentistry and nutrition” for the fourth year dental students. The department is also in charge of “Experiential research exercise” for the fourth year dental students, and “Comprehensive clinical practice phase I & II” for the fourth and fifth year dental students, in cooperation with other departments.

3. Research Subjects

Research topics are innovative, academic and international research in the field of dental public health and preventive dentistry to proceed with oral health promotion that contributes to human health. The current main research themes are:

1. Epidemiology and prevention of dental disease
2. Oral health care system
3. Relationship between oral health and general health
4. Oral health promotion
5. Diagnosis and treatment system construction of oral malodor
6. International oral health

4. Clinical Services

“Fresh breath clinic” in Dental hospital, Tokyo Medical and Dental University is a special clinic for diagnosis, treatment and prevention of oral malodor. About half of oral malodor patients are referred from other departments in the dental hospital or outside dental clinics. Other patients visit the clinic by finding the information of the clinic from mass media such as the internet, newspapers and television.

For oral malodor examination, gas chromatography and gas sensor instrument are used to measure the concentration of volatile sulfur compounds (VSCs) along with the organoleptic test. Oral malodor is treated based on diagnosis by precise measurement and oral examination, besides psychological aspects of the patient are paid attention. Treatment of oral malodor needs continuous periodontal disease management and oral care in cooperation with oral care department in the
dental hospital and patient’s family dentist.

5. Publications

Original article

1. M Ueno, Y Izumi, Y Kawaguchi, A Ikeda, H Iso, M Inoue, S Tsugane: Pre-diagnostic Plasma Antibody Levels to Periodontopathic Bacteria and Risk of Coronary Heart Disease for the JPHC Study Group International Heart Journal, July 2012; 209-214


Sports Medicine/Dentistry

1. Staffs and Students (April. 2012)
   
   **Associate Professor**  Toshiaki Ueno
   **Assistant Professor**  Toshiyuki Takahashi, Hiroshi Churei
   **Hospital Staff**  Sachiko Fujino, Katsuhide Kurokawa
   **Graduate Student**  Keisuke Abe, Sharika Shahrin, Ruman Uddin Chowdhury, Takayuki Ishigami, Kairi Hayashi, Mai Tanabe, Akihiro Mitsuyama, Sintaro Fukasawa, Abhisheki Shrestha

2. Purpose of Education
   Sport medicine/dentistry is a branch of medical and dental sciences which deals with the clinical management of oral health of athletes and sports-active people and the safety measures of sports-related traumatic injuries and disorders. Main objective of sports medicine/dentistry in graduate course is to provide the students to study the oral health conditions in athletes and sports-active people, the changes of oral environment associated with physical and sporting activities, the possible correlations between occlusion and general motor functions and body posture, the novel techniques of sports mouthguard and faceguard, the relations between mastication and occlusion and brain functions, and so on. Students are also taught to advanced knowledge on sports medicine/dentistry and up-to-date techniques to fabricate custom mouthguard and faceguard.

3. Research Subjects
   1) Oral health promotion of athletes and sports-active people
      (1) Field survey of oral health conditions in athletes and sports-active people
      (2) Changes of oral environment associated with physical and sporting activities
      (3) Influences of sports drinks and supplements on oral health
   2) Safety measures of sports-related dental and maxillofacial traumatic injuries
      (1) Diagnosis and treatment techniques for sports-related dental and maxillofacial injuries
      (2) Development and innovation of sports mouthguard
      (3) Development and innovation of sports faceguard
      (4) Development and innovation of scuba diving mouthpiece
   3) Correlations between occlusion and general motor functions
      (1) Biomechanical assessment of motor performance associated with occlusion
      (2) Electrophysiological analysis of neuromuscular function associated with occlusion
   4) Correlations between occlusion and body posture
   5) Relations between mastication and occlusion and brain functions
   6) Application of HBO therapy to sports-related dental diseases and traumatic injury

4. Clinical services
   Sports dentistry clinic in Dental Hospital of Tokyo Medical and Dental University offers comprehensive care and clinical management for athletes and sports-active people suffered dental diseases and traumatic injuries. Custom-fitted protective gears such as mouthguard and faceguard against sports-related dental and maxillofacial trauma are also handled for participants in contact sports such as a boxing, American football, rugby football, hockey, lacrosse, and martial art.

5. Publications
   **Original Articles**

6. Presentations


4) Chowdhury RU, Churei H, Takahashi H, Sharika S, Ueno T: Mouthguard design for sports-active person with spaced dentition. 100th FDI Annual World Dental Congress, Hong Kong, China, Aug 29 - Sep 1, 2012.

7. Grants and Fellowships

1) JSPS Grant-in-Aid for Scientific Research (Japan Society for the Promotion of Science, 2009.4-12.3). Ueno T, Takahashi T.

2) JSPS Grant-in-Aid for Scientific Research (Japan Society for the Promotion of Science, 2011.4-14.3). Takahashi T, Kato G, Ueno T.


4) Project Research Grant (Japanese Association for Dental Science, 2012.4-14.3). Yasui T, Maeda Y, Ishigami K, Ueno T, Takamata T, Koide K, Matsumoto M, Kawara M.

8. Awards and Honors

N/A

9. Volunteer activities and International exchange, etc


Educational System in Dentistry

1. Staffs and Students

Professor  Kouji  ARAKI
Junior Associate Professor (non-full time)  Yukio NAKAMURA, Hiroki KATAOKA
Secretary  Satomi ITOH
Graduate Student  Hirono KIKUCHI, Michiyo KUROSA

2. Purpose of Education

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.

3. Research Subjects

1) The development of evaluation method for dental education curriculum
2) The development of inspection method of the validity and reliability of the evaluation system for dental education
3) The development of evaluation system compared between international and Japanese education level in undergraduate or after the graduation periods
4) The development of the program for dental clinical skills improvement by the virtual reality simulation system

4. Clinical Services

In the Clinic of Oral Diagnosis and General Dentistry, University Hospital, we performs manner education, for a student during clinical training.

5. Publication

Educational Media Development

1. Staffs and Students

Professor Astuhiro KINOSHITA
Assistant Professor Masayo SUNAGA
Assistant Professor on Special Assignment
  Yoko HAGIYA
  Izumi KIKUCHI

2. Purpose of Education

We will assist graduate students in understanding new educational systems and media utilizing information-communication technologies, such as the computer-assisted education system, the e-learning system and the live broadcasting lecture system. We will also assist these students in mastering how to create related educational media and apply it to medical, dental, nursing and dental hygiene education, as well as interprofessional cooperation.

First and Second-year students at the School of Dentistry, and first and second-year students at the School of Oral Health Care Sciences will learn to process media information and create media content, as well as how to search the Internet for information that is necessary for their study and research activities. They will also learn how to make use of various databases.

Fourth-year students at the School of Dentistry will acquire the practical knowledge, communication skills and attitude to build good relationships with patients by gaining clinical experience at an early stage. This practice consists of two units: clinical experience in the teaching clinic and the computer-assisted simulation practice. This experience will enhance the students’ abilities, enabling them to be effective clinicians.

3. Research Subjects

1) Development of computer-assisted clinical simulation system for medical and dental practice training.

In our university, we executed the Establishment of Computer-Assisted Education System on Clinical Simulation for Medical and Dental Practice Training project, which was adopted as part of the Support Program for Distinctive University Education in 2005, and developed the computer simulation materials on clinical education by utilizing digital clinical data from our Medical and Dental hospitals. We have expanded our study into a new project, ‘Progress of Computer-Assisted Simulation for Medical and Dental Practice Training – Computer-Assisted Simulation Promoting Clinical Inference, Decision-making, Problem Solving and Cooperation Abilities of Health Professionals’, which was subsequently selected to be part of the Program for Promoting the University Education Reform in 2009 by the Ministry of Education, Culture, Sports, Science and Technology. After utilizing the simulation materials for our students, we will evaluate and analyze their educational efficacy. Furthermore, we will develop a computer-assisted clinical simulation system for the entire university.

2) Development of new education system using information and communication technologies for medical and dental students.

At our university, we executed the Integration of Information and Communication Technologies into Clinical Training project, which was adopted as part of the Support Program for the Contemporary Educational Needs in 2007. The aim of this program is to integrate traditional educational methods with advanced information and communication technologies in order to allow clinical training, practical training and lectures to be effectively interlinked. By expanding digital content and employing an automatic visual recording system, we are planning to establish a digital archive of treatments and surgeries, demonstrations of dental techniques, lectures and student training. We will then launch an on-demand distribution system in order to incorporate this content into clinical education, which the students will be able to use for their self-evaluation and learning.

3) Development and utilization of an educational media for medical and dental students.

- Development and Study of Computerized Dental Simulator for Training of Dental Cavity Preparation and Prosthodontic Tooth Preparation practices:
  We plan to develop a new computerized dental simulator and evaluate its effectiveness for training in dental cavity preparation and prosthodontic tooth preparation.

- Development and Study of Dental Model and Kit for Practical Training:
Dental and dental hygiene students must acquire skills for measuring periodontal pockets and must learn to identify the base of the pocket. However, few dental models are commercially available, and students cannot measure deep periodontal pockets by practicing on one another. Thus, we developed a new dental model with which the students can practice the probing of deep periodontal pockets, and plan to evaluate its effectiveness in training and evaluation of examiners.

- Development of Composing and Screening System for Original 3D Movies from Operator’s Viewpoint:
  If students can experience and recognize three-dimensional space from the operator’s (instructor’s) viewpoint during their practice sessions and lectures, it would have educational benefits. Thus, we plan to develop a Composing and Screening System for Original 3D Movies from an Operator’s Viewpoint. Furthermore, we will improve the quality of distance learning and remotely operated instruction using the superimposing method.

- Development of Dental Handpiece System with CCD camera:
  We plan to develop a system equipped with a CCD camera, mirror and reverse image units in order to allow students in the lecture room to observe dental treatment sites in real-time, thereby giving them a sense of being at a clinic.

4. Publications

Original Article
1. Staffs and Students

Professor
Kentaro SHIMOKADO, MD

Associate Professor
Eiji KANEKO, MD

Assistant Professor
Yasuko ABE, MD, Shohei SHINOZAKI PhD, Kenji TOYOSIMA, MD

Graduate Student
Yasuko USHIO, Mizuki IWAMA, Rie MASUDO, Norihiko IZUMI\(\text{\textperiodcentered}\) \(\text{\textperiodcentered}\) Kae ITO, Tomomi HAKAMADA, Yuki KISHIMOTO, Ryo NAKAYAMA, Keita TAKAHASHI

2. Purpose of Education

1) Undergraduate education of medical students with a particular emphasis on geriatrics
2) Development of ability to conduct the research on aging and age-related diseases with a particular emphasis on atherosclerosis

3. Research Subjects

1) Cell biological mechanisms of atherogenesis
2) Mechanisms involved in dyslipidemia
3) Mechanisms of aging and age-related diseases
4) Undergraduate and postgraduate education in geriatrics

4. Clinical Services

As a division of the Department of Internal Medicine, we are taking care of elderly patients who are better treated by us rather than by highly specialized experts both at the outpatient clinics and the ward of our university hospital. We also provide subspecialty service such as oriental herbal medicine, mononuclear cell transplantation for PAD, and dyslipidemia clinic.

5. Publications (Original articles)

Rehabilitation Medicine

1. Staffs and Students (April, 2012)

Associate Professor                  Sadao MORITA
Graduate Student
   Kazuhisa INOUE,                    Akihito KUBOTA,
   Tomoko ARAKI,                      Junya AIZAWA,
   Keisuke KAJI,                      Risa NAKAYAMA,
   Kashitarou HYOUDOU,               Kinei BOKU,
   Chisato TAKADA,                   Maierhaba AILIXIDING,
   Takanori KOKUBUN

2. Purpose of Education

Rehabilitation medicine consists of physical, occupational and speech therapy. Main theme of rehabilitation medicine in graduate course is to study 3-dimentional motion analysis in activities of daily living and molecular biological analysis of disuse atrophy.

3. Research Subjects

1) 3-dimention motion analysis in activities of daily living
2) Balance and occlusion
3) Biomechanical analysis of artificial limb
4) Prevention of dislocation after total hip arthroplasty
5) Prevention of disuse bone atrophy

4. Publications

Original Article
1. Staffs and Students

Professor Hiroshi UEMATSU (~2012.3)
Associate Professor Tsuneto OHWATARI
Junior Associate Professor Ken’ichi KOBAYASHI, Toshiaki SEKITA
Assistant Professor Kazuo MOTOMURA, Ayako NAKANE, Shino MURATA, Shinya MIKUSHI (~2012.3), Syuuhei TAKEUCHI

2. Purpose of Education

Given the increased health needs of an aging society, we aim to integrate diverse clinical specialties related to geriatric dental practice and to educate individuals of fundamental studies in each field. We emphasize a comprehensive approach to patient interactions by examining daily life functionality rather than focusing only on their diseases.

With regard to dysphagia, which can lead to aspiration pneumonia, we provide comprehensive education on causes, diagnostic methods, and rehabilitation options from a dentistry point of view. Since we regard rehabilitation as the medicine of daily living, we emphasize that dysphagia rehabilitation should be considered a method to ameliorate disability rather than diseases by introducing practical approaches in addition to factual knowledge.

3. Research Subjects

1. Medical management of Elderly Patients During Dental Treatment

Most of medically compromised elderly patients have poor hemodynamic stability. Medical emergencies, such as hypertensive crisis, heart attack and severe arrhythmias, frequently occur in their dental practice. The prevention and prediction of medical emergencies are essential. The purpose of our research is to develop a noninvasive prediction system of medical emergencies in dental practice of medically compromised elderly. For this purpose, our research subjects are as follows: (1) Epidemiological study of medical history, medication and physical examination data in the medically compromised elderly patients, (2) Analysis of hemodynamic changes of those undergoing open heart surgery, (3) Analysis of arrhythmia during invasive dental treatment, (4) Linear and nonlinear analysis of biological signals, (5) Systemic identification analysis of closed loop circulatory system for the prediction of hypertensive crises, (6) Investigation of etiology and risk factors of medical emergencies during dental practice.

2. New Examination Method for Dry Mouth

Construction of an optical fiber oral fluid measurement system and development of oral moisture measurement devices are underway to provide new methods for examining dry mouth in elderly patients.

3. Oral Stereognosis Ability in the Elderly

We used near infra-red spectroscopy to measure brain activity of elderly people in an oral stereognosis ability test (OSA test). Furthermore, the OSA test is currently being reformed and examined for practical application as a screening test for dementia.

4. Threshold of Mucous Membrane under Denture Base in Elderly Oral Mucosa Patients

Using Semmes-Weinstein monofilaments we measured the pain threshold of the mucous membrane under the denture base and examined the change in pain threshold based on the number of remaining teeth or occlusal pattern. Furthermore, we examined possible causes of change in oral pain threshold.

5. State of the art Lasers in Zirconia Prosthetic Processing and Pain-free Treatment

With the goal of establishing a “ceramic crown digital process”, we manufactured 3D CAD data for crowns and combined nanosecond lasers and femtosecond lasers and tested 3D high-speed laser processing of fully sintered
gerontology and gerodontology

zirconia. We also examined the efficacy of natural teeth with a non-thermal femtosecond laser with an extremely small processing reaction force.

6. Denture Mobility

We have developed an inertial measurement unit device for the measurement of denture mobility. This system is composed of an accelerometer, a magnetometer, and a gyro.

7. Deglutition in Elderly Patients Requiring Nursing Care

We studied swallowing care in elderly patients in long-term nursing care facilities and the dietary planning and oral maintenance in those facilities.

We also examined the influence on food intake and swallowing function of foods with added fat that were developed to improve both ease of eating and nutrient levels.

8. Eating and Swallowing Rehabilitation in Post-Oral Tumor Surgery Patients

Our study focused on the swallowing dynamics of pills and the effects of the reclined position, with respect to eating and swallowing disability following oral tumor surgery. We also created a clinical pathway for them and are studying effective rehabilitation methods in order to speed up food intake.

9. Dysphagia of Medullary Infarction Patients

There are cases of lateral medullary syndrome patients in which food predominantly passes through the affected side, and the cause has been thought to be the laterality of the pharyngeal contraction during the swallowing reflex. Therefore we researched, compared and examined the laterality of the side of the pharynx on which food passes and the number of days after onset of condition, the presence of laterality of pharyngeal contraction, and the point position of food during the swallowing reaction.

10. Dental Approaches to Dysphagia

Coping methods for food intake and swallowing disability are primarily physical therapy approaches. By clarifying the effects of specific approaches from dental care practitioners, in order to clarify the importance of our existence in this field, we are studying Palatal Augmentation Prosthesis (PAP), Palatal Lift Prosthesis (PLP) and specialty oral care.

11. Screening Methods of Silent Aspiration

The majority of food intake and swallowing disability screening methods up until now used coughing during accidental swallowing as an index. So we examined the usefulness of a cough test as a screening method for silent aspiration in which there is no coughing. Furthermore, we are conducting research to increase the precision of screening without increasing the difficulty of evaluation.

12. Swallowing Dynamics and Brain Activity

Using optical topography devices we analyzed which regions of the brain were active during swallowing and application of food intake and swallowing rehabilitation methods.

4. Clinical Services

We manage the outpatient special care and the outpatient dysphagia rehabilitation.

1. Outpatient special care for department elderly:

Comprehensive dental treatment is given to patients who are 65 years and older with diseases spanning multiple specialties. We work together with outpatient specialty departments for complicated cases. Since many of our patients are elderly individuals with cardiovascular disease, in order to carefully manage their overall medical condition, we measure oxygen saturation with a pulse oximeter, perform electrocardiography, and monitoring a blood pressure at the time of their dental treatment. We perform invasive treatments under controlled monitoring by a specialist and take extra safety measures. In addition to providing treatment, we hold consultations before treatment and carry out highly predictable safety management.

2. Outpatient dysphagia rehabilitation:

Patients in this department are mainly inpatients from hospitals affiliated with a medical school or an oral surgery department. For inpatients from oral surgery departments, we conduct the examination and training. For inpatients of our hospitals, we work together with the hospitals physical therapy department. We organize collaboration with these physical therapy and oral surgery departments, and accept about 100 to 150 cases from these departments. With the opening of the new outpatient department, we have received more and more requests from pulmonary, gastroenterology, and head and neck outpatient departments, as well as general medicine clinics and telephone consultations. For each case,
we provide continuous guidance not only to the patients but also to associated workers and family members. Furthermore, we help introduce examination and training methods upon requests from other medical institutions that wish to practice dysphagia rehabilitation.

5. Publications

Original articles


Review Article

Book
Laboratory Medicine

1. Staffs and Students

Professor Nobuo NARA
Associate Professor Shuji TOHDA
Research Associate Mai ITOH
Graduate Students Yuki OKUHASHI, Yusuke TAKAHASHI, Aya ONO

2. Purpose of Education

Main objective of Laboratory Medicine in the graduate course is to provide students opportunity to study analysis of pathophysiology, development of new diagnostic tests, and establishment of diagnosis-supporting system using laboratory tests. We focus on the analysis of pathophysiology of hematological malignancies and the development of molecular diagnostic tests for cancer and infectious diseases.

3. Research Subjects

1) Mechanism of abnormal growth of acute leukemia cells
2) Molecular diagnostic tests for cancer and infectious diseases
3) Mechanism of abnormal growth of lymphoma cells
4) Detection of minimal residual leukemia or lymphoma cells

4. Clinical Services

We are developing new diagnostic methods collaborating with various clinical departments. We are also supporting them in their diagnostic procedure.

5. Publications

Original Article

Critical Care Medicine

1. Staffs and Students (January 2012~December 2012)

Associate Professor  Chieko MITAKA
Assistant Professor  Go Haraguchi (Intensive Care Unit) (2011.4.1~)
                  Maiko Yamauchi (Intensive Care Unit) (2011.2.1~2012.5.31)
                  Mamoru Yamamoto (Intensive Care Medicine) (2012.6.1~)
                  Masatoshi Jibiki (Critical Care Medicine) (2012.4.1~)
                  Takahiro Toyofuku (Critical Care Medicine) (2011.4.1~)
Hospital Staff  Yasuhiro Ueda (Intensive Care Unit) (2011.10.1~2012.3.31)
                Yutaka MIYAWAKI (Intensive Care Unit) (2009.4.1~2012.3.31)
                Masanori Konishi (Intensive Care Unit) (2012.4.1~2011.6.30)
                Naoto Fujiwara (Intensive Care Unit) (2012.4.1~)
                Postgraduate students  May Khin Hnin Si (2010.4.1~)
                Miniwan Tulafu (2010.4.1~)

2. Purpose of Education

   Undergraduate education

   Lectures: Fourth-year medical students
   1) Acute respiratory failure and mechanical ventilation (Mitaka)
   2) Sepsis and multiple organ dysfunction syndrome (Mitaka)
   3) Examination of critical care medicine

   Clinical clerkship: Fifth-year and Sixth-year medical students

   Critical care medicine is a branch of faculty of medicine which deals with monitoring and care of critically ill patients. Main objective of critical care medicine is to provide students opportunity to study diagnosis and treatment of critically ill patients in the intensive care unit (ICU). Students are taught on clinical practice in the ICU. Students take charge of 1-2 patients with attending physician and intensivist. Students check clinical data every morning and evening and make system-oriented presentation at ICU rounds.

   Conference: Students are assigned to read recent articles of critical care medicine and make presentations by power point at the conference.

3. Research Subjects

   1) Treatment and prevention of ischemia/reperfusion injury of lung
   2) High tidal volume ventilation and remote organ injury
   3) A selective inhibitor for inducible NO synthase in endotoxic shock
   4) Blockade of NF-κB activation in endotoxic shock
   5) Treatment for septic shock by poly (ADP-ribose) synthetase inhibitor
   6) Clinical study of atrial natriuretic peptide
   7) Effects of atrial natriuretic peptide on acute kidney injury

4. Clinical Services

   Critical care medicine provides intensive care and treatment of critically ill patients. The role of intensivists take charge treatment of critically ill patients in the ICU. To treat critically ill patients, intensivists have to catch the changes of the patients' condition by monitoring and evaluation, and practice appropriate therapy. It is important that intensivists practice minute-to-minute titration therapy in cooperation with attending physician. The purpose of critical care medicine is to treat and improve the serious condition by maintaining the patients' hemodynamics to be stable.

   Critical care medicine includes intensive care for various types of shock, acute respiratory distress syndrome/acute lung injury, sepsis, multiple organ dysfunction syndrome, abnormal acid-base balance, abnormal electrolyte, acute kidney injury, central nervous system dysfunction, and hospital-acquired infection, mechanical ventilation, pharmacological support, cardiopulmonary support system, blood purification, and nutrition support.
5. Publications

[Original Article]


[Conference]


[Research grant]

1. Staffs and Students (April, 2012)

Associate Professor: Eisuke MATSUSHIMA
Junior Associate Professor: Miho MIYAJIMA
Tokunin Assistant Professor: Hospital Staff
Secretary: Kyoko NAKAGAWA
Graduate Student: Aya KOIZUMI, Motonori KIMURA, Hirofumi NAKAMURA, Makiko KOIKE, Ako HANEKAWA, Mare NISHIURA, Mariko KOBAYASHI, Yuhko KOHNO, Nao NAKAYAMA, Kanako ICHIKURA, Hiroshi KOBO, Yoko SUZUKI, Ayasa MATSUDA, Ryuho IBARAKI, Natsumi NAKAMURA.

2. Purpose of Education

The purpose of the section is to help understanding characteristics of psychosocial distress in patients with physical and mental disorders from a comprehensive viewpoint. Objects are mainly physical patients accompanied with pain, anxiety, depressive mood and so on. Students study these patients’ symptoms, how to diagnose, practice of treatment and methods of preventive measures.

3. Research Subjects

1) Assessment of mental state in cancer and other physical patients using written questionnaire
2) Research on quality of life (QOL) in cancer patients and their families
3) Investigation cognitive function of patients with organic disorders (SLE, diabetics, and so on) undergoing a battery of psychometry tests and neuroimaging examinations
4) Explanation for the relationship between physical symptoms and mental states in patients with psychosomatic diseases including chronic pain and irritable bowel syndrome (IBS)
5) Examination for physiological phenomenon of psychiatric patients using eye mark recorder, electroencephalogram (EEG) and functional MRI (fMRI)

4. Clinical Services

Psychosomatic clinic provides consultation-liaison psychiatry services at the request of the treating medical or surgical staffs. Patients accompanied with insomnia, anxiety, depressive mood and delirium are treated with psychotherapy and prescription medicines.

5. Publications

Original Article


4. Ako Terakado, Takako Watanabe: Creation of a questionnaire to measure stress among nurses engaged in palliative care on general wards. Support Care Cancer. 20(10), 2012


Pharmacokinetics and Pharmacodynamics

1. Staffs and Students (April, 2012)
Professor Masato Yasuhara
Associate Professor Masashi Nagata
Graduate Student Ryosuke Isozaki, Seiji Karakawa

2. Purpose of Education
Department of Hospital Pharmacy, University Hospital of Medicine, is in charge of the education of pharmacokinetics and pharmacodynamics for the establishment of safe and effective drug therapy. In the graduate course, the lecture on the recent progress of the pharmacokinetic analysis and drug transport will be given. Students will have the practice of pharmacokinetic analysis and animal experiments.

3. Research Subjects
1) Investigation on the membrane transport of drugs
2) Kinetics of drug action in disease states
3) Therapeutic drug monitoring and clinical pharmacokinetics
4) Development of new drug delivery systems

4. Clinical Services
Department of Hospital Pharmacy provides all services about the pharmacotherapy, including dispensing, formulation, preparation of injections and infusion solutions, drug information, and therapeutic drug monitoring.

5. Publications
Original Article
Medical Education Research and Development

1. Staffs and Students

Professor Yujiiro TANAKA
Junior Associate Professor Makoto TAKAHASHI, Shinya OOKA, Yuki SUMI
Project Junior Associate Professor Toru SUGIYAMA
Attending Staff Akiko KITAZUME

Department of General Medicine was established in 2000, when Prof. Yujiro Tanaka assumed the role of chairman of the department. Since then, our aim has been to coordinate and support a wide range of new innovations for the department of medicine and its affiliated hospitals. Accordingly, we launched the following projects to carry out our mission: 1) Designing a new postgraduate clinical training program for TMDU affiliated hospitals, 2) Forming a patient support system including social casework, 3) Establishing the Center for Cell Therapy, and 4) Reforming undergraduate medical education.

In response to the expansion of our activities, we have had some reforms in our organizations. 1) We founded the Center for Postgraduate Medical Education in 2002. (Director: Prof. Tanaka. Associate Director: Dr. Masanaga Yamawaki/former, Dr. Yoshihito Momohara/former, and Dr. Makoto Takahashi/previous) 2) In 2002, we also established the Center for Health and Welfare. And two years later in 2004, it was developed into an independent center as the Department of Medicine when Dr. Masayoshi Shichiri was appointed as the Director. 3) The Center for Cell Therapy, which was first established as a part of the Blood Transfusion Department in March, 2001, became an independent organization in 2003. Then Dr. Tomohiro Morio became the director. 4) Prof. Tanaka became a member of the Board of Education and worked at the committee for curriculum renovations in the Department of Medicine. Then he became the chair of the Education Committee in 2004.

In addition to the curriculum reforms, the Department of General Medicine has been in charge of early clinical training, PBL implementation, supervising patient-doctor communication education, OSCE (objective structured clinical examination) preparation, and BSL (bedside learning). We have also promoted educational alliances with Harvard University since 2002 and with Imperial College, London since 2003.

As mentioned above, a couple of years after their launch, the Center for Health and Welfare and the Center for Cell Therapy became independent from the Department of General Medicine. Meanwhile, new working groups were formed within the department in 2004; the Working Group for Ward Management and the Safety Management Committee. The Department of General Medicine also devised an evaluation system for the residency training program (EPOC), which was later adopted as a national online evaluation system for postgraduate clinical training. We are working in close cooperation with Center for Interprofessional Education which we took in part of its establishment to materialize the interprofessional education introduced due to a revision of new curriculum in 2011.

2. Education

Undergraduate Education

As a division, which is responsible for the education of students and residents, our primary goal is to foster doctors who have both a ‘patient-centered perspective as a specialist’ and ‘up-to-date knowledge as a generalist’. To achieve our goal, we are designing and offering a continuing medical educational (CME) program for clerkship students, emphasizing on educational systems spreading among multiple departments. Since we think it is crucial to foster medical prospective with a patient-centered perspective, we introduced an early exposure course (MIC: Medical Introductory Course) for the 1st and 2nd year medical students, as well as some medicine oriented English courses, including a special course titled "Language and Philosophy of Western Medicine" regarding some of the needs of this globalized era of medicine. In addition, we are managing a training course for simulated patients who can contribute to medical education cooperating with the International Center for Medical Education at the University of Tokyo. To improve the quality of clinical training, we are currently developing an evaluation system for tutors and trainers.

Postgraduate Education (Clinical Training)

Our department has offered the postgraduate clinical training since 2004 according to the new national residency system in Japan. We have also played an important role in developing the online evaluation system for postgraduate
Comprehensive Patient Care

clinical training (EPOC), which is used in 60% of education hospitals in Japan. Results of the questionnaire in Match, 2009 showed the highest satisfaction rate among all national universities.

Postgraduate Education  (Master’s degree courses)

We have been offering master’s degree courses in Medical Administration since this MMA program started in 2004, and were in charge of two courses this year, "Human resources management" and “Leadership in the medical care.”

3. Research

Research on continuing education in clinical EBM (Tanaka)

Although the theory of EBM (Evidence-Based Medicine) has become common knowledge, there are many practical problems yet to be solved. Research on teaching and assessment techniques for under-and post-graduate clinical training are ongoing.

Medical risk education using the HAZOP method-through analyzing basic surgical procedure (Takahashi)

Structured risk analysis methods, HAZOP, are applied for medical risk management. We have also developed computer software for risk analysis with HAZOP. As a method of medical education for medical risk as well, HAZOP is a comprehensive method that is effective in reducing medical errors.

Review of clinical training in postgraduate clinical education (Tanaka, Takahashi)

The performance evaluation system using EPOC, which is used in 60% of educational hospitals in Japan, was primarily developed at Tokyo Medical and Dental University. We applied this system to a clerkship program to compare its educational effect with that of a residency program.

General research on medical education (Tanaka, Takahashi, Ooka, Sugiyama, Sumi)

We are developing a comprehensive research project regarding postgraduate medical education, primary care in rural regions, development of clinical competence, and a new PBL system.

4. Clinical Practice

Second Opinion (Takahashi, Ooka)

Our hospital is open to the public who ask for second opinions about their recommended treatments so that we can continue to contribute to the provision of safe and high-quality advanced medical technology. Over 300 consultation cases have been performed for patients coming from other hospitals nationwide. The purpose of this section is to assist the patients to exercise their right of self-determination and to be informed of new treatments and diagnostic tests. To provide a qualified second opinion, we have organized the network of specialists in TMDU.

Patient Safety (Ooka)

Dr.Ooka is the General Risk Manager of our university hospital, and our department regularly organizes seminars and training courses. In collaboration with other departments (e.g., Skills Laboratory Center, Infectious Control Committee, etc.), we are working for greater safety and quality of healthcare.

5. Original Article

1. Rie Ozeki, Sei Kakinuma, Kinji Asahina, Keiko Shimizu-Saito, Shigeki Arii, Yujiro Tanaka and Hirobumi Teraoka. Hepatic stellate cells mediate differentiation of dendritic cells from monocytes. Journal of Medical and Dental Sciences Vol.59 No.1, March 2012, Tokyo Medical and Dental University


7. Masato Ozaka · Yuji Matsumura · Hiroshi Ishii · Yasushi Omuro · Takao Itoi · Hisatsugu Mouri · Keiji Hanada · Yasutoshi Kimura · Iruro Maetani · Yoshinobu Okabe · Masaji Tani · Takaaki Ikeda · Susumu Hijioka · Ryuouhei Watanabe · Shinya Ohoka · Yuki Hirose · Masafumi Suyama · Naoto Egawa · Atsushi Sofuni · Takaaki Ikari · Toshifusa Nakayama · Randomized phase II study of gemcitabine and S-1 combination versus gemcitabine alone in the treatment of unresectable advanced pancreatic cancer (Japan Clinical Cancer Research Organization PC-01 study). Cancer Chemother Pharmacol. 69:1197–1204, 2012


Acute Critical Care and Disaster Medicine

1. Staffs and Students (April, 2012)
Professor Yasuhiro OTOMO
Junior Associate Professor Masahito KAJI, Junichi AIBOSHI
Assistant Professor Tomohisa SHOUKO, Naoki TOSAKA,
Atsushi SHIRAISHI, Kiyoshi MURATA,
Syusuke MORI, Toshiki SERA,
Akira ENDO, Kazuhide YOSHIKAWA,
Kenichi HONDO, Kiyuhei MIYAKAWA,
Marie TAKAHASHI
Hospital Stuff Mitsuaki KOJIMA, Hiroyuki SATO,
Yuka MISHIMA, Nao MIKURA,
Sayuri INAGAKI
Graduate Student Koji MORISHITA, Saori MIKAMI,
Hiroto USHIZAWA, Minoru UEKI,
Hideaki ANAN
Resident Sinya ENOMOTO, Wataru TAKAYAMA,
Raira NAKAMOTO, Asahi NEHA

2. Purpose of Education
We, the department of acute critical care and disaster medicine, investigate following wide range of fields, such as the search for mechanisms of biological response to severe stresses, the development of strategy for multiple organ dysfunction from the view of intensive care medicine, basic and clinical research about trauma, trauma preventive medicine and disaster medicine. Our targets of research are practical and cutting edge to work not only as a medical scientist but as a researcher for government projects.

3. Research Subjects
Basic research of the mechanism of multiple organ dysfunction following hemorrhagic/septic shock
Development of strategy for multiple organ dysfunction
Basic and clinical research of multiple trauma
Trauma epidemiology and trauma preventive medicine
Disaster medicine
Clinical research of cerebrovascular disease on acute phase

4. Clinical Services
Our emergency center was authorized to hold the 21st level I center in Tokyo on April 1, 2007. We give treatments over 8000 patients annual who are under critical condition like multiple organ dysfunction, severe sepsis and septic shock, life-threatening trauma as well. We also contribute to medical services, rushing to the emergency scene by a Doctor-Car/Helicopter at times.

Publications
Original Article

— 118 —

1. Staffs and Students (April, 2012)

Professor Satoshi MIYAKE
Associate Professor Yasuaki NAKAJIMA
Assistant Professor Hiroyuki SAKASHITA

2. Purpose of Education

Department of Clinical Oncology was established in May 2012 to promote the field of palliative medicine and cancer chemotherapy according to “Training Program for Next Generation Specialists to Promote Cancer Therapy”. As for the education in medical school, we are involved in the course of Hematology-Oncology block and have a class of palliative medicine in the third year grade. In addition, we have a class of clinical ethics mainly focusing on the end-of-life care. As for the post-graduate education, we organized the “Training Program for Next Generation Specialists to Promote Cancer Therapy”.

3. Research Subjects

1) Application of palliative care when the patient is diagnosed as cancer
2) Improvement of QOL in the end-of-life care of cancer patients.
3) Communication skills in the team health care.
4) Multi-institutional research in pancreatic cancer treatment.
5) The role of biomarkers for newly developed anti-cancer drugs in lung cancer.

4. Clinical Services

Department of Clinical Oncology manages Cancer Center of the medical school hospital. There are five divisions below.
1) Division of palliative medicine
2) Division of cancer chemotherapy
3) Division of cancer registry
4) Division of coordination of cancer treatment
5) Division of cancer consultation and support

5. Publications

Original Article


Dentistry for Persons with Disabilities

1. Staffs and Students (April, 2012)

Junior Associate Professor Osamu SHINOZUKA
Junior Associate Professor (Part-time) Sadamu HAGA, Minoru INADA, Goro SEKIGUCHI, Hiroyuki ISHIKAWA, Yohei TAKEUCHI, Syohei TAMURA, Moriyuki NAKAMURA
Assistant Professor Yasuka KUSUMOTO
Hospital Staff Mariko WATANABE, Tomo SUZUKI, Anna KUMAKURA, Naoki HAYASHI
Graduate Student Yousuke KINOSHITA
Visiting Clinical Junior Associate Professor Seiji SAKURAI

2. Purpose of Education

Our department was started as a graduate course of the special dentistry section on April, 1999. The sections are the dentistry for persons with disabilities and medical problems.

The main objective of this course is to provide the opportunity for students to understand the outline of the reconstruction of functional and esthetic disorders of oral and/or maxillofacial areas by means of the high-advanced dental cares for patients with special needs.

3. Research Subjects

1) General research about the dentistry for persons with disabilities
2) Oral bacteria and systemic illness
3) Oral biofilm formation and elimination (Drug Delivery system)
4) Gingival overgrowth of the pharmacogenic
5) Dental phobia

4. Clinical Services

The clinical purpose of our section is to treat oral problems of special patients who are unable to receive normal dental care by reason of a disability which may be physical, mental, medical, or emotional, or combination of any of these under using behavior management and systemic support.

For example,
1) The patients requiring behavior management are physically disabled, mental retardation, autism, etc.
2) The patients requiring systemic support are internal impediment, dental phobia, etc.

5. Publications

Original articles

Abstracts
Comprehensive Patient Care

General Dentistry Oral Diagnosis and General Dentistry

1. Staffs and Students (April, 2012)

Chief
Shiro MATAKI

Associate Professor
Shigeru ODA

Junior Associate Professor
Masayuki HIDESHIMA, Satoko OHARA, Ken-ichi TONAMI

Assistant Professor
Sachi UMEMORI, Kanako NORITAKE

Hospital Staff
Tomohiro ISHIDA, Shuhei NAKAMURA, Ayaka INAKAZU, Yuko MITSUMA, Hirono KIKUCHI, Akina ADACHI, Takahumi SUZUKI

2. Purpose of Education

General Dentistry is a branch of dental science which deals with oral diagnosis and general dentistry. Education objective of General Dentistry is to acquire comprehensive patient care methods from medical interview to periodic maintenance after dental treatment. Therefore, General dentistry provides practical training course of medical interview, oral examination, oral diagnosis, writing dental records, and simulation education.

3. Research Subjects

1) Study on Implementation and assessment of new dental clinical education systems
2) Study of oral appliance therapy in obstructive sleep apnea
3) Study on new oral diagnosis for comprehensive oral health care (ex. Caries diagnosis using digital imaging)
4) Study on new dental treatment based on concept of minimal intervention (ex. Selective caries removal using ArF excimer laser/chemical solvent)

4. Clinical Services

In our dental hospital, most new patients consult dentists in our clinic of general dentistry and oral diagnosis to receive suitable treatment for their chief complaints. Dentists of our clinic decide where to refer each case for the optimal clinic in our hospital for their needs. If new patient is suitable for treatment in general dentistry, dentists of our clinic ask them to receive treatments from students or residents.

Clinic of general dentistry and oral diagnosis also provides patient-centered general practice, oral care by dental hygienists, and oral appliance therapy of obstructive sleep apnea syndrome (OSAS).

5. Publications

Original Article


6. Review articles
Psychosomatic Dentistry

1. Staffs and Students (April, 2012)
Professor Akira Toyofuku
Assistant Professor Satoshi Ishida
Hospital Staff Miho Takenoshita, Emi Skou, Tomomi Sakuma Kurasawa
Graduate Student Tomoko Sato, Ayano Katagiri, Yojiro Umezaki, Motoko Watanabe

2. Purpose of Education
It is not uncommon to see the patients diagnosed with “Oral Psychosomatic Disorders”, so there is a growing need for proper treatment of the disorders from both sides of doctors and patients. It is, therefore, extremely important for dental students to instruct in psychosomatic dentistry. However, few Dental Universities in Japan are following this. At the same time, there’s a great deal of misunderstanding about psychosomatic dentistry, in spite of we have many years of consistent education. For example, “Your work is only hearing to complaints from patients”, “Patients with not otherwise specified mental illness is eventually referred to your clinic”, or “The mission of your clinic is to calm down your patients with unidentified dental and oral complaints”.

So, regarding undergraduate medical education, we focus on not only lessons from lectures and books but also practical experience through clinical training. We have comprehensive medical teaching for fifth and sixth-year students. Students can listen to patient’s complaints directly and deepen their understanding. Actually, they can see patients with dental psychosomatic disorders, and they know that these disorders are treatable. Moreover, they can learn negative effects of wrong ideas as a psychogenic disorder, and they can understand serious distress in patients and family members.

This practice is arduous effort, but in the future, it is hoped that efforts will be made to facilitate uniformed services for patients with dental psychosomatic disorders, enhance coping skills for refractory cases, and reduce trouble with patients by the graduates of our department who mastered psychosomatic dentistry.

It is important to have identity as a dentist on practice of psychosomatic dentistry. Therefore we have advanced strengthening of human resource development. In particular, we focus on cultivation of dentists who can be readily applied their knowledge of psychosomatic medicine to clinical practice. And we are working towards establishment of ‘psychosomatic dentistry’ introduced psychotherapy.

Also regarding education for graduate student, we focus on clinical practice for development of dentists who have great skill in psychosomatic dentistry.

3. Research Subjects
1) Study on pathophysiological mechanisms of oral psychosomatic disorders
2) Psychosomatic study on oro-facial medically and psychiatrically unexplained symptoms
3) Brain imaging of oral psychosomatic disorders
4) Psychopharmacological study on oral psychosomatic disorders

4. Clinical Services
We take charge of “Head and Neck Psychosomatic Medicine clinic” in dental hospital of Tokyo Medical and Dental University. This special clinic is for patients with oral psychosomatic disorders, such as glossodynia (burning mouth syndrome), atypical facial pain, atypical odontalgia, oral dysesthesia, occlusal discomfort(dysesthesia).

Main psychosomatic treatment is psychopharmacological one with SSRIs(Selective Serotonin Reuptake Inhibitors), SNRI(Serotonin-Noradrenaline Reuptake Inhibitor), SDAs(Serotonin-Dopamin antagonists) etc. And supportive psychotherapies are applied.

Intractable cases are increasing year by year, we take care of every patient and have good clinical courses about 70% of them.

We believe there are exactly “oral psychosomatic disorders”, and dentists should be in charge of treatment. Psychosis, as a matter of course, should be taken care by psychiatrists, so we discriminate them from oral psychosomatic disorders, and properly refer to psychiatry.

On the other hand, on “functional somatic symptoms secondary to psychiatry disorders”, which are refer to us from psychiatrists, we do our best in cooperation with psychiatrists.
We have about 400 new outpatients per year, and almost of them were referred from other specialists not only in dentistry but also internal medicine, otorhinolaryngology, dermatology, psychosomatic medicine, and psychiatry. They come from the Metropolitan area, of course, Osaka, Kyushu, Hokkaido and so on. We take fine-grained care and follow up, total number of patients is up to 10,000 per year.

We have a mission to meet the demand of these patients and their families, so better treatment outcome and increasing efficiency are required, and cooperation with other medical specialists is needed.

5. Publications

Original Article


Abstract

1) Ayano Katagiri, Masamichi Shinoda, Koichi Iwata.; Satellite cell-P2Y12 receptor in the trigeminal ganglion is involved in mechanical and thermal hyperalgesia in rats with lingual nerve injury. The 89th Annual Meeting of the Physiological Society of Japan, Matsumoto, March 29-31 2012.


Behavioral Dentistry

1. Staffs and Students (April, 2012)

Professor Shiro Mataki
Associate Professor Hiroshi Nitta
Graduate Student Yuki Ohara

2. Purpose of Education

The topic of Behavioral Dentistry included characteristics of human behavior, especially of the relationship between patients and dental staff based on informed consent. The main objective of behavioral dentistry in the graduate course is to provide students opportunity to study application of behavioral science to deal with dental patients showing various perception and behavior in clinic.

3. Research Subjects

1) Construction of educational system of behavioral dentistry for dental students
2) Application of behavioral science to development of dental educational curriculum
3) Patients’ evaluation of the dental hospital and the dental educational system
4) Application of behavioral science to dental clinic

4. Clinical Services

Behavioral Dentistry provides medical interview for preliminary diagnosis and general dental practice at the clinic of oral diagnosis and general dentist cooperating with General Dentistry.

5. Publications

Original Article


Abstracted Papers Presented at Scientific Meeting

4) Tonami K, Nitta H, Mataki S. Change in students’ perception of inter-personal relationships during “Introduction to the Behavioral science” class – Seven-year survey. 38th ADEE Meeting, Lyon, France, August 29 - September 1, 2012.
5) Toshiko Yoshida, Kazuyoshi Suzuki, Mika Oishi, Tetsuji Ogawa, Shiro Mataki, Kazutaka Kasai, Seminar on the communication training implementation for faculties in dental educational institutions, AMEE (The Association for Medical Education in Europe) Meeting, Lyon, France, 28 August, 2012( Conference Programe, p.101)
1. Staffs (April, 2012)

Associate Professor  Koji KINO
Assistant Professor  Akira NISHIYAMA
Hospital Staff        Kaori TSUKAGOSHI, Shoko TOBE, Natsuko OTOMO

2. Purpose of Education

Purpose of education for students and residents in this course is to provide an opportunity to learn basic knowledge on diagnostic and therapeutic procedures for temporomandibular diseases. In special course for graduate students and under graduate students, we instruct statistical techniques especially with the multivariate analysis by using clinical data acquired from patients with temporomandibular disorders (TMD).

3. Research Subjects
1) Development of multidimensional evaluation system for etiological factors of TMD
2) Influence of patients’ psychosomatic factors for TMD
3) Sleep bruxism: its etiology, influence and treatment
4) Effectiveness of physiological therapy for TMD
5) Mechanisms of occlusal discomfort

4. Clinical Services

Temporomandibular joint clinic provides diagnosis and treatment for diseases and disfunctions of temporomandibular joint and masticatory muscles. We also provide the treatments for the nocturnal bruxism and the occlusal discomfort.
Neuroanatomy and Cellular Neurobiology

1. Staffs and Students
Professor Sumio TERADA
Assistant Professor Masahiko KAWAGISHI, Mitsunobu HOSHINO(June)
Kenta SAITO(July-), Keisuke SATO(July-)
Graduate Student Toshiya TERAISHI
Technician Mie TAGUCHI

2. Purpose of Education
Section of neuroanatomy and cellular neurobiology takes charge of basic neuroscience education for medical undergraduate student (Lectures and Wet labs), especially from the morphological point of view.
For graduate school students, we offer introductory courses on both optical and electron microscopy (Lectures and Wet labs), with close relation to molecular and cellular neurobiology.

3. Research Subjects
1) Molecular mechanism of intracellular transport, quality control of transporting cargos, and their interrelation (Slow axonal transport and neurodegeneration)
2) Development of the real-time detection system of the biomolecular network in vivo and its application to cell biology
3) Molecular and cellular biological analysis of neuron-specific small G proteins
4) Development of new spectroscopic methods to visualize the localization of biomolecules without fluorescence labeling
5) Search for new cellular morphological regulatory factors on cytoskeletal dynamics
6) Functional image analysis on neuropsychiatric disorders

4. Publications
Systems Neurophysiology

1. Staff and Students
Professor Izumi Sugihara
Associate Professor Yuriko Sugiuchi
Lecturer Yoshiko Izawa
Assistant Professor Mayu Takahashi
Graduate Student (JSPS DC1) Hirofumi Fujita

2. Education
We participate in “Introductory Neurophysiology” (lectures, 2nd year), “Neuroscience” (systematic lectures, 2nd and 3rd years) and “Physiology Lab” (2nd and 3rd years) courses for medical students as well as in courses for graduate students. We mainly teach the neurophysiology sections in these courses. Our goal is for students to understand normal function of nerve cells and the nervous system and, on this ground, to understand pathological states of the nervous system in disease. For this purpose, we give clinically-oriented lectures and laboratory courses linked with morphology and pharmacology. They cover transport and electric potential of the cell membrane, excitation and synaptic transmission (Introductory Neurophysiology), sensory systems, motor systems, autonomic nervous systems, and higher brain function (Neuroscience), i.e. neurophysiology in general from the cellular through the organismic levels. For students to gain first-hand experience in basic matters such as generation and propagation of excitation in nerve cells, we have developed a computer simulation program for a part of the laboratory course. We have had a “project semester” student (4th year in the medical school) and an exchange student from Imperial College London.

3. Research Subjects
Our main interest lies in clarifying the structures that underlies function of the central nervous system and then understanding their function. We are focused on the part of the central nervous system that is involved in control of eye movements. The eye movement control system is located in the cerebrum, brainstem and cerebellum, has been studied in great detail and is important clinically. The cerebellum itself is another site of focus. Dysfunction of the cerebellum causes ataxia, a movement disorder associated with impaired control of movement. We use electrophysiological, morphological and cell-biological approaches.

1) Cerebellar function
Distinct regions in the cerebellum make specific connections with different areas of the brain and are involved in the control of various movements including eye movements. For example, the neuronal circuitry that connects the lateral cerebrum, pontine nuclei, cerebellar cortex (hemisphere), cerebellar nucleus (dentate nucl.), thalamus and cerebrum is important for initiation, execution and control of movements. To understand cerebellar function, it is important to understand the organization of the cerebellum into distinct anatomical regions, to characterize the specific neuronal circuitry of these regions, and to identify how the cerebellum is organized into regions and functions by way of the input and output systems. Our systematic approach to this question includes (developmental) anatomy, molecular biology, and electrophysiology. We have expertise in neuronal labeling with marker molecules and tracers, single-axonal reconstruction, three-dimensional mapping of neuronal projection patterns.

2) Neural mechanism of eye movement control
An animal fixates on a target of interest by moving its eyes and head. This eye-head coordination system is an important model of motor control in the central nervous system of higher mammals. To understand the mechanism of the visuo-motor transformation in eye movement system, we analyze neural mechanisms of signal transformation from the superior colliculus (center for rapid gaze shifts) to the brainstem, the midbrain, and the spinal cord using electrophysiological and morphological methods. Furthermore, we analyze the mechanisms for the control of eye movements and visual fixation in the systems from the frontal and parietal cortices to the superior colliculus and the brainstem.

4. Publications
Original Articles
1. Fujita H, Sugihara I (2012) FoxP2 expression in the cerebellum and inferior olive: development of the transverse


Pharmacology and Neurobiology

1. Staffs and Students (April, 2012)

Professor Tsutomu TANABE
Assistant Professor Hironao SAEGUSA, Shuqin ZONG
Graduate Student

2. Purpose of Education

2-1 Undergraduate course: Pharmacology course provides the principle of pharmacological basis of therapeutics. Several representative therapeutic drugs in each disease will be picked up and systematic lectures from basic pharmacology to mechanism of action, drug metabolism, clinical application and side effects will be provided. Students are projected to acquire self-learning skills during the course and expected to be ready for handling clinical cases by pharmacological means.

We consider education through the pharmacology lab work is important. Students are given opportunity to dissect out several tissues (heart, skeletal muscle, ileum and vas deferens) from living animals by themselves and test the effect of a number of drugs including specific agonist, antagonist and non-selective drugs. Lab work course is divided into two parts. In the first part, students were given several known drugs for testing the known effect on these tissues. In the second part, students are given two unknown drugs and requested to identify the name and concentration of each drug using the tissues they prepare by themselves.

2-2 Graduate course: 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.

3. Research Subject

1. Molecular basis of calcium channelopathy
2. Molecular mechanism of neurodegenerative disease
3. Mechanism of modal shift of cell sensor: from touch perception to pain sensation
4. Molecular mechanism of neuropathic pain
5. Molecular mechanism of drug tolerance
6. Hormonal modulation of stem cell development

4. Publications

Meetings:

1. Tsutomu Tanabe, Hironao Saegusa and Shuqin Zong: Contribution of the enhanced expression of N-type calcium channel in microglia on neuropathic pain, 14th World Congress on Pain, Milan Italy 8.27-31, 2012.

2. Tsutomu Tanabe, Hironao Saegusa and Shuqin Zong: Effect of N-type calcium channel deficiency in microglia on neuropathic pain, the 42nd annual meeting of the Society for Neuroscience, New Orleans USA 10.13-17, 2012.
Molecular and Cognitive Neuroscience
(Department of Molecular Neuroscience)

1. Staffs and Students (April, 2012)

Professor  Koliichi Tanaka
Associate Professor  Hidenori Aizawa
Assistant Professor  Tomomi Aida
Project Assistant Professor  Miho Soma
Project Assistant Professor  Yukiko Ito
Graduate Student  Bai Ning, Michiko Yanagisawa,
Hayato Sugiyama, Yuichi Hiraoka,
Zulpiye Habibulla, Junya Sugimoto,
Cui Wanpeng, Sun Weinan

2. Purpose of Education

The final goal of our research is to understand molecular, cellular, and neuronal ensemble mechanisms underlying higher order brain functions including learning and memory. For that purpose, we combine molecular genetics, physiological and behavioral methods. The laboratory also studies the mechanism that underlies neuronal cell death and regeneration.

3. Research Subjects

1) Role of glutamate transporters in the neuropsychiatric disorders.
2) Role of the lateral habenula in the psychiatric disorders

4. Publications

Original Article

Neuropathology

1. Staff and Students (April 2012)

Professor: Hitoshi Okazawa
Associate Professor: Kazuhiko Tagawa
Adjunct Lecturer: Nobuyuki Nukina, Masaki Sone, Toshiki Uchihara
Assistant Professor: Takuya Tamura
Project Assistant Professor: Hikaru Ito, Toshikazu Sasabe, Chisato Yoshida, Kyota Fujita, Kazumi Motoki, Xigui Chen
Technicians: Tayoko Tajima, Chiharu Mizoi, Yuko Uyama, Kimiko Ibagawa
Secretary: Mari Kishimoto
Graduate Students: Ying Mao, Min Xu, Chan Li, Hong Zhang
Research Trainees: Asuka Katsuta

2. Purpose of Education

As educational tasks, we have lecture and experiment classes of neuropathology for medical/dental graduate school program and medical school program. We also have general pathology and neuropathology classes for graduate school for health sciences, and clinical anatomical and therapeutic pathology classes for research students. We also guide practical research techniques on neuropathology especially neurodegenerative diseases.

3. Research Subjects

Following studies have been intensively carried out in our laboratory with various techniques including molecular biology, cell biology, biochemistry, Drosophila models, and mouse models.

1) Investigation of molecular pathologies of neurodegenerative diseases.
2) Studies on impairment of DNA-repair in polyglutamine diseases.
3) Development of new seed drugs for neurdegeneration.
4) Development of new seed drug for mental retardation.
5) Investigation of molecular functions of Oct-3/4

4. Clinical Services

DNA sequence based diagnosis of PQBP1-related mental retardation.

Publications

Original Articles

1. Staff and students (April, 2012)

Professor: Manabu Mochizuki
Associate Professor: Kyoko Ohno-Matsui
Assistant Professor: Yosiharu Sugamoto, Hiroshi Takase
Hospital staff: Akiko Tanaka, Koji Kamoi, Masaru Miyanaga, Manabu Ogawa.
Graduate student: Moriyama Muka, Murai Hideki, Yuko Kawazoe, Ayano Imai, Naonori Ohno, Kousei Shinohara

2. Purpose of education

Ophthalmology and Visual Science deal with the eye. Main objective of ophthalmology and visual science in the graduate course is to obtain the highly-advanced knowledge in the diagnosis and the treatment of various ocular disorders and to perform the basic research based on clinical experience. The graduate students are expected to be academic doctors who develop and perform highly-qualified ophthalmologists, as well as become scientists who can perform basic research focusing on their clinical interest.

3. Research subjects

1) Evaluation of the molecular mechanism of immunoregulation in intraocular inflammation
2) Pathogenic mechanism of intraocular inflammatory diseases
3) Development of novel treatments of intraocular inflammation
4) Molecular diagnosis of virus-infected uveitis and intraocular lymphomas.
5) Evaluation of the change of the circulation as well as the glucose metabolism in the visual cortex using positron emission tomography (PET) in various ocular disorders
6) Mechanism of visual pathway in normal conditions as well as in the patients with amblyopia.
7) Development of a novel treatment for vitreoretinal disorders like retinal detachment, diabetic retinopathy, and macular holes.
8) Analysis of retinochoroidal complications in high myopia (choroidal neovascularization, myopic tractional retinopathy)
9) Evaluation of the molecular mechanism of choroidal angiogenesis using the cultured cells as well as experimental animals (collaboratory project with Department of Cellular Physiological Chemistry)
10) Gene analysis of highly myopic patients (collaborator project with Kyoto University)
11) Establishment of a novel therapy to prevent an axial elongation or the formation of posterior staphyloma
12) Development of new materials for contact lens, the development of a novel drug delivery system using contact lens
13) Effect of the visual background on binocular vision as well as the influence of strabismus on dynamic visual acuity.

4. Clinical services

Clinical practice is organized by the general ophthalmology clinic as well as the several subspecialty clinics. When the patients visited our department, they are screened in the general clinic, and then the final decision of the diagnosis and treatment is made in cooperation with each subspecialty clinic.

Subspecialty clinics include uveitis clinic, retinal detachment clinic, diabetic retinopathy clinic, neuro-ophthalmology clinic, high myopia clinic, and medical retina clinic.

Approximately, 1,100 surgeries are performed per year (e.g., cataract surgery, vitreoretinal surgery, glaucoma surgery, strabismus surgery).

5. Publications

[Original Article]


34. Spaide RF, Akiba M, Ohno-Matsui K. Evaluation of peripapillary intrachoroidal cavitation with sept source and enhanced depth imaging optical coherence tomography. RETINA, 2012; 32: 1037-1044.


[Review Article]


[Presentation]


16. Ohno-Matsui K. The Imaging of the optic nerve in eyes with pathologic myopia by using swept-source OCT. 台湾眼科学術会議 Kaoshung (Taipei), 2012.10.5
17. Ohno-Matsui K. Topographical analysis of eye shape of highly myopic patients by using 3D MRI as well as swept-source OCT. In Myopia Symposium. 台湾眼科学術会議 Kaoshung (Taipei), 2012.10.6
18. Mochizuki M. Role of regulatory T cells in uveitis. 8th International Symposium on Uveitis, Thessaloniki (Greece), 2012.10.19.

[Symposium, Special lecture]
1. Ohno-Matsui K. Phenotypes of myopic maculopathy. Myopia GWAS consortium, Rotterdam (Netherlands), 2012.3.15
Oto-Rhino-Laryngology

1. Staffs and Students

Professor  Ken KITAMURA
Associate Professor  Atsunobu TSUNODA
Junior Associate Professor  Taro SUGIMOTO,  Yoshihiro NOGUCHI,
Assistant Professor  Hisashi TOKANO,  Yasuhiro SUZUKI,
                   Akemi IWASAKI,  Masatoki TAKAHASHI
Hospital Staff  Yusuke KIYOKAWA, Yuichiro INABA
Graduate Student  Yoshimi TAMEKUCHI,  Katsura YAMAMOTO,
                   Palida AIHAITI,  Ayako NISHIO,
                   Keiji HONDA,  Naoto TAKAHASHI,
                   Ryoichi YOSHIMOTO

2. Purpose of Education

Pre-graduate clinical education

Clinical systematic lecture covers anatomy, a general idea of diseases, their pathological conditions and treatments in the field of otorhinolaryngology. Clinical clerkship I (general diagnostic training) provides instruction in the diagnosis and testing techniques of the otorhinolaryngological field; clinical clerkship II (clinical training) provides detailed explanations of disease mechanisms, training in the performance of examinations, and clinical responsibilities involving both inpatient and outpatient care. Clinical clerkship III provides advanced training beyond the scope of clinical clerkship II. In particular, students develop an advanced understanding of otorhinolaryngological diseases by conducting outpatient procedures (including taking histories, visual inspection, and palpation), and gaining practical experience in assessment and diagnosis of patients’ conditions. Furthermore, in the clinical clerkship III, students also attend a “micro-conference” on teaching. Finally, students are assigned to patients throughout their treatment, consistently dealing with the same individuals before, during, and after surgery; this allows the students to become familiar with the course of clinical care.

3. Research Subjects

1) Deafness gene analysis
2) Neurophysiological study of hearing
3) Histoeptomical study of ear, nose, throat, head, and neck
4) Eye movement analysis in patients with dizziness
5) Clinical study of treatment and prognosis in patients with allergic rhinitis, acute and chronic sinusitis, and benign tumors
6) Treatment of tinnitus
7) Treatment using endoscope

4. Clinical Services

Otorhinolaryngology clinic provides full examinations and treatment for diseases in ear, nose, throat, head, and neck, including dizziness, sudden deafness, facial palsy, infectious disease and benign as well as malignant disease in the otorhinolaryngeal area. We have performed the first implementation of bone anchored hearing aid implant in Japan and since then we have experienced many patients for this surgery. We also have performed surgery for patients with malignant disease as well as skull base lesions in collaboration with the Department of the Head and Neck Surgery. Our outpatient clinic includes general ear, nose and throat clinic as well as allergy, sinusitis, dizziness, otitis media, tumor, deafness, and tinnitus clinic.

5. Publications

Original Articles


Conference Presentations


Holt J: Mechanotransduction in mouse vestibular hair cells requires transmembranechannel-like genes 1 or 2. ARO 35th MidWinter Meeting. San Diego USA, February 2012.


Neurology and Neurological Science

1. Staffs and Students (April, 2012)

Professor, Chairman                  Hidehiro Mizusawa
Professor                             Takanori Yokota
Junior Associate Professor            Kinya Ishikawa, Nobuo Sanjo
Assistant Professor                   Satoru Ishibashi, Takuya Ohkubo,
                                        Shoichiro Ishihara
Hospital Staff                        Takumi Hori, Takahiro Nagao,
                                        Shunsuke Kudo, Koutaro Yoshioka,
                                        Keiko Ichinose, Eri Iwasawa
Senior Resident                       Yuriko Okabe, Fumiko Furukawa
Post-doctorial Fellow                 Kazutaka Nishina, Nozomu Sato
                                        Taro Ishiguro
Graduate Students (Doctoral course)   Akira Machida, Ayaka Yamanami,
                                        Kazuyuki Saito, Yui Hashimoto,
                                        Tomoko Nishina, Kiyobumi Ota,
                                        Teruhiko Sekiguchi, Saneyuki Mizutani,
                                        Kokoro Ozaki, Masahiko Ichijo,
                                        Piao Wenying, Temuqina

2. Education

Neurology is a medical specialty concerned with the diagnosis and treatment of disorders of the nervous system including the brain, spinal cord, peripheral nerves, autonomic nerves and skeletal muscles. Since the nervous system extends to the whole body and regulates all the organs, neurologists have to examine and understand many symptoms of the whole brain and body.

Department of Neurology and Neurological Science at Tokyo Medical and Dental University offers an unique “clinical neurological training for specialist” in a four-year residency program. This program is designed to provide the highest quality clinical training in the clinical practice of neurology, either in an academic or a practice career. To accomplish this, the program integrates extensive practical exposure to all aspects of current clinical neurology with a firm grounding in underlying scientific principles and methods of clinical investigations such as electrophysiology, neuromuscular pathology, neuroimaging, or neurogenetics and so on. The faculty and staff are committed to facilitate resident education and training.

After completion of their training for four years, senior residents are equipped with a lot of clinical experience as attending doctors or teaching assistants in the university hospital and affiliated hospitals. They are eligible for the board certification by the Japanese Society of Neurology.

3. Research Subjects

1) Gene identification and investigation of its pathomechanism for hereditary diseases such as spinocerebellar ataxias, especially for SCA6 and SCA31
2) Development of gene therapies using RNAi and other techniques
3) Establishment of ALS animal model
4) Basic and clinical researches for neurodegenerative diseases such as spinocerebellar ataxia, amyotrophic lateral sclerosis, and Alzheimer disease
5) Development of neuroregenerative therapy using stem cells for cerebrovascular and neurodegenerative disorders
6) Basic and clinical researches of neurological autoimmune diseases
7) Electrophysiological studies using electric and magnetic stimulation
8) Basic and clinical studies of neuromuscular diseases by studying the biopsied peripheral nerves and muscles

4. Clinical Services

We see about 100 out-patients and 40 in-patients daily, and offer in and out-patient consultation services through the weekday and on weekends. We diagnose and treat stroke patients, as well as patients with epilepsy, headache, multiple sclerosis, Parkinson’s disease, spinocerebellar ataxia, and hundreds of other neurological issues, some of which are acute,
others may be chronic. We also have an out-patient clinic specialized to patients with dementia corresponding to needs of the rapidly aging society. Our patients will be reliably evaluated and diagnosed with some skillful techniques, such as the electrophysiological, neuroradiological, and neuropsychological tests and pathological diagnosis of biopsied nerves and muscles.

5. Publications

Original Article


19. Ohyagi M, Okubo T, Yagi Y, Ishibashi S, Akiyama J, Nagahori M, Watanabe M, Yokota T, Mizusawa H. Chronic...


Psychiatry and Behavioral Sciences

1. Staff members and Students
Professor Toru NISHIKAWA
Associate Professor Akeo KURUMAJI
Junior Associate Professor Naoki YAMAMOTO
Assistant Professor Takashi TAKEUCHI, Hotsumi KYONO,
Mitsuhiko TAKEDA, Daisuke JITOKU,
Akihito UEZATO, Hiroo MITSUSADA,
Mizue HOBOno
Technical Specialist Asami UMINO
Medical Staff Shunsuke TAKAGI (~2012.9), DaisukeIKEI,
Shinichiro TAMAI, Kotaro KAWAMATA
Yuya TERASAWA
Medical Fellow Michio ITASAKA
Technical Assistant Yasuhiro OKA, Miyuki SAITO,
Meri SASAKI, Yoshihumi KANEKO,
Ayano SOMEYA, Ken MATSUNAGA
Graduate Students Kenji SASAKI, Syunsuke TAKAGI,
Tomoko TANAKA, Sayuri ISHIWATA,
Masakazu UMINO, Kazuo TAKIGUCHI,
Takuya YOSHIKKE, Ayako KANIE,
Emiko HARAMO, Momoko KOBAYASHI,
Research Student Megumi GOTO

2. Education
In the first term (two years) of postgraduate training, residents will learn basic laboratory procedures and diagnostic techniques, psychotherapy and drug treatment and laws and regulations related to clinical practice, and acquire other general knowledge, all being essential for biologic, psychological, social, and ethical approaches to neuropsychiatric diseases. Following the two-year period of mandatory clinical training, basic professional training in psychiatry will be provided for 6-9 months mainly in the university. In the second term of training, they will acquire knowledge and clinical experience necessary for neuropsychiatrists, and undergo practical training at affiliated medical facilities to become qualified psychiatrists. Undergraduate education, which places emphasis on clinical clerkship training after a systematic series of lecture course and seminar-based classes, is designed to develop students’ problem-solving skills, and increase their motivation to learn neuropsychiatry, with support from external facilities.

3. Research
Our laboratory is committed to comprehensive research on endogenous psychosis, neurosis, and epilepsy through biological, psychological and social approaches. In collaboration with external research facilities, we are also involved in social psychiatry, child and adolescent psychiatry, and brain imaging studies:

1) Studies in neurochemistry
(i) Molecular genetic studies to clarify the causes and conditions of neuropsychiatric diseases:
Using animal models with psychotic symptom-causing agents, we are involved in a study to isolate new candidate gene clusters associated with the pathogenesis and pathophysiology of neuropsychiatric disorders from the viewpoint of developmental pharmacology. We are examining the effects of candidate gene clusters in patients with neuropsychiatric disorders.
(ii) Studies in biochemical pharmacology to develop new therapeutic methods for neuropsychiatric disorders.

We are working to examine the pharmacological/biochemical effects of candidate substances to develop new drugs for neuropsychiatric disorders. Extensive research is being conducted to isolate agents associated with the metabolism of D-serine, an endogenous antipsychotic substance, and examine the effects of D-serine on neurotransmission in the brain.
2) Neurophysiological and psychophysiological studies

(i) A study of biological indicators in schizophrenia with eye cameras:

We are not only involved in studies of monozygotic twins, early-onset patients, and children at a high risk in Japan, but also in an international joint research project of the WHO as a center in charge of operations.

(ii) Studies of neurotransmitter receptor binding in neuropsychiatric disorders with PET:

We are working together with the National Institute of Radiological Sciences to investigate the binding activities of dopamine receptors in various brain areas of the patients with schizophrenia and mood disorders.

(iii) A study of sleep stages and behavior in neuropsychiatric diseases:

A study is being carried out to examine sleep stages and behavior using an originally developed automatic analysis device (polysomnography) in patients with various psychiatric disorders.

A study on brain functioning in psychiatric disorders by using the near-infrared spectroscopy (NIRS): To obtain an insight into biological markers of psychiatric disorders, changes in regional brain functions during psychological tasks are examined by measuring the relative concentrations of oxyhemoglobin using NIRS in combination with MRI in the brain areas of the patients with schizophrenia and mood disorders.

3) Psychopathological studies

We are conducting psychological studies of neuropsychiatric diseases from the aspects of phenomenology, anthropology, and linguistics, while employing a psychotherapeutic approach. Other research activities include a review of basic psychiatric concepts and a basic study for the classification and diagnosis of psychiatric disorders, which are important recent issues. In addition to endogenous psychosis including schizophrenia and manic depressive disorder, we are also involved in psychoanalytic studies of neurosis and borderline personality disorder, which are attracting increasing attention, and psychotherapies for them, as well as pathological research on pathography and art therapy in terms of creativity.

4. Clinical practice

Approximately eighty new outpatients visit our department every month, about 30% of which are classified as having “mood disorders” (F3) by ICD-10, followed by “neurotic, stress-related, and somatoform disorders” (F4) and “schizophrenia, schizophrenic and paranoid disorders” (F2). We are also actively involved in consultation and liaison psychiatry for inpatients in other departments. Patients with snile dementia, child and adolescent psychiatric disorders, substance, dependence, and neurosis requiring intensive psychotherapy are often referred to related and advanced facilities for specialized treatment. Since this facility, the psychiatric department of a general hospital, is used for university education and training, most inpatients are classified as F2, followed by F4 and F3 (ICD-10). We also provide care and treatment for patients with sleep rhythm disorders and neurological disorders, including epilepsy and senile dementia. In addition to drug treatment, we have introduced and provided mECT (modified electroconvulsive therapy) for inpatients, and individual and group psychotherapy for the patients in our psychiatric ward and clinic and day care center in close collaboration with rehabilitation facilities in the community. The day care team consists of a doctor, two nurses. And a psycho-social-worker or a clinical psychologist. Day care (partial hospitalization) is the transitional element between inpatient and outpatient care and its indications have a wide range of psychiatric disorders as follows: schizophrenia, depression, bipolar disorder, adjustment disorder and personality disorders. Each member has the own aim and the team gives care with different types of framework. Our day care team regards the potentiality of group very important and the group process could contribute to therapeutic effect. With this kind of experience, patients could develop their ability to communicate with other people and readapt to social situations.

5. Publications (in English)

Original Articles


Neurosurgery

1. Staffs and Students (April, 2013)

Professor: Taketoshi Maehara
Associate Professor: Tadashi Nariai
Assistant Professors: Yoji Tanaka and Motoki Inaji
Hospital stuffs: Takashi Sugawara, Yoshihisa Kawano,
Kaoru Tamura, Takumi Kudo,
Kana Sawada, Shihori Hayashi,
Juri Kiyokawa, Rena Kawanami,
Natsumi Ito, Satoka Hashimoto,
Toshihiro Yamamura

Graduate Students: Yohei Satoh, Yoshihisa Kawano,
Toshiya Momose, Shin Hirota,
Tomoyuki Kino, Maki Mukawa,
Masahumi Sasaki, Yoshiteru Obata,
Yousuke Ishii, Sakyo Hirai,
Yasuhiko Ueda, Takahiro Ogishima,
Juri Kiyokawa and Dong Xiao Shu

2. Purpose of Education

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.

In the clinical practice, it is important to attach priority to the patients, considering their background. Also in surgery, it is important to preserve the normal brain functions by employing the cutting edge technique. In the research field, it is essential to introduce and develop the latest knowledge and technology by establishing the reciprocal relationship with the other laboratory institutions.

3. Research Subjects

**Brain tumors**

1. Analysis of the mechanism of tumor proliferation and infiltration, and its application to treatment
2. Analysis of both proliferative and inhibitory cancer genes in cerebral and spinal tumors
3. Studies of photodynamic therapy, irradiation therapy, agents of chemotherapy, immunotherapy, and inhibition of angiogenesis

**Vascular diseases in the central nervous system and spinal cord**

1. Analysis of pathogenesis of vasospasm after subarachnoid hemorrhage and its application to treatment
2. Studies of circulatory disturbance in ischemic and hemorrhagic diseases, and reversibility of the brain tissue
3. Investigations of pathology of Moyamoya disease and the effects of indirect surgical anastomosis on this entity
4. Solutions of problems in the development of endovascular surgery

**Neurotrauma**

1. Analysis of cell damage and its reversibility, dynamic simulation in cerebrospinal injury
2. Animal experiments concerning treatment of cerebrospinal injury

**Functional neurosurgery**

1. Pathological analysis and treatment of temporal lobe epilepsy
2. Analysis of intracellular signal transductions

**Others**

1. Studies of human cerebral circulation, metabolism, and functions using PET, MRI/S, and MEG
2. Studies of receptors in the central nervous system using PET
3. Experiments of brain diseases using animal model MRI and PET

4. Clinical services

Neurosurgery is a clinical department dealing with various diseases of central nervous system and spinal cord including tumors, vascular diseases, trauma, congenital malformation, functional disorders, and infection.

5. Publications

Original Articles


Endovascular Surgery

1. Staffs and Students (December 2012)

Professor: Shigeru Nemoto
Associate Professor: Yoshikazu Yoshino
Assistant Professor: Toshiki Tomori
Assistant Professor: Kazunori Miki
Clinical Fellow: Masato Inoue
Clinical Fellow: Koichi Arimura
Secretary: Yoko Yanagida, Hitomi Kuwahara

2. Purpose of Education

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 vascular system, which will directly benefit for the improvement of clinical results. Main educational purpose of Endovascular Surgery 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.

3. Research Subjects

Our experimental research program is objected to elucidate unsolved questions derived from daily clinical experience. To treat vascular diseases of central nervous system, facial and head-neck legions, we need to understand detailed vascular anatomy, accurate function of these organs and exact pathophysiology of each disease. Our essential research target is the hemodynamics in the vascular diseases of these lesions. Especially we are interested in the integration of the fluid engineering technology into the endovascular field in an effort to open a new frontier of surgical treatment.

4. Clinical services

Endovascular Surgery is a clinical department dealing with various vascular diseases of central nervous system, spinal cord, facial and head-neck lesions including tumors, congenital malformation, and functional disorders.

5. Publications

Original Articles

NCNP Brain Physiology and Pathology

1. Staffs and Students

Collaborative Professor  Mikio HOSHINO
Collaborative Professor  Yu-ichi GOTO
Collaborative Professor  Hiroshi KUNUGI
Collaborative Professor  Manabu HONDA
Collaborative Professor  Ichinohe NORITAKA
Collaborative Associate Professor  Takashi OKADA
Collaborative Associate Professor  Yoshitaka NAGAI

2. Purpose of Education

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 course, 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.

3. Research Subjects

1) Investigation of the molecular machinery underlying brain development.
   (Mikio Hoshino; Department of Biochemistry and Cellular Biology, National Institute of Neuroscience, NCNP)
   We are investigating molecular machinery underlying nervous system development, especially focusing on neuron-subtype specification, nervous system regionalization and neuronal migration. We are also interested in human diseases/disorders caused by disorganized development of the nervous system.

2) Molecular genetic and genomic study for intellectual disability in Japan.
   (Yu-ichi Goto, Department of Mental Retardation and Birth Defect Research, National Institute of Neuroscience, NCNP)
   One of the major causes of intellectual disability (ID) is based on mutations in the related genes, which are timely and locally expressed in concert with one another in central nervous system. ID is a phenotype derived from the inappropriate expression of these genes. Recent advances in molecular genetics and genome medicine have pushed us on with systematic analysis of ID patients, especially on X-linked MR. Japan is behind Europe and USA because we do not have the system for the research resource collection of many specimens and accurate clinical information available for genetic analysis. This research group intended to organize a depository at NCNP for genetic analysis of ID.

3) Clinical research on mood disorders and schizophrenia
   (Hiroshi Kunugi, Department of Mental Disorder Research, National Institute of Neuroscience, NCNP)
   The pathogenesis and physiology of mood disorders and schizophrenia remain elusive, and their biomarkers have not yet been established. Our department, which is in collaboration with the National Center of Neurology and Psychiatry Hospital, is trying to develop objective diagnostic markers for these diseases, employing omics approach, brain imaging, and physiological studies. We also aim to develop new treatment on the basis of key molecules.

4) Noninvasive study on pathophysiology of human higher brain function.
   (Manabu Honda, Department of Functional Brain Research, National Institute of Neuroscience, NCNP)
   We try to reveal various human higher brain functions including sensory, motor, thought, emotion and KANSEI functions and pathophysiology underlying higher brain function disorders by integrating multiple noninvasive brain imaging techniques. We also pursue researches for developing a new technique of functional therapy by means of noninvasive brain stimulation.

5) Study of social primate brains: their development, anatomy, physiology and patho-physiology.
   (Noritaka Ichinohe, Department of Ultrastructural Research, National Institute of Neuroscience, NCNP)
   We are aiming to elucidate the neural circuit mechanisms of how social primate brain is working, using Common Marmoset, new Primate model animal. Emphases are on their development, anatomy, physiology and patho-physiology.
6) Basic research towards effective gene and cell therapy for neuromuscular diseases
(Takashi Okada, Department of Molecular Therapy, National Institute of Neuroscience, NCNP)

The characteristics of a recombinant adeno-associated virus (rAAV) with safety profile and long-term expression have made it an attractive transduction tool for clinical gene therapy. We developed a method of generating highly purified AAV vectors to meet labor-effective and large-scale production. We have adopted this intelligent system to investigate AAV vector-mediated transduction for the treatment of neuromuscular diseases. Our experience suggests that long-term transgene expression with therapeutic benefits would be achieved by the rAAV-mediated transduction strategy with an adequate regimen to regulate host immune response. In this respect, multipotent mesenchymal stromal cells (MSCs) are currently being tested in a number of clinical trials for various inflammatory diseases. To improve clinical benefits of gene and cell therapy, we have provided progress towards understanding of MSCs phenotype, expansion features, differentiation ability and therapeutic benefits in vivo.

7) Molecular pathogenesis and therapies of neurodegenerative diseases
(Yoshitaka Nagai, Department of Degenerative Neurological Diseases, National Institute of Neuroscience, NCNP)

As we face global aging of the population, a challenging theme, namely, to overcome late-onset incurable neurodegenerative diseases including Alzheimer’s disease, Parkinson’s disease, and polyglutamine diseases, has emerged. Recent great progress of molecular genetics and biomedical research revealed that these diseases share a common molecular pathogenesis; protein misfolding and aggregation plays a central role in neurodegeneration. In our department, researchers with various backgrounds such as medicine, pharmacy, biology, and chemistry, are working towards understanding the molecular pathogenesis of and developing therapies for these neurodegenerative diseases by taking advantage of a variety of techniques including molecular genetics, molecular & structural biology, chemical biology, and various animal models (flies, mice, marmosets).

4. Publications

Original Articles


Immune Regulation

1. Staffs and Students

Professor
Hajime KARASUYAMA

Associate Professor
Yoshiyuki MINEGISHI (until May)

Assistant Professor
Yohei KAWANO, Shingo SATO, Soichiro YOSHIKAWA (since July)

Technical Official
Toshiyuki KOJIMA

JSPS Research Fellows
Kazushige OBATA, Masako SAITO (until Oct.)

Medical Fellow
Soichiro YOSHIKAWA (until June.)

Graduate Students
Hiromi OGAWA (until March), Hirofumi YAMAGISHI (until March), Mio FUJIMAKI (until March), Mayumi EGAWA, LI Li Hua, Kayo HORIGUCHI, Misako IKI, Hidemitsu TSUTSUI, Takuya OHTA (since April), Hayato DEKI (since April)

2. Purpose of Education

Main objective of the immunology course for undergraduate students is to provide them the basic ideas how the immune system works and is regulated in various physiological and pathological settings including infections, cancer, autoimmune and allergic disorders, and organ transplantation. In the immunology course for graduate students, they study molecular mechanisms underlying the lymphocyte differentiation and the development of immune disorders such as allergy and primary immunodeficiency, by employing advanced technology in molecular biology, biochemistry, cellular biology and developmental engineering.

3. Research Subjects

1) Roles of basophils in health and disease
2) Genetic and molecular studies on the pathogenesis of primary immunodeficiencies.
3) Regulation of B cell development

4. Publications

Original Articles


**Review Articles**

Molecular Virology

1. Staffs and Students (April 2012)

Professor
Shoji YAMAOKA

Project Professor
Eiji IDO

Assistant Professor
Yasunori SAITO,
Ryuta SAKUMA,
Hiroaki TAKEUCHI,
Shin UOTA

Laboratory Engineer
Yoshio INAGAKI

Secretary
Kumiko THORPE-MATSUI

Research Assistant
Reiko ONAI,
Kanako MOCHIDA

-Students-

Ph.D. course
Yasunori HORI,
Miho OHSAKO,
Masaya UNO,
Eiko OZONO,
Sayaka SUKEGAWA

Master course
Hideki SAITO,
Saori SHIKAMA,
Yusuke HARADA,
Yuki HASHIDA,
Masumi FUKAZAWA,
Masato SANO,
Ayaka KAKEYA,
Ayumi WAKUTSU,
Akiko FUKUDA

2. Purpose of Education

Microbiology covers several aspects of bacteriology, immunology and virology. Through the studies on various microbes it is expected to understand host-parasite relationship and mechanisms of pathogenicity. Unlike the past, microbiology has rapidly been drawn to the center of the biological stage.

Our laboratory mainly deals with viral oncogenesis and immunodeficiency in humans. Especially, several projects are carried out with the emphasis on investigations into the mechanisms of viral replication and pathogenesis induced by human retroviruses (HIV-1 and HTLV-I) and human herpes viruses. The purpose of many of the studies being undertaken is to identify critical events and molecules responsible for the efficient replication of these viruses, and in case of human retroviruses, those for transformation or destruction of normal lymphocytes. Virological, immunological and molecular approaches are being applied for this purpose.

3. Research Subjects

Following studies have been extensively carried out in our laboratory with various biological and molecular biological techniques:

- Pathogenesis of HIV and HTLV (mutation, virulence, apoptosis, polymorphism).
- Studies on signal transduction pathways targeted by viral proteins.
- Molecular cloning by genetic approaches of components essential for virus replication in mammalian cells.

4. Publications: Original articles


(* Main contribution § Corresponding author)

Immunotherapeutics

1. Staffs and Students (April, 2012)

Professor Mari KANNAGI
Associate Professor Takao MASUDA
Assistant Professor Atsuhiko HASEGAWA
Assistant Professor Amane SASADA
Postdoctoral Fellow Ayako TAKAMORI, Shuichi KINPARA
Graduate Student Yotaro TAMAI, Yoko SATO,
Satomi ANDO, Tatsuro TAKAHATA,
Yuji MURAKAMI, Ayano AKIBA,
Tomohiro IKUMA, Touru KAKINUMA,
Mami KIJIYAMA

2. Purpose of Education

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 opportunity to research for mechanisms of infectious disease and development of immunological therapeutics.

Viral infection causes various diseases by inducing immunodeficiency, malignancy, autoimmunity, and inflammation. Human immunodeficiency virus (HIV) causes acquired immunodeficiency syndrome (AIDS), and Human T-cell leukemia virus type-I (HTLV-I) causes adult T-cell leukemia (ATL) and various chronic inflammatory autoimmune-like diseases. To understand mechanisms of these diseases, investigation on host immunity is indispensable. Immune responses are usually protective but sometimes harmful for the host, and are important determinants for disease manifestation. The goal of our research is elucidation of the role of host immunity in the diseases in order to develop effective immunotherapy. We also investigate intracellular mechanisms of viral replication to target direct molecules for therapy.

3. Research Subjects

1. Analysis of immunological risks for ATL development in HTLV-I-carriers.
2. Development of anti-tumor vaccine against ATL.
3. Immunological and molecular mechanism of HTLV-1-induced leukemogenesis.
4. Molecular mechanism of HIV replication especially related to HIV-1 integrase.
5. Experiments based on gene therapy to suppress HIV-1 replication.

4. Clinical Services

5. Publications

Original article


Review Article


International Scientific Meetings


1. Staffs and Students (April, 2012)
Associate Professor  Masayuki HARA
Graduate Student  Satoru MIYAKURA

2. Purpose of Education

Living organisms were influenced their life by environment and adapted themselves to it, however, they formed environment and affected it. In other words, the species that cannot fit the changing environment were fallen and replaced by the new species which could adapt itself to. The organisms are as a part of the global environment, so it is thought that the individual structure and working of them are necessary environmental measures for their survival. It may be said that it is excessive suddenness of the change that human activity is environmentally-impacted now.

Main objective of cellular and environmental biology in the graduate course is to provide students opportunity to study the reaction and adaptation of the organisms for the environmental change at cellular level, to consider hazardous property, toxicity, or physiological activity of environmental (or man-made) factor, and to mention the biotechnical action to the environmental problems.

3. Research Subjects

1) Reaction mechanisms of cellular protection systems against environmental oxidation stresses.
2) Modifying mechanisms in higher order structure of chromatin in cellular differentiation.
3) Shifting mechanisms in proteome profiles of cell organelle between pre and post conditions in environment, cell differentiation, disease, or drug exposure.
Biodefense Research

1. Staffs and Students

Professor Toshiaki Ohteki
Junior Associate Professor Nobuyuki Onai
Assistant Professor Hiroyuki Tezuka
Project Junior Associate Professor Yusuke Nakanishi
Project Junior Assistant Professor Taku Sato
Project Junior Assistant Professor Satoshi Yotsumoto
Project Junior Assistant Professor Junpei Asano
Research Technician Shoko Kuroda
Secretarial Assistant Hisako Kamioka

2. Purpose of Education

Our research projects focus on maintenance and failure of immunological homeostasis. Our goal is to define the mechanism of immune cell and tissue stem cell behavior under conditions of health and disease. To accomplish this goal, we are trying to clarify the molecular basis of induction and failure of immunological tolerance by focusing on immune cells and tissue stem cells in the bone marrow, skin, and intestine including its associated lymphoid tissues. On the basis of our findings, we will further pursue our research in the hope of developing new rational therapies for prevention and treatment of disease.

3. Research Subjects

1) Mechanism of tolerance induction and its failure in the mucosa-associated lymphoid tissues.
2) Differentiation and function of dendritic cells
3) Understanding of immunological diseases based on tissue stem cell disorder

4. Publications

[original papers]


5. Presentation at international meetings

2. Sato T, Ikeda M, Yotsumoto S and Ohteki T. Combination effects of type-I IFNs and imatinib against Leukemia-initiating cells I mouse model. 10th Stem Cell Research Symposium Awaji 2012.5.31
6. Ohteki T. Role for monocyte-derived cells in fine-tuning excessive immune responses. The 12th International Symposium on Dendritic Cells Daegu, Korea 2012.10.9
8. Tezuka H, and Ohteki T. Prominent role for plasmacytoid dendritic cells in mucosal T cell-independent IGA Induction. The 12th International Symposium on Dendritic Cells Daegu, Korea 2012.10.11
9. Sato T, Yotsumoto S, and Ohteki T. Combination effects of type-I IFNs and imatinib against Leukemia-initiating cells in mouse CML model. 2012 Annual Meeting of the Japanese Society for Immunology Kobe 2012.12.6
Pathological Cell Biology

1. Staffs and Students (April, 2012)

Professor Shigeomi SHIMIZU
Associate Professor Norio SHIMIZU
Junior Associate Professor Akimitsu KONISHI
Tokunin Junior Associate Professor Tatsushi YOSHIDA
Assistant Professor Satoko ARAKAWA
Tokunin Assistant Professor Michiko MUROHASHI, Shinya HONDA, Hirofumi YAMAGUCHI
Secretary Sachiko OTSUKA
Graduate Student Yuichiro WATANABE, Dai MIYAZAKI, Kanako TAKEDA, Meruna NAGATA

2. Purpose of Education

Main objective in the graduate course is to provide students opportunity to study the molecular mechanisms of cell death and autophagy, the cell death-related diseases, the physiological and pathological roles of autophagy, and the development mechanism of Epstein-Barr virus (EBV) infection, the employment of immunodeficiency animals for the creation of virus research models and development of an exhaustive pathogenic microbial screening system.

3. Research Subjects

1) Analysis of apoptosis mechanism
2) Analysis of non-apoptotic cell death (autophagic cell death)
3) Physiological and pathological roles of cell death in mammals
4) Analysis of alternative macroautophagy mechanism
5) Physiological and pathological roles of autophagy in mammals
6) Development of novel EBV infection animal models using the hNOG mice
7) Development of an exhaustive pathogenic microbe screening system

5. Publications

Original Article


1. Staffs and Students

Professor Takeshi TSUBATA, M.D., Ph.D.
Associate Professor Takahiro ADACHI, Ph.D.
Assistant Professor Kozo WATANABE, Ph.D.
Assistant Professor Yusuke KISHI, Naoko MATSUBARA
Technician Yukie KURUSU
Secretary Hiroko TAKAHASHI
Graduate Student XU Miduo, TANG Miao,
Toshitaro TAKATA, Satoya OMORI,
Shirly PHOON, Ayse Ucar KONUSKAN,
Sumiyo EZAKI, JIAO Xuyang

2. Purpose of Education

Lecture course on immunology at the master course aims at giving the students the basic ideas how immune system recognize and respond to the antigens, and how immune system efficiently remove pathogens without responding to self-antigens and environmental antigens. In the lecture course in bioscience at the doctor course, lectures on immune responses are given so that the students are introduced with the current topics in the field of humoral immune responses. Research projects in both master and doctor courses aims at training the students to acquire basic research techniques on immunology, molecular biology and biochemistry, and abilities to conduct good research by themselves under supervision.

3. Research Subjects

The nature of immune responses depends on whether they respond to protein or non-protein antigens because T lymphocytes recognize only protein antigens. Normal immune system removes pathogens and cancer cells but does not respond to non-microbial foreign substances or self-antigens. Immune responses to non-microbial foreign substances and self-antigens cause allergy and autoimmune diseases, respectively. How immune system distinguishes pathogens from non-microbial antigens and self-antigens is already clarified for protein antigens. However, little is know about such distinction for non-protein antigens. Immune responses to non-protein antigens play crucial roles in host defense against pathogens such as tuberculosis bacilli and meningococci, and autoimmune diseases such as lupus and immuno-neurological disorders. Thus, immune responses to non-protein antigens constitute a remaining frontier in immunology research. Followings are our research subjects.

1) Elucidation of the mechanisms for humoral immune responses to glycans, glyco-lipids and nucleic acids-related antigens.
2) Elucidation of the role of glycan signals in the regulation of humoral immune responses, and application of glycan signals to therapy.
3) Analysis of pathogenesis of lupus and immuno-neurological disorders.

5. Publications

[Original Article]

1. Staffs and Students (April, 2012)

**Professor**
- Shuki Mizutani

**Associate Professor**
- Tomohiro Morio

**Junior Associate Professor**
- Masatoshi Takagi
- Mitunori Nisiyama

**Assistant Professor**
- Yaeko Motoyoshi
- Yuji Sugawara
- Daisuke Tomizawa
- Kenichi Kashimada
- Taku Ishii
- Takeshi Isoda
- Manabu Sugie
- Tomohiro Udagawa
- (Apr~) Takeshi Isoda
- (Mar~) Keisuke Enomoto

**Graduate Student**
- Norimasa Ibara
- Kaori Nakatani
- Yuuko Ohnishi
- Eriko Tanaka
- Yuki Aoki
- Fumihiko Takizawa
- Susumu Hosokawa
- Setuko Kaneko
- Kei Takasawa
- Noriko Mituiki
- Takahiro Kamiya
- Tetsuro Nagasawa
- Keisuke Nakajima
- Eriko Kikuchi
- Yohei Matsubara
- (Mar~) Takeshi Isoda
- (Apr~) Akifumi Endo
- Rina Nishi
- Chikako Morioka
- Miko Shigeno

**Special Study Student**
- Sayaka Osada
- (Apr~) Kensuke Kojima

**Collaborator**
- Minoru Asada (Department of Pharmacology, Nippon Medical School)
- Hatsume Uno (Sony Life Science Laboratories)

**Medical Fellow**
- Konka Boku

---

2. Educational activities

**Field of Education:** Education for the 3rd and the first half of the 4th graders of Medical students was proposed 34 lectures on the basis of two big standpoints, child developments and pediatric diseases, by the staffs of Department of Pediatrics and Developmental Biology, Department of Pediatrics, Perinatal and Maternal Medicine, Department of Research for Regional Pediatrics, and the part-time lecturers. The field of totally 34 lectures is widely covered, for example, Hematology, Oncology, Immunology, Cardiology, Neurology, Endocrinology, Neonatology, Nephrology, Allergy, Pulmonology, Infection, and Social Medicine and so on. Opportunities of training in scientific research were provided for the elective latter half of three 4th graders during so-called project semester. The 5th graders were divided into the small groups, and started and continued for three months to learn the introduction of Clinical Clerkship, so-called Pre-clerkship, classified by organs. We were engaged in the organs of Blood, Chest(Heart) and Neuron shared with the another Departments. Then one month practice in pediatric clinical trainings was provided for the 5th to 6th graders among 13
months, where every student belonged to one of the professional clinical teams (Hematology/Oncology/Immunology, Cardiology, Neurology, Endocrinology, Neonatology and Nephrology) in the University Hospital or some affiliated hospitals (Tsuchiura Kyodo General Hospital, Kawaguchi municipal Medical Center or North Tokyo Social Insurance Hospital), and studied clinical practice as one of the team members. Another mission of this Department was to provide lecture courses on general pediatrics for the students of Dental and School of Health Science.

Junior clinical fellows who are in the training course of pediatric practice under the supervision of senior staffs were also expected to supervise these medical students. The style of clinical training was maintained and the 1st year trainee as well as the 2nd year trainee could choose the training in the pediatric ward for two months. On the other hand, the 2nd year trainee was in general engaged in the basic training for one month in the pediatric ward in some affiliated hospitals (Musashino Red Cross Hospital, Soka Municipal Hospital or North Tokyo Social Insurance Hospital). Depending on the individuals, they could select the advanced training at the pediatric ward in The University Hospital for two to eight months.

Strategy of Education

It is a goal of education for the 3rd and 4th graders (first half) of medical students to learn the whole picture of general pediatric diseases, and for the 4th graders (latter half, so-called project semester) to touch the basic research, get the fundamental way of thinking and skills of experiments. On the other hand, it is a goal for the 5th and 6th graders (so-called pre-Clerkship and Clinical Clerkship), to be in charge of each patient with pediatric staffs and experience the general steps under the clinical medicine, for example, the following steps how to interview the medical history, get the physical findings, plan the laboratory examinations, differentially diagnose by analyzing the personal data, describe the clinical records, and discuss about the treatment planning. Junior clinical trainees, previously started to train the pediatrics from the 2nd year, became to be able to elect the pediatric training for two months from the 1st year, actually however, the fellows who desired to optionally choose the pediatric training did not necessarily perform it because of too many applicants. The 2nd year junior clinical trainees were divided two groups. Those only required pediatric training for one month were generally planned to experience the common pediatric diseases in the affiliated hospitals. On the other hand, those electively selected pediatrics were basically planned to train almost in university hospitals together with at the affiliated hospitals for one month. Senior clinical trainees were rotated among in the university hospitals and chief affiliated hospitals, planned to experience all kinds of pediatric diseases related to oncology, cardiology, neurology, infections and immunology, endocrinology and metabolic diseases, neonatology, nephrology, pulmonology, digestive diseases, and genomics. Moreover, we educate the students of dentistry and health care sciences, who learn not only general pediatric diseases but the importance of pediatrics as playing roles of total coordination and mutual cooperation beyond specialty for children’s care.

3. Research Subjects

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. We are interested in a broad spectrum of subjects in life science field as shown below.

1. Stem cells and hierarchy of infantile leukemic cells
2. Molecular mechanism of aberrant T-cell differentiation and lymphoma development in the absence of ATM
3. Molecular mechanism of Purkinje cell loss in Ataxia telangiectasia
4. Novel roles of ATM in cellular differentiation
5. Ras associated ALPS like syndrome
6. Systematic search for responsible gene for a subset of common variable immunodeficiency
7. Gene hunting for radiosensitive-hyperIgM syndrome
8. Negative regulation of granulocyte activation and apoptosis by Tec family protein
9. Development of innovative techniques for cell therapy and gene therapy
10. Skin barrier and development of atopic dermatitis and of GI allergy
11. Glycobiologic approach for molecular pathogenesis of IgA nephropathy developed in WASP deficiency
12. Involvement of Notch signaling pathway in the process of glomerular sclerosis
13. Molecular mechanisms of primary pulmonary hypertension
14. Lung injury induced by cytokines/monocytes/granulocytes
15. Pathogenesis of periventricular leukomalacia (PVL) and broncho-pulmonary dysplasia (BPD); Development of novel therapy using mesenchymal stem cells for PVL and BPD.
16. Sox family protein in sex differentiation
17. Intrauterine stem cell transplantation for congenital disorders
18. Coagulopathy in hematopoietic cell transplantation and alteration in membrane protein expression in red blood cells

We have been collaborating with Institute of Cancer Research in London (Prof Mel Greaves), Istitute Nazionale Tumori (Dr. D. Delia), University of Queensland (Prof. Peter Koopman), Erasmus University (Prof. Jacques van Dongen), Yonsei University (Profs. H. Kim, and SK Lee), Sony Life Science Laboratories, Medical Research Institute at TMDU, National Institute for Longevity Sciences, National Research Institute for Child Health and Development, RIKEN Research Center for Allergy and Immunology, Kazusa DNA Research Institute, National Institute of Advanced Industry and Technology, Metropolitan Institute for Neuroscience, Juntendo University, and many other laboratories.

The research projects of each subspecialty group in the department are as follows.

**Hematology/Oncology/Immunology Group (Basic Research)**

- Development of in vitro and in vivo leukemogenesis model that stemmed from defective tumor surveillance system.
- Involvement of ATM in T-cell differentiation and adipocyte differentiation.
- Molecular pathogenesis of T-cell malignancy in ATM deficiency.
- Identification of stem cells of infantile leukemia using leukemic-cell transplanted NOG-SCID mice.
- Lymphoproliferation and leukemia in Ras associated ALPS like disorder (RALD).
- Responsible gene hunting for CVID and for radiosensitive hyperIgM syndrome using next generation sequencing system.
- Negative regulation of activation and apoptosis of granulocytes by Btk.
- Application of protein transduction strategy for congenital gene defect.
- Development of adoptive immunotherapy for immune reconstitution after SCT.
- Development of innovative technique for quality control and cell profiling for processed cells used in regenerative medicine/cell therapy.
- Dielectric spectrum cytometer for analysis of membrane protein expression in RBC in association with post-transplant coagulopathy.

We have achieved two great discoveries in this year. Most remarkable achievement in this year is identification of novel roles of BTK for regulation of reactive oxygen species (ROS) and neutrophil survival done by F Honda and T Morio. Btk is responsible genes for a gamma globulinemia. Only, function in B cell has been explored. This finding opens a window for new filed of neutrophil research. The report was published in Nature Immunology. Second is explication of T cell developmental failure in Ataxia Telangiectasia done by T Isoda, M Takagi and S Mizutani. In this research, we found how ATM deficiency causes T cell developmental failure, and increased susceptibility of chromosomal translocation which leads to tumor development during double negative phase of T cell development. The report was published in Blood.

**Cardiology Group**

We performed both the basic and clinical studies.

The basic studies were related to the vascular remodeling in pulmonary hypertension (PH), whose mechanisms are still unknown but thought to be inflammation as one factor. Dipeptidyl peptidase-4 (DPP-4) inhibitors (Allogliptin) are new drugs for type 2 diabetes mellitus and have an important role for cardiovascular protection by its anti-inflammation effect. Therefore we investigated the role of DPP-4 in PH. In vivo study, Allogliptin markedly improved the survival and pulmonary artery pressure of monocrotaline (MCT)-induced PH rats by improving medial hypertrophy. In in vitro experiments, allogliptin dependently inhibited proliferation of PASMCs stimulated with TGF-beta and also suppressed p-Erk 1/2 protein levels induced by TGF-beta. Therefore, DPP-4 inhibitor has potential as a new therapeutic tool for PH because DPP-4 is associated with the progression of PH by causing TGF-beta-induced inflammation. On the other hand, omega-3 fatty acids (FA) such as eicosapentaenoic acid (EPA) were reported to exert potent anti-inflammatory effects through G protein-coupled receptor 120 (GPR120). We investigated the effect of EPA in PH as well. In vivo study, EPA markedly improved survival, PH and medial hypertrophy of small pulmonary arteries. In vitro study, EPA inhibited dose-dependently pulmonary arterial smooth muscle cells (PASMCs) proliferation stimulated with TGF-beta or FGF2. EPA also suppressed nuclear factor-kappa B p65 translocation into the nucleus in PASMCs. We elucidated that EPA had anti-inflammatory effects through GPR120 in PH. EPA has also potential as a new therapeutic tool for PH. Both results were presented in The 77th Annual Scientific Meeting of Japanese Circulation Society.

Secondly, we were engaged in four multi-center-associated clinical studies. All of them were related to The Japanese
Bio-Environmental Response

Society of Pediatric Cardiology and Cardiac Surgery. These themes were “Clinical backgrounds of Eisenmenger syndrome”, “Randomized controlled trial to assess immunoglobulin plus steroid efficacy for Kawasaki disease (RAISE study)”, “Efficacy of school-based heart examination in early detection of idiopathic pulmonary arterial hypertension” and “Gene mutations in idiopathic pulmonary arterial hypertension”. The result of RAISE study were published in The LANCET and the result of gene mutations in IPAH was published in American Journal of Cardiology.

● Neurology Group
1) Mechanism of neurodegeneration and therapeutic approach in xeroderma pigmentosum
2) Role of oxidative stress in childhood neurodegenerative disease
3) Analysis of multiple malformation disorders with or without intellectual disability using techniques of molecular genetics and cytogenetics (e.g. micro-array CGH) and clinical dysmorphology
4) Derivation of neural stem cell via iPS cell from ataxia telangiectasia
5) Efficacy and safety of very-low-dose betamethasone therapy in ataxia telangiectasia

● Endocrinology Group
Currently, our research is focused on elucidating the molecular mechanisms of congenital diseases of endocrine organs, especially adrenal glands and gonads. We are looking at developing the radical treatment systems for the congenital endocrine diseases by using regenerative medicine as a final target.
Our ongoing projects are bellows
#1: Molecular mechanisms of sexual determination, collaborating with P. Koopman’s lab (IMB. The university of Queensland, Brisbane, Australia) A. Sinclair’s Lab. (Royal Children’s Hospital, Melbourne, Australia) and V. Harely’s Lab (Prince Henry’s Institute, Melbourne, Australia)
#2: Molecular pathological mechanisms in congenital adrenal hyperplasia
Current ongoing projects will be integrated systematically, and be developed further in order to accomplish our final target.

● Neonatology group
1) We are analyzing the expression of angiogenesis-related factors both in placenta and in umbilical vessels in complicated pregnancies.
2) We are investigating a novel therapy with umbilical cord blood derived mesenchymal stem cells for treating periventricular leukomalacia and chronic lung disease using intrauterine infection model.

● Nephrology Group
1) Analyses of the mechanism of pathogenesis for IgA nephropathy in Wiskott-Aldrich syndrome patients
2) Analyses of glomerular epithelial cells (podocytes) unknown function
3) Analyses of the mechanism of tubulointerstitial injury in nephrotic syndrome patients
We work on these researches in cooperation with The National Institute of Advanced Industrial Science and Technology(1), Juntendo University (2), and Division of Nephrology and Hypertension, Miller School of Medicine, University of Miami (2).

● Allergy Group
To elucidate molecular mechanisms for food allergy such as against milk and egg is one of the main projects of our group. In the light of recent progress of immunology, we analyze the function of regulatory T cells which inhibit Th2 type immune response. We also define the roles of innate immune responses in host defense against foreign antigens entering skin and mucosal tissues. We are one of the research members on the epidemiological study of allergic disorder supported by a grant-in-aid from Ministry of Health, Labor and Welfare, Japan. In collaboration with the Japanese Society of Pediatric Allergy and Clinical Immunology, we conduct several clinical studies to refine pharmacologic therapy listed in the Japanese pediatric guideline for the treatment and management of asthma. We collaborate with pharmaceutical companies on the study of clinical efficacy of leukotriene antagonist. Clinical and epidemiological study on food allergy is another major field in our study. We conduct clinical studies of specific oral tolerance induction in food allergy in which the offending food is administered orally in order to achieve tolerance.

4. Clinical Services
Hematology/Oncology/Immunology Group

Hematology/Oncology/Immunology Group treats patients with hematological malignancies, hematological disorders, malignant solid tumors, and primary immunodeficiency diseases. Our team consists of 8 staffs, including 6 senior with diplomat of board of pediatrics and/or hematology and 2 junior staffs. We offer a team-based high-quality and evidence-based clinical care for both inpatients and outpatients. Additionally, we are on our way to establish cooperative system for medical liaison and professional training with other professional facilities such as St. Luke’s International Hospital and Juntendo University Hospital.

1. Participation in multi-center cooperative clinical research group: In collaboration with national co-operative clinical research group, such as the Japanese Pediatric Leukemia/Lymphoma Study Group (JPLSG), we offer our patients opportunities to participate in the latest clinical trials and contribute to establish both standard and/or novel therapies for childhood cancers and other non-malignant diseases.

2. Participation in industry-based clinical trials for drug approval: In 2012, we participated in two industry-based trials; IgPro20, a subcutaneous immunoglobulin product, and OP-01, an Erwinia L-asparaginase.

3. Hematopoietic stem cell transplantation (HSCT): In 2012, we performed HSCT for 9 cases; related bone marrow transplantation (BMT) (n=2), unrelated BMT (n=2), unrelated cord blood transplantation (n=4), and related peripheral blood stem cell transplantation (n=1). Our experience of HSCT exceeds 140 cases including more than 50 cases with primary immunodeficiency diseases, so far. We are also working on novel HSCT methods, such as transplantation with haplo-identical donor and/or killer inhibitory receptor (KIR) ligand mismatched donor, and use of reduced-intensity conditioning aiming for reduction of late effects in HSCT recipients.

4. Analysis of pathogenesis and establishment of clinical service for rare diseases: Our group have identified a novel disease, “RALD (RAS-associated lymphoproliferative disease),” from an infant with somatic RAS mutation who exhibited both JMML (juvenile myelomonocytic leukemia)-like and ALPS (autoimmune lymphoproliferative syndrome)-like clinical features, and continuing research for this disorder. Not only for RALD, but for ataxia telangiectasia (A-T) and common variable immunodeficiency (CVID), group members are working as chief organizer of nation-wide clinical research projects financially supported by the Ministry of Health, Labour and Welfare of Japan.

5. long-term follow-up for childhood cancer survivors (CSS): In cooperation with pediatric endocrinologists, CLS (child life specialist) and psychotherapists, we are taking care of cancer survivors and supporting their quality of life.

Cardiology Group

The University Hospital has been certified as a training institute to produce the expert in pediatric cardiology by Japanese Society of Pediatric Cardiology and Cardiac Surgery. There are three pediatric cardiology experts (Doi S, Nishiyama M, Ishii T), two general pediatric cardiologists (Watanabe T, Sazuka M) and one senior resident in The University Hospital who were mainly engaged in the diagnosis and treatment for every kind of heart disease patients both in the pediatric ward and the field for pediatric outpatients. On cardiac catheterization performed in every Friday, one postgraduate (Hosokawa S) and three part-time doctors (Tashiro R, Matsumura Y, Sakurai M) were also joined to back up the procedures.

In-patients were 109 and chiefly introduced from the affiliated hospitals and out-patients field in The University Hospital. The diseases we dealt with were 46 congenital heart diseases, acquired heart diseases such as 30 Kawasaki diseases, 15 pulmonary hypertensions and 4 cardiomyopathies, and 14 cardiac arrhythmia. We performed invasive examination of cardiac catheterization, cardiovascular angiogram and myocardial biopsy as well as non-invasive examinations such as nuclear medicine, CT and MRI for differential diagnosis, decision of medication strategy and evaluation of treatments. In 65 cardiac catheterizations per year, catheter intervention included 1 coil embolization for PDA and 3 catheter ablation for arrhythmias. Twenty five cases were radically or palliatively operated at The Sakakibara Heart Institute. The treatment strategy for Kawasaki Diseases (KD) was severity-dependent and active usage of glucocorticoids, urinastatin, infriximab and cyclosporine to protect the complications of coronary aneurysms. Three KD patients were treated by infriximab and one was treated by cyclosporine. 15 patients with pulmonary hypertension (PH) were admitted for diagnosis, evaluation of treatments or decision of treatment strategy. The most important thing is early diagnosis and early initiation of treatment for PH, which is nominated for difficult-cured and progressive disease. Therefore, we decide to positively treat by receiving up-front combination therapy (uCT) with tree kinds of disease targeted drugs and inducing continuous venous infusion of epoprostenol. Four patients were treated with uCT and one patient was induced epoprostenol. As the result, we succeeded in decreasing pulmonary arterial pressure as well as increase in cardiac output and decrease in pulmonary vascular resistance. 14 patients with cardiac arrhythmia was admitted. Among them, six patients was prolonged QT elongation (PQT) and one was Brugada syndrome. They were examined to be diagnosed, on drug provocation test,
Bio-Environmental Response

exercise-tolerated ECG, face drop in cold water examination or gene mutation evaluation. Moreover, three patients were performed catheter ablation therapy, one was ventricular fibrillation with arrhythmogenic right ventricular cardiomyopathy (ARVC) and two were AVRT with WPW syndrome.

Out-patients for pediatric cardiology were up to 1,500 patients with the 1400 examinations of echocardiogram. Moreover, Holter 24-hours ECG monitoring examination was performed on about 100 patients, and Treadmill exercise tolerance examination were also performed on the same number patients. We have participated in the school heart screening program of Tokyo Metropolitan Institute for Preventive Medicine and Tokyo Medical Association, and checked more than 10,000 students ECG records in elementary, junior high and senior high schools. The students who were needed the third stage checkup visited The University Hospital, examined at out- or in-patients fields and finally decided the exercise restriction level in school life.

●Neurology Group
Child neurology group provides highly specialized diagnostic approach and medical care for neurological disorders such as epilepsy, neuromuscular disorders, infection of nervous system, neurodegenerative diseases and genetic syndromes. In particular, we provide therapeutic approach of xeroderma pigmentosum by using of clinicopathological analysis, and perform molecular genetic testing for multiple congenital malformation disorders with or without intellectual disability. In addition, in cooperation with the department of neurosurgery, we evaluate the indication for surgical treatment and then performe surgical operation such as focal brain resection to the patient of intractable epilepsy.

●Endocrinology Group
We provide highly specific diagnostic approach and therapy for pediatric endocrine disorders, such as growth retardation, hypogonadism, thyroid diseases, disorder of sex development, disorder of Ca-P-PTH metabolism, type1 diabetes mellitus. In collaborating with the satellite hospitals, we are following more than a thousand patients, and more than 80 children with endocrine disorders hospitalized yearly our university.

Senior physician of our group is an adviser of Tokyo Health Service Association, and leading the newborn screening of congenital adrenal hyperplasia in Tokyo.

Among many pediatric endocrine disorders, we are directing our effort at the disorders of adrenal gland and sex development, and looking at establishing the clinical center for those patients with pediatric-urologist and other co-medical staffs.

Type1 DM is another disease into which we put a great effort. We manage the Type 1 DM patients' association (Wakamatsu-kai) and organize the summer camp every year. The camp is consisted of more than a hundred participants and provides the valuable educational opportunities for the patients, the medical staffs and the medical students.

●Neonatology group
1) Our NICU (Neonatal Intensive Care Unit) was established on April 2012 with 6 beds, and provide intensive care for preterm infants (> 30 weeks of gestation and/or >1000g of birth weights). We also take care of critically ill newborns, those with congenital heart disease, hematological disorder, etc., in cooperation with other pediatric subspecialty groups.
2) As a designated Perinatal Cooperation Hospital in Tokyo, we accept newborn patients from various areas in Tokyo.

●Nephrology Group
Nephrology Group provides diagnosis and treatment for patients with acute and chronic glomerular diseases, nephrotic syndrome, and congenital abnormality of kidney and urinary tract. We perform special examination such as kidney biopsy, renogram, MRU, etc. We also participate positively in urinary analysis screening performed at schools.

We operate clinical trial to examine the efficacy and safety of eculizumab for treatment of atypical hemolytic uremic syndrome patient.

We participate in multi-institutional joint research of refractory nephrotic syndrome operated by Japanese Study Group of Kidney Disease in Children.

We hold conference together with neighboring institutions regularly to discuss about better treatment for serious kidney diseases and to improve our knowledge. Some members study treatment for serious kidney diseases, kidney transplantation and renal replacement therapy for children at National Research Institute for Child Health and Development.

●Allergy Group
Allergy Group provides diagnostic and medical care for patients with allergic diseases such as asthma, food allergy, atopic dermatitis mainly at outpatient clinic.

5. Publications

Original articles


**International congress**


1. Staffs and Students (April, 2012)

Professor
Nobuyuki MIYASAKA
Masayoshi HARIGAI(1)

Associate Professor
Hitoshi KOHSAKA
Tetsuo KUBOTA(2), Ryuji KOIKE(3), Kazuki TAKADA(4), Toshihiro NANKI(1),

Junior Associate Professor
Hideyuki IWAI

Assistant Professor
Fumitaka MIZOGUCHI, Akito TAKAMURA, Kaori WATANABE(1), Ryoko SAKAI(1)

Visiting Lecturer
Rieko TSUBATA, Hiroyuki HAGIYAMA, Yoshiki NONOMURA, Yukiko KOMANO, Kenji NAGASAKA, Jun OGAWA, Fumihito SUZUKI, Kayoko KANEKO, Peter Y. Shane, Toru KINO

Graduate Student

Research Student
Chie MIYABE

Resident Physician
Mineto OTA, Hiroshi MORI, Yoji KOMIYA, Mari NAKAJIMA

Research Worker
Yusuke TAGATA

Office Administrator
Rie FUJIME, Kaori KONNO, Tomoko TAKAHASHI(1), Momoko MITSUISHI, Marie YAJIMA(1)

Technical Staff
Eri YOSHIMOTO, Sayaka ONO

(1) Department of Pharmacovigilance, (2) Health care sciences, (3) Clinical Research Center, (4) Clinical Clerkship Working Group

2. Purpose of Education
We have provided medical students and graduates with the opportunity to obtain the ability to identify important clinical problems and to solve them by clinical reasoning through their active participation into the diagnosis and management of various rheumatic diseases.

3. Research Subjects
Following studies have been extensively carried out in our laboratory with various biochemical, immunological, molecular biological and statistical techniques:

1) Development of new therapeutics for the treatment of rheumatoid arthritis targeting cell cycle regulators, inflammatory molecules and synovial fibroblasts.
2) Investigation of mechanism and development of new therapeutics for the treatment of polymyositis.
3) Analysis of the roles of chemokine and bioactive lipid on the pathogenesis of rheumatic diseases.
4) Establishment of evidence-based treatment of rheumatic diseases by implementing several cohort studies.

4. Clinical Services
We have provided care to a large number of patients with diverse rheumatic diseases with 27,957 clinic visits and 274 hospital admissions in 2012. We have aimed to practice evidence-based medicine and to provide care that is in accordance
with the global standard. We have contributed to the development of potential new drugs and treatments through participation into industry- as well as investigator-initiated clinical trials for chemical and biological agents. We have also contributed to the refinement of the care of rheumatoid arthritis patients through the conduct of various pharmacovigilance studies.

5. Publications

Original Article


Dermatology

1. Staffs and Students (April 2012)

Professor Hiroo YOKOZEKI
Junior Associate Professor Kaoru TAKAYAMA, Ken IGAWA
Assistant Professor Kunitaro FUKUYAMA, Akiko FUJIWARA, Takichi MUNETSUGU, Hitomi Satoh
Hospital Staff Tsukasa UGAJIN, Ai AKINO, Sayaka SHIBAMA, Takahiro ISHIKAWA, Hana TERAKI, Natsumi NOGUCHI
Secretary Yukako KIKUCHI, Mina ARAI
Graduate students Makiko UENO, Kazumi SAEKI, Risako INOUE, Rie YU, Minako INAZAWA

2. Purpose of Education

Dermatology is a department of medical science which educates students to make a diagnosis and treatment for skin diseases. Main objective of Dermatology in the graduate course is to provide students opportunity to study advanced Immunodermatology, physiology, pathology and allergology, and also to study making diagnosis of skin diseases and operation techniques. Students are also taught on skin oncology (melanoma, angiosarcoma) and its related laboratory technology depending on their research project.

3. Research Subjects

1) Mechanisms of contact hypersensitivity
2) Pathological etiology of atopic dermatitis
3) Mechanisms of eosinophil recruitment to the skin
4) Roles of basophils in human skin diseases
5) Functional roles of PGD2 and its receptors in allergic inflammation
6) Therapeutic approach for skin diseases by stable form of galectin-9
7) Analysis of pathological mechanisms’ of hyperhidrosis
8) Investigation of mediators for itch
9) Pathological etiology of chronic prurigo
10) Therapeutic approach for angiosarcoma with HVJ-E.
11) To establish the in vitro diseases model of dermatological disorders using human induced pluripotent stem cell
12) Murine food allergy model with transcutaneous sensitization

4. Clinical Services

Dermatology clinic provides an advanced treatment for skin diseases; skin tumors, infectious diseases, skin allergy, collagen diseases and psoriasis. Recently, we established the gene theories (STAT6 decoy ODN) for severe atopic dermatitis in the clinic.

5. Publications

Original Article
2. Nishizawa A, Satoh T, Yokozeki H : Erythrodermic psoriasis improved by panitumumab, but not bevacizumab,
Human Pathology

1. Staff and Students

Professor:  Yoshinobu EISHI  
Junior Associate Professor: Hiroshi KAWACHI  
Assistant Professor: Daisuke KOBAYASHI, Takashi ITO, Maki KOBAYASHI, Mariko NEGI  
Laboratory Technician: Asuka FURUKAWA  
Technical Assistant: Yoshimi SUZUKI  
Secretary: Miho IWAMITSU  
Graduate Students: Yuan BAE, Naoki AKAZAWA, Tadatsune IIDAA, Akira TAKEMOTO, Shohei TOMII, Atsuko KONTA, Katsumi OISHI, Yoshihiko SUZUKI, Nifutar LOKMAN, Teruko NAKAMURA, Kana MINEGISHI, Pariko YOROZU, Hiroki AIKAWA, Mami HANAO, Yurika UENO, Kousuke TAKEMURA, Kentaro BABA, Chisato ITO, Sayoko CHIBA, Ayaka MATSUKAZE  
Research Student: Tomoya KAKEGAWA

2. Purpose of education

Department of Human Pathology provides a graduate course for future pathologists to train the skills and knowledge of anatomical pathology and develop the abilities for medical researches. Graduate students are educated to associate their researches with problems in diagnosis and treatment of diseases and etiologies of the diseases of unknown causes. In the course, they usually spend the first two years for anatomical pathology training, searching for their own research theme and another two years for researches and thesis-writing.

3. Research Subjects

1) Endogenous infection (diseases caused by indigenous microorganisms in susceptible hosts)
2) Cancer research (histopathology, carcinogenesis, prognostic factors, and so on)

4. Clinical Services

Teaching staffs in Human Pathology support all functions of Surgical Pathology in our university hospital.

5. Publications

Original Article

Physiology and Cell Biology

1. Staffs and Students

Professor Noboru MIZUSHIMA (~September)
Adjunct Professor Noboru MIZUSHIMA (October~)
Assistant Professor Akiko KUMA, Taki NISHIMURA, Atsushi TANAKA
Adjunct Lecturer Ikuko HONDA (August~)
Tokunin Assistant Professor Chieko KISHI (April~July), Eisuke ITAKURA (April~July)
Medical Fellow Chieko KISHI (~March), Ikuko HONDA (June~July)
Postdoctoral Fellow Eisuke ITAKURA (~March), Ikuko HONDA (~May)
Graduate Students Anoop Kumar Gopi VELIKKAKATH (~March), Kay KITAMURA (~March), Mayurbhai Himatbhai SAHANI, Hideaki MORISHITA, Quy PHAM NGUYEN, Takako NAITO, Takeshi KAIZUKA, Peidu JIANG, Saori YOSHII (April~), Norito TAMURA (April~)

2. Purpose of Education

Our department is a branch of basic medical science. In the undergraduate course, our department deals with physiology and introductory cell biology. Our main object in the graduate course is to provide a wide range of views to understand human biology using various research techniques such as molecular biology, biochemistry, cell biology and mouse genetics.

3. Research Subjects

1) Molecular mechanism of autophagy, a dynamic degradation system within cells
2) Physiological and pathophysiologival roles of autophagy
3) Development of new methods for monitoring autophagy

4. Publications

Original Article

1. Itakura, E., Kishi-Itakura, C., Mizushima, N. The hairpin-type tail-anchored SNARE syntaxin 17 targets to autophagosomes for fusion with endosomes/lysosomes. Cell 151: 1256-1269 (2012)
2. Quy, P.N., Kuma, A., Pierre, P., Mizushima, N. Proteasome-dependent activation of mammalian target of rapamycin complex 1 (mTORC1) is essential for autophagy suppression and muscle remodeling following denervation. J. Biol. Chem. Epub 2012 Dec 3

**Review Article**


Molecular Cellular Cardiology
Bio-informational Pharmacology

1. Staffs and Students (April, 2012)
Professor Tetsushi Furukawa, MD, PhD
Assistant professor Yusuke Ebana, MD, PhD

2. Purpose of Education
This laboratory focuses on understanding pathogenesis of intractable and common cardiovascular diseases using multidisciplinary approach (patch-clamp, cell biology, optical recording, genetic analysis, and computational analysis). Our ultimate goal is to improve diagnosis and management of intractable and common cardiovascular diseases.

3. Research Subjects
1. Pathogenesis of atrial fibrillation (AF)
Atrial fibrillation (AF) is the most frequent arrhythmias, reaching more than 3.5 million patients in Japan. Associated cerebral infarction due to cardiogenic thrombosis (250,000 patients/year in Japan) causes reduced QOL and is one of the main causes of bedridden old people. We have taken following approaches to establish protection and treatment of atrial AF.

a. GWAS (genome-wide association study) in AF
We carry out most extensive GWAS (genome-wide association study) in Japan to determine gene polymorphisms associated with AF. Since 2011, we have participated in the international Meta-analysis called as CHARGE study. We found 10 SNPs associated with AF: among them, 6 SNPs were associated with both European/American and Japanese, and 4 with European/American but not with Japanese.

b. Inflammatory and immunological mechanisms in atrial fibrillation
AF is a multifactorial disease, and inflammatory response is believed to play a role in linking between these risks and AF. In vitro Boydren chamber experiments and in vivo TAC experiments, we showed that stretch-induced ATP release via a gap-junction channel, pannexin-2, induces recruitment of macrophages, acting as an initial factor to provoke atrial inflammation. This paper was selected as the Best Basic Paper on AF 2012 in Boston AF symposium 2013.

2. Pathogenesis of ventricular tachyarrhythmias and sudden cardiac death
Despite extensive effort by many researchers for years, ventricular tachycardia and fibrillation remain the main cause of sudden death, and the biggest challenge in arrhythmia research. Our laboratory approaches this issue using genetically engineered mice. In this year, we found that the mice with genetic deletion of the His-Purkinje system-specific transcription factor were susceptible to exercise-related atrio-ventricular block and ventricular tachyarrhythmias. In human, genetic mutations in the His-Purkinje system-specific transcription factor are associated with idiopathic ventricular fibrillation related to exercise.

3. Use of iPS cells for arrhythmia research
Traditional arrhythmia researches have been performed in cardiomyocytes of species other than human, or in cultured cells, in which human ion channel genes have been heterologously expressed. The milieu different from human cardiac myocytes (especially the lack of excitation-contraction coupling machinery) is the serious limitation for arrhythmia research. Cardiomyocytes differentiated from human iPS cells could overcome this critical limitation, and would bring marked advance in arrhythmias researches. We take following 2 approaches.

a. Establishment and functional analysis of human iPS-derived cardiomyocytes (hiPS-CM) from familiar sudden death patients (LQT, Brugada syndrome)
We established and characterized iPS cell-derived cardiomyocytes from human fibroblasts obtained from familiar sudden death patients (LQT, Brugada syndrome). We have able to establish iPS cells from LQT1, LQT2, LQT3, and Brugada syndrome. Our data showed that hiPS-CM from LQT patients maintain some of electrophysiological phenotype found in LQT patients’ hearts.

b. Drug screening system using human iPS cells-derived cardiomyocytes

4. Use of state-of-art technology for cardiovascular research
a. Use of motion vector technology for in vitro analysis of cardiac contraction
To analyze cardiac contractility, one has to perform echocardiography or catheter measurement of intra-cardiac pressure/intra-cardiac volume in vivo. Thus, to examine possible cardiac toxicity of new drugs, one must wait until in vivo assay. Motion vector technology created by Sony Co. can non-invasively estimate contraction and relaxation speed of cardiac myocytes in vitro. We verified using well-defined drugs that motion vector technology can assess drug’s effects on contraction and relaxation of cardiac myocytes. We also confirmed that motion vector can be monitored simultaneously with electrical activity of cardiomyocytes (MEA), and also that this technology can be applied to the hiPS-CMs.

b. Basic research for generation of 3-D simulator of cardiac electrical activity

4. Publications List

Original Article


Molecular Medicine and Metabolism

1. Staffs and Students (April, 2012)
Associate Professor Takayoshi SUGANAMI

2. Purpose of Education
   The concept of the metabolic syndrome has come before the footlight because it is a precursory state of atherosclerotic
diseases. It has been defined as a constellation of abdominal obesity, insulin resistance, hyperlipidemia, and hypertension,
and is a multi-factorial pathologic condition that arises from complex interactions between genetic and environmental
factors. In our laboratory, all the staffs and students have been provided the unique opportunities to investigate the
pathophysiologic role of chronic inflammation and therapeutic implication of adipocytokines toward the better
understanding of the molecular mechanism of the metabolic syndrome.

3. Research Subjects
   1) Role of adipose tissue inflammation in the metabolic syndrome
   2) Molecular mechanisms of saturated fatty acid-induced chronic inflammation

4. Publications
   Original Articles
      Nagai Y. The Radioprotective 105/MD-1 complex contributes to diet-induced obesity and adipose tissue
      T, Okano M, Ogawa Y. Role of DNA methylation in the regulation of lipogenic glycerol-3-phosphate acyltransferase
      Suganami T, Hasegawa K, Ogawa Y. Highly purified eicosapentaenoic acid increases interleukin-10 levels of
      peripheral blood monocytes in obese patients with dyslipidemia. Diabetes Care 35: 2631-2639, 2012
      Shimizu T, Miyake K. Human TLR4 polymorphism D299G/T399I alters TLR4/MD-2 conformation and response to

   Review Articles
   1. Suganami T, Tanaka M, Ogawa Y. Adipose tissue inflammation and ectopic lipid accumulation. Endocr. J. 59: 849-
      857, 2012
Stem Cell Regulation

1. Staffs and Students

Professor Tetsuya TAGA
Associate Professor Tetsushi KAGAWA
Associate Professor Ikuo NOBUHISA
Project Assistant Professor Kouichi TABU (April 2012-)
Administrative Assistant Mako FUSHIMI
Technical Assistant Yuko ONISHI (-March 2012)
Technical Assistant Hiroko SUZUKI (-March 2012)
Technical Assistant Kazuko INOUE (April 2012-)
Graduate Student Norihisa BIZEN
Graduate Student Maha ANANI
Graduate Student Genki SUDO (April 2012-)
Graduate Student Yasuhiro KOKUBU (-March 2012, October 2012-)
Graduate Student Suguru KINOSHITA (-March 2012)
Graduate Student Yuuki TAKAZAWA (-March 2012)
Graduate Student Reiko NOMURA (-March 2012)
Graduate Student Nozomi MURAMATSU
Graduate Student Kaho HARADA (April 2012-)
Graduate Student Mayumi AMANO (April 2012-)
Graduate Student Sachiko KANEKO (April 2012-)
Graduate Student Yoshitaka MUROTA (April 2012-)
Research Student Kazuo TERASHIMA (April 2012-)
Research Student Wenqian WANG (October 2012-)

2. Purpose of Education

Our education has been conducted to elucidate the mechanisms by which stem cells are regulated. The major focus has been on neural stem cells, hematopoietic stem cells, and cancer stem cells. The study is aimed to understand development, maintenance, and regeneration of the central nervous system and the hematopoietic system, and to obtain a clue to tackle the problem of cancer recurrence. The projects have been performed, for instance by elucidation of stem cell characteristics, analysis of transcriptional regulatory signaling pathways, and identification of niche signals.

3. Research Subjects

1) Molecular basis for the maintenance of neural stem cells
2) Regulation of the neural stem cell fate
3) Characterization of hematopoietic stem cells in fetal hematopoietic organs
4) Characterization of cancer stem cells and their niche
5) Epigenetic regulation of neural development

4. Publications

Original Article

Review Article
Molecular Pharmacology

1. Staffs and Students
Professor: Masaki Noda, M.D., Ph.D.
Associate Professor: Yoichi Ezura, M.D., Ph.D.
Assistant Professor: Tadayoshi Hayata, Ph.D.
GCOE International Coordinator: Tetsuya Nakamoto, M.D., Ph.D.
GCOE Research Instructor: Takuya Notomi, Ph.D.
Secretary: Naoko Ogawa
GCOE Secretary: Yuko Oshie, Kumiko Tomita
Graduate Students: Smriti Aryal A.C., Chiho Watanabe, Makiri Kawasaki, Junpei Shirakawa, Shuichi Moriya, Takayuki Yamada
Undergraduate Student: Arina Hatta

2. Purpose of Education
Osteoporosis is one of the serious diseases in aging societies in the world. Osteoporosis increases risk of fracture that results in loss of quality of life and threatens life of aged people. Therefore, it is crucial to understand how bone mass is regulated by specific factors to establish the therapy and prevention for osteoporosis. Graduate students will study bone metabolism through journal presentation and investigate bone metabolism using mice and tissue culture system by advanced molecular and cellular biological approaches.

3. Research Subjects
1) Molecular mechanisms of osteoblast and chondrocyte differentiation.
2) Mechanism of regulation of bone mass by nervous system.
3) Regulation of bone metabolism by mechanical stress.
4) Regulation of gene expression by hormones.
5) Molecular biology of function and formation of osteoclasts.

4. Publications
Original articles
2. Purpose of Education

Our goal is to define the molecular basis for the mechanism of organ formation and regeneration using knockout mice and mutant fishes. To accomplish this goal, we have focused on defining signaling molecules and pathways that regulate liver formation and stress responses. Moreover, we are trying to establish a cell therapy for intractable diseases such as liver failures using self-bone marrow cells. Our study will provide new insights into understanding the precise molecular mechanisms that underlie organ failures found in human disease and will lead to he development of new rational therapy for the diseases.

3. Research Subjects

1) Studies on the stress-activated protein kinase (SAPK/JNK) signaling pathway
2) Studies on the Hippo signaling pathway
3) Studies on the cell differentiation of mouse ES cells
4) Studies on liver formation using a small fish, Medaka, Oryzias Latipes
5) Studies on liver regeneration using mice
6) Studies on circadian clock using zebrafish and mice

4. Publications

Original Articles


Stem cell Biology

1. Staffs and Students (April 2012)
Professor: Emi NISHIMURA
Assistant Professor: Takahiro AOTO, Hiroyuki MATSUMURA
Research Associate: Yasuaki MOHRI, Jun SUNAYAMA
Graduate Student: Makiko UENO, Ryoko TAGUCHI, Hikaru KOBAYASHI
Research Student: Nguyen Thanh BINH
Technical Staff: Koki ONISHI
Secretary: Iku WATANABE

2. Purpose of Education
Stem cell systems play fundamental roles in tissue turnover and homeostasis. 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 ageing. We further aim to apply these knowledges gained to regenerative medicine, treatment of cancer and other age-associated diseases.

3. Research Subjects
1) Identification of stem cells in the skin.
2) Mechanisms of stem cell maintenance
3) Mechanisms for ageing and quality control of stem cell pools.
4) Mechanisms of tissue ageing
5) Mechanisms of cancer development in stem cell systems.

4. Publications
Integrated Pulmonology

1. Staffs and Students (December, 2012)

Professor
Naohiko INASE

Junior Associate Professor
Kimitake TSUCHIYA

Assistant Professor
Toshio FUJIE, Tomoya TATEISHI,
Haruhiko FURUSAWA, Hiroyuki SHIMADA

Project Assistant Professor
Hiroyuki SAKASHITA

Graduate Students
Takasa OKAMOTO, Sahoko CHIBA,
Yuichiro NEI, Yoshitoshi KOMAZAKI,
Mayuko TAO, Yumi SAKAKIBARA,
Masahiro ISHIZUKA, Kozo SUHARA,
Toshiharu TSUTSUI, Masahiro MASUO,
Tsuyoshi SHIRAI

2. Purpose of Education

Integrated pulmonology is a branch of internal medicine which 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. Students are also taught on basic science and its related laboratory technology depending upon their research subject.

3. Research Subjects

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
5) Pathogenesis of pulmonary fibrosis and emphysema

4. Clinical Services

Integrated pulmonology 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, management of sleep apnea, and arrange of clinical studies are provided.

5. Publications

Original Article

Gastroenterology and Hepatology

1. Staffs and Students (April, 2012)

Professor
Mamoru WATANABE

Professor
Yasuhiro ASAHINA (Department for Hepatitis Control).

Associate Professor
Kazuo OHTSUUKA (Department of Endoscopic Diagnosis and Therapeutics),
Ryuichi OKAMOTO (Department of Advanced Therapeutics in Gastrointestinal Diseases),
Tetsuya NAKAMURA (Department of Advanced Therapeutics in Gastrointestinal Diseases)

Junior Associate Professor
Akihiro ARAKI
Shinya OOKA (Department of Professional Development),
Sei KAKINUMA (Department for Hepatitis Control),
Kiichiro TSUCHIYA (Department of Advanced Therapeutics in Gastrointestinal Diseases)

Assistant Professor
Masakazu NAGAHORI, Cheng-Hsin AZUMA,
Takashi NAGAISHI, Mina NAKAGAWA,
Yasuhiro NEMOTO,
Eriko OKADA (Department of Endoscopic Diagnosis and Therapeutics),
Shigeru OOSHIMA (Department of Advanced Therapeutics in Gastrointestinal Diseases)

Tokunin Assistant Professor
Megumi TASAKA

Hospital Staff
Yuki SAKURAI, Toshimitsu FUJI,
Elko SAITO, Akiko KITAZUME,
Yoshitomo KANO(April~), Syun KANEKO(April~),
Fumio GOTO(April~), Yoichi NIBE(April~),
Sayuri NITTA(April~)

Medical Fellow
Shiro YUI, Tomohiro MIZUTANI(April~)

Graduate Student
Masahiro SUZUKI, Xiu ZHENG,
Michihiro SHIMIZU, Miyako MURAKAWA,
Tatsuro MURANO, Masayoshi FUKUDA,
Kouhei YOSHINO, Go ITOH,
Nobukatsu HORITA, Yu MATSUZAWA,
Kengo NOZAKI, Masahiro TAKAHARA,
Yuki YAMAUCHI, Junnko FUJIKI,
Hikiko KAWAI, Miki TANIGUCHI,
Hideto YAMANAKA, Kenji OOTANI,
Keita FUKUSHIMA, Masanori KOBAYASHI,
Satoru FUJII, Hideji HIBIYA

2. Education Principles

We believe that the central role of clinical departments in the graduate school is to establish basis for the innovative medicine / medical treatment in the next generation. Basic research lead by clinical concepts, and development of novel therapeutics established upon basic research are both critically required to achieve our mission. Therefore, our primary goal is set to train highly educated and experienced clinician-researchers in the field of gastroenterology and hepatology.

In the clinical area, we pursue development and application of highly advanced technologies, including novel endoscopic procedures, for sophisticated diagnosis and treatment of gastrointestinal and liver diseases. In basic research, our principle is to achieve “clinical science”, a research evoked from various clinical problems, and also directed to launch innovative therapeutic procedures to the daily clinical practice. Based on these principals, we are running research projects to 1) develop novel therapy for refractory inflammatory bowel diseases, 2) prevent progression of liver failure in chronic hepatitis patients and 3) improve anti-cancer therapy for the treatment of gastrointestinal malignancies, by expanding our distinct basic research findings in the area of mucosal immunology, liver immunology, regenerative medicine and virology, to various clinical settings.

Moreover, we promote both intra- and inter-national exchanges of researchers, and provide good opportunities to study abroad. The final goal of our education is to promote students to become a well-developed clinician-researcher, and also a leading expert in the field of gastroenterology and hepatology.
3. Basic Research Projects

- Elucidating the pathophysiology of inflammatory bowel diseases and development of treatment by disease-specific immue-regulation.
- Development of novel therapeutics for inflammatory and allergic diseases based on gut–specific mucosal immune regulation.
- Basic research and clinical application of regenerative medicine in gastrointestinal diseases.
- Analysis of interferon-resistant hepatitis C virus.
- Comprehensive analysis of susceptibility genes for various gastrointestinal diseases.

4. Expert Areas in Clinical Practice

- Immune-regulation based treatment of inflammatory bowel diseases.
- Prevention of chronic hepatitis progression to hepatocellular cancer and liver failure, by virology-based treatment strategy.
- Clinical trial of innovative treatment for hepatocellular cancer.
- Diagnosis and treatment of small intestinal diseases by balloon enteroscopy and capsule endoscopy.
- Advanced diagnosis and treatment of colonic diseases by colonoscopy.
- Development of minimally-invasive diagnostic modalities for gastrointestinal diseases (i.e. MR enteroclysis).
- Improved chemotherapy for gastric and pancreatic malignancies.

5. Publications


Surgical Oncology

1. Staffs and Students

Professor: Kenichi SUGIHARA
Junior Associate Professor: Satoru IIDA, Mikito INOKUCHI
Assistant Professor: Takanobu SATO, Toshiaki ISHIKAWA, Tsuyoshi NAKAGAWA, Keiji KATO, Takatoshi MATSUYAMA, Kazuo MOTOYAMA, Makoto NAGAHARA, Satoshi OKAZAKI
Professor: Kazuyuki KOJIMA (Minimally invasive surgery center)
Associate Professor: Hiroyuki UETAKE (Translational oncology)
Associate Professor: Hirotoshi KOBAYASHI (Minimally invasive surgery center)
Assistant Professor: Megumi ISHIGURO (Translational oncology)
Graduate Student: Yasushi TAKATSUNO, Ken HINOUE, Hirofumi SUGITA, Goshi ODA, Akifumi KIKUCHI, Yoshitake FUJIMORI, Shinichi YAMAMUCHI, Kohji MIYAZAKI, Hideaki MURASE, Hitoshi SUGIMOTO, Nobuko TAMURA, Toshiyuki ISHIBA, Norihito OGAWA, Taiki MASUDA, Mai KASAHARA, Toshimitsu YANAKA, Ayako KAMIYA, Yuya SATO, Masatoshi NAKAGAWA, Hironobu BABA

2. Purpose of Education

Main objective of surgical oncology in the graduate course is to provide students with opportunity to study oncology in order to become the well-rounded surgeon who has international and scientific feelings.

3. Research Subjects

1) Role of Cox-2 and VEGF in growth of solid tumor and angiogenesis
2) Identification of predictive factors for chemo-responsiveness and prognosis in cancer by molecular biological technique.

4. Clinical Services

Surgical oncology clinic performs less invasive operation for cancer of stomach, colon and rectum, and breast with new devices including laparoscope, thereby allowing physiological and neurological functions to be preserved. Moreover, treatment with chemotherapeutic agents for cancer is also conducted.

5. Publications

Original Articles


GEP-Nets with Undetermined Malignant Potentials of their Primary Sites. Hepatogastroenterology. 2012;59(118):1682-1686


Review Articles


Books


1. Staffs and Students (April, 2012)

Professor  
Mitsuaki Isobe

Clinical Professor  
Kenzo Hirao

Associate Professor  
Takashi Ashikaga,
Tetsuo Sasano (Graduate School of Health Care Sciences, Biofunctional Informatics)

Junior Associate Professor  
Yasuhiro Yokoyama,  Go Haraguchi (Department of Critical Care Medicine)

Assistant Professor  
Mihoko Kawabata,  Ryoko Azuma,
Shunji Yoshikawa,  Ken Kurihara,
Yasuki Tanaka,  Shingo Maeda,
Taro Sasaoka,
Yusuke Ebana (Medical Research Institute, Bio-informational Pharmacology),
Daisuke Tezuka

Graduate Student  
Chisato Takamura, Yu Hatano,
Kentaro Takahashi,  Koji Higuchi,
Tatsuya Hayashi,  Kiyoshi Ohtomo,
Tetsuo Kamiishi,  Masahiko Setoguchi,
Susumu Tao,  Tomoko Manno,
Hiroshi Kawata,  Daisuke Ueshima,
Tomoyo Sugiyama,  Kensuke Ihara,
Tomofumi Nakamura,  Koji Sugiyama,
Kei Takayama,  Ryota Iwatsuka,
Toru Miyazaki,  Yoko Kato,
Yuji Konishi,  Yoichi Otaki,
Masa-- Takigawa,  Atsuhiko Yagishita,
Tatsuya Fujinami,  Osamu Inaba,
Masahito, Suzuki,  Naoyuki Miwa,
Rena Nakamura

2. Education

We are dealing with pathophysiology of circulatory system especially cardiovascular diseases. Cardiovascular diseases are principal cause of death in our country. These diseases are categorized into several fields. They include ischemic heart disease, myocardial disease, valvular disease, atherosclerosis, arrhythmia, and infectious disease. The common final figure of these diseases is heart failure leading to patients’ death. Based on recent progresses in molecular biology and bioengineering our knowledge on the pathophysiology of these diseases has been expanded rapidly. There are variety of new diagnostic technologies including imaging tests, hematological tests and electrophysiological tests. In addition, development in the treatment of cardiovascular disease is overwhelming. They include intravascular catheter intervention, catheter ablation and operation. Medical treatment has also been progressed rapidly. Further, gene therapy for cardiovascular diseases has started. All of these fields are our focus for education. In this course, students learn about modern knowledge and technologies in cardiovascular diseases, especially in the field of pathophysiology, diagnosis, treatment and prevention.

3. Research Subjects

The purposes of our investigation are to reveal the etiology and pathophysiology of cardiovascular diseases, and to develop new technologies for diagnosis and treatment. For that purpose we investigate clinical cases and model animals. Currently our investigations are focused on arteriosclerosis, atherosclerosis, cardiomyopathy, myocarditis, arrhythmias, cardiac rejection and heart failure. The relationship between gene mutation and cardiovascular disease, electrophysiology, myocardial cell transplantation and myocardial regeneration are also our major subjects of research.

1) Clinical study of gene therapy for coronary artery disease (Isobe)
2) Clinical study for treatment of acute coronary syndrome (Isobe, Ashikaga, Yoshikawa)
3) Molecular mechanism and treatment of myocardial ischemia and reperfusion injury (Isobe, Haraguchi)
4) Molecular mechanism and treatment of coronary restenosis and vascular disease (Isobe)
5) Gene therapy of myocarditis and cardiac chronic rejection (Isobe, Suzuki)
6) Cardiac rejection and immunological tolerance (development of safe immunosuppressive therapy) (Isobe, Suzuki)
7) Treatment of heart failure and cardiomyopathy by myocardial regeneration (Isobe, Suzuki)
8) Regulation of arteriosclerosis by targeting transcription factors (Isobe)
9) Gene therapy of vascular disease (Isobe)
10) Diagnostic imaging of aortitis (Isobe)
11) Molecular mechanism and treatment of aortitis (Isobe)
12) Assessment of vascular endothelial dysfunction in vasculitis, heart failure and arrhythmia (Isobe)
13) Application in gene therapy for heart failure and cardiomyopathy (Isobe)
14) Molecular system of myocardial remodeling in heart failure and ventricular hypertrophy (Isobe)
15) Therapy of sleep apnea syndrome with heart failure (Isobe)
16) Assessment by imaging of coronary artery and cardiac function (Isobe, Tezuka)
17) System of origin with tachyarrhythmias (particularly supraventricular tachycardia) (Hirao)
18) Medical therapy and ablation for tachyarrhythmias (Hirao)
19) Research for the conduction of atrio-ventricular node (Hirao)
20) Research and Therapy for arrhythmia by using Cardioendoscope (Hirao)
21) Research of atrial fibrillation from origin of pulmonary vein (Hirao)
22) Research of genetic factor with atrial fibrillation (Hirao)
23) Research of ablation for atrial fibrillation (Hirao, Yokoyama)

We conduct collaborative researches with not only Medical Research Institute and other facilities in our university but also domestic and foreign institutes according to research projects. Since clinical cases in our hospital are diverse and abundant, clinical investigations are also our major target. Therefore, we can provide many research projects depending on students’ need. We encourage and help students to pursue their own original way of investigation.

4. Clinical Services
Students are also encouraged to learn about clinical cardiology. They can participate in any clinical activities undertaken in our hospital including cardiac catheterization, electrophysiological study, catheter ablation, various imaging tests, cardiac pathology, and patients care.

5. Publications

Review

Original Article
2. Ozaki, S; Ando, M; Isobe, M; Kobayashi, S; Matsunaga, N; Miyata, T; Nakabayashi, K; Nakajima, Y; Nose, M; Ohta, T; Shigematsu, H; Sueishi, K; Tanemoto, K; Yoshida, A; Yoshida, M; Yutani, C; Arimura, Y; Fukaya, S; Hamaguchi, S; Hashimoto, H; Hiromura, K; Ishizu, A; Iwai, T; Kaneko, K; Kataoka, H; Kawana, S; Kida, I; Kobayashi, Y; Komori, K; Masaki, H; Matsumoto, T; Nagaoka, T; Nagasawa, K; Nojima, Y; Okada, M; Okazaki, T; Sakamoto, I; Shigematsu, K; Shiiya, N; Takahashi, A; Takizawa, H; Yamada, H; Yoshida, S; Fukui, T; Horie, M; Koike, T; Kumagai, S; Sasajima, T: Guideline for Management of Vasculitis Syndrome (JCS 2008) Digest Version. Circ J 75(2): 474-503, Feb 2012


18. Hikita, H ; Kuroda, S ; Kawaguchi, N ; Nakashima, E ; Fujinami, T ; Sugiyama, T ; Kamiishi, T ; Takahashi, Y ; Nozato, T ; Kuwahara, T ; Sato, A ; Takahashi, A ; Isobe, M. Differential Characteristics of Inflammatory Responses to Stent Implantation Between De Novo and Intrastent Restenosis Lesion in Patients With Stable Angina. ANGIOLOGY 63(Feb): 92-95, 2012


1. Staffs and Students (April, 2012)

Professor
Koshi MAKITA

Associate Professor
Koichi NAKAZAWA

Junior Associate Professor
Tokuiro UCHIDA, Seiji ISHIKAWA,
Jiro KURATA

Assistant Professor
Akio MASUDA, Maiko SATOMOTO,
Hiroyuki KOBINATA, Mamoru YAMAMOTO
Takashi HAKUSUI, Eri IKEDA,
Yoshie OTANI, Sonomi TANAKA,
Hiroto YAMAMOTO

Graduate Student
Wei FAN, Fukami NAKAJIMA,
Yutaka MIURA, Hiroyuki ITO,
Qi YU

2. Purpose of Education

The Department of Anesthesiology is an integral part of the health care system providing valuable perioperative services as well as pain relief and critical care management. Our goals of education are understanding clinical pathophysiology and clinical pharmacology, which are essential for daily clinical activities to treat patients with critical illness undergoing major surgery and to relieve patients suffering from severe pain.

3. Research Subjects

1) Discovering most effective ventilation methods for injury lungs.
2) Therapeutic mechanism of mesenchymal stem cell for lung injury
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 ventilator mechanics and remote effects of protective one-lung ventilation during thoracic surgery.
6) Studies of epidemiology, early diagnosis, prevention and therapeutics of perioperative acute kidney injury.
7) Studies on the effect of anesthetics on the developing brain.

4. Clinical Services

Service of the department of anesthesiology covers perioperative management of surgical patients and pain relief services for patients suffering severe chronic pain.

5. Publications

2. Ishikawa S. Alveolar recruitment maneuver as an important part of protective one-lung ventilation. J Anesth 2012; 26: 794-5
5. Nakazawa K, Yokoyama K, Makita K. Cardiac arrest due to pulmonary thromboembolism following administration of spinal anesthesia – a case with femoral neck fracture who was successfully resuscitated with thrombolytic treatment. Anesthesia & Resuscitation 2012:4871-2
Cardiovascular Surgery

1. Staffs and Students (April. 2012)

Professor Hirokuni ARAI  
Associate Professor Tomohiro MIZUNO  
Junior Associate Professor Masafumi YASHIMA, Satoru KAWAGUCHI, Susumu MANABE, Tsuyoshi HACHIMARU, Akane MIHARA, Shuhei FUJITA  
Graduate Student Hidehito KUROKI, Taiju WATANABE, Tatsuki FUJIWARA  
Hospital Staff 3  

Department of Cardiovascular Surgery, Research and Innovation for Advanced Surgery  
Associate Professor Katsuhiro OHUCHI

2. Purpose of education

Cardiovascular Surgery is a branch of surgery which deals with heart and vascular (mainly aortic) disease. Main objective of our department in the graduate course is to provide medical students an opportunity to study surgical anatomy, pathophysiology, pharmacology, and advanced surgical treatment for heart and aortic disease. Students are also taught basic research for the surgical treatment for heart and aortic disease. We also provide clinical training program for young surgeon to obtain Japanese cardiovascular surgical board.

3. Research Subjects

1) Developing safe and high quality surgical strategy in coronary artery bypass grafting surgery.  
2) Developing new surgical technique for ischemic heart disease  
3) Developing new surgical technique for beating mitral valve surgery  
4) Clinical research for artificial heart  
5) Research for new regenerative therapy for failing heart to recover cardiac function

4. Clinical Services

Our department provides well-advanced surgical treatment of heart and aortic surgery. We perform off-pump coronary artery bypass grafting for more than 90% of patients with coronary artery disease, mitral valve repair, not valve replacement, for almost all patients with mitral valve regurgitation. New surgical reconstruction technique is provided for patients with functional mitral regurgitation due to severe heart failure. For elderly patients, we offer minimally invasive aortic surgery such as thoracic endovascular aortic repair (TEVAR) and hybrid aortic surgery without cardiopulmonary bypass for aortic arch and thoracoabdominal aortic disease.

5. Publications in English

Original Articles


Presentation in international conference

1. Hirokuni Arai  Coronary Surgery in PCI Era: Changes and Challenges. Special Guest Lecture, The 1st Heart Care
1. Staffs and Students (April, 2012)
Professor Sei SASAKI
Associate Professor Shinichi UCHIDA, Tatemitsu RAI (Dept. of Blood Purification)
Yumi NODA (Dept. of Chronic Kidney Disease)
Junior Associate Professor Tomokazu OKADO
Assistant Professor Naofumi YUL, Eisei SOHARA (Dept. of Blood Purification)
Katsuyuki OI (Dept. of Blood Purification)
Project Assistant Professor Soichiro IIMORI
Hospital Staff Miyuki SAZUKA, Yoshihito TSUZAKI
Fumiaki ANDO (2012.7~), Yuki YOSHIZAKI (Dept. of Blood Purification, 2012.7~)
Keita KUSAKA (Dept. of Blood Purification, 2012.6~)
Technician Motoko CHIGA
Secretary Asa MURANO, Miki SAKIYAMA, Yukiko ITO
Graduate Student Mai WAKABAYASHI, Hidenori NISHIDA
Muhammad Zakir Hossain Khan, Koichiro SUSAY, Kiyoshi ISobe,
Takayasu MORI, Yuichi INOUE,
Daiei TAKAHASHI, Moko ZENIYA,
Eriko KIKUCHI, Yuya ARAKI,
Yutaro MORI

2. Purpose of Education
The policy of the Department of Nephrology is to accomplish trustworthy medicine and to educate excellent academic scientists and nephrologists.

Our department is one of the initial institutes that started the hemodialysis therapy in Japan, and thus, has a long experience of clinical practice of kidney diseases. Through the activities our department has brought up a number of leading nephrologists who contribute to establishing nephrology in Japan and in the world. Academic research is another important mission of our department. Research from bench experiments to clinical studies has been performed to understand the pathogenesis of the diseases and to develop new therapeutic strategies. Especially, our study on “water-electrolyte transport in the kidney and related diseases” is well known worldwide for its originality and high quality. We hope new young scientists and physicians join us for future science and nephrology.

3. Research Subjects
We have been studying renal membrane transporters and channels for more than 20 years. Most of the AQP water channels and CLC chloride channels were cloned in our laboratory in 1990s (Nature1993, PNAS1994, JBC1993&1994, Neuron1994, etc) and the physiological roles in vivo have been analyzed by generating the KO mice (Nature Genet1999, PNAS2006, etc). Recently, we are interested in regulators of transporters and channels (JCB2008), and discovered a novel kinase cascade (WNK-OSR1/SPAK-NCC) regulating NaCl balance in the body (Cell Metab 2007, Hum Mol Genet 2010, JCS 2011, PLoS One 2011). Based on the molecular mechanisms we identified, we hope to find the way to regulate renal transporters and channels.

4. Clinical Services
We are taking care of a variety of kidney diseases including acute kidney injury, chronic kidney disease, blood purification, and renal transplantation. We routinely perform renal biopsy.

5. Publications
Original Articles
2. Chang JM, Hwang SJ, Tsukamoto Y, Chen HC. Chronic kidney disease prevention - a challenge for Asian countries:


**Review Articles**


**Books**

Comprehensive Reproductive Medicine
(Maternal and Women’s Clinic)

1. Staffs and Students (2012)
Professor : Toshiro Kubota
Associate Professor : Satoshi Obayashi
Professor (chairman) : Naoyuki Miyasaka
Junior Associate Professor : Naoyuki Yoshiki, Tatsuya Harada
Associate professor (chairman) : Masakazu Terauchi
Assistant professor : Akira Wakabayashi, Kimio Wakana,
Mikayo Toba, Yuki Iwahara,
Masato Yamanaka, Asami Hirata,
Rie Oi, Makiko Egawa
Hospital Staff : Takeru Ichimura, Shunsuke Ishiyama
Graduate Student : Masaya Uno, Shiro Hiramitsu,
Yoshinori Okura, Reiko Tajirika,
Atsushi Yamamoto, Makoto Iizuka,
Kiyotaka Takagi, Izumi Honda,
Aiko Motoshita, Asuka Kajiyama,
Kazuki Yamada, Yuki Hirose,
Mikiko Yamada

2. Purpose of Education
CRM (OB/GY) department has an obligation to offer medical services, education, research as one of the clinical departments in national graduate school, and has duty on making a mutual cooperation with local gynecological institutions.
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.
Aims of research works are focusing on reproductive medicine, perinatal medicine and oncology.
Educational intention in medical doctor course and nursing course includes systemic lectures, clinical conferences and special lecture by many extramural speakers. During Bed-Side Learning period, students should be treated as one of medical stuffs, attend all of deliveries and be present at gynecological procedure. Several OB/GY institutions will be provided as an extramural drills.

3. Research Subjects
Research divisions :
1) Research in physiology, endocrinology and metabolism in the reproductive medicine
2) Research of female physical and mental change with aging
3) Pathophysiological examination of gynecological malignant tumor
4) Clinical research and basic research in perinatal medicine

Available scientific procedures :
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 and patch clump )
3. Measurement of intra-cellular IP3
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.
4. Clinical Services

For intractable sterilization, satisfactory results are obtained with endoscopic examinations and IVF-ET methods. Health care unit for menopausal women was established, where inspections for atherosclerosis, osteoporosis (DEXA), autonomic nervous system are performed, and postmenopausal managements are provided including HRT, mental care and counseling.

After construction of LDR(labor, delivery, recovery) unit, cure for complicated pregnancies is now carried out, and cases of deliveries are rising now.

Malignant gynecological tumor is also an important aim of this department, for which surgery, chemotherapy and radiotherapy with complete cure are applied to patients. For benign tumor and endometriosis, laparoscopic operations are aggressively performed, whose number is now increasing.

5. Publications

Original Article


International Presentation


3. Oi R, Matsuoka K, Sagou H. Evaluation of perinatal course of congenital lower urinary tract obstruction in 34 cases. 22nd World Congress on Ultrasound in Obstetrics and Gynecology, Copenhagen, Denmark, Sep, 2012


1. Staffs and Students (December, 2012)

Professor and Chairman  
Kazunori Kihara

Associate Professor  
Hitoshi Masuda (~June), Yasuhisa Fujii (July~)

Lecturer  
Fumitaka Koga, Kazutaka Saito

Assistant Professor  
Yoh Matsukawa, Junichiro Ishioka, Minato Yokoyama, Manabu Tatokoro (~May), Soichiro Yoshida (June~)

Hospital Staff  
Shuichiro Kobayashi, Toshiki Kijima, Yasukazu Nakanishi, Hideki Takeshita, Masaya Ito, Takayuki Nakayama, Saori Higuchi, Yuma Waseda, Makoto Kagawa, Akitetsu Miyakawa, Hiroshi Fukushima

Graduate Student  
Naoko Kawamura, Shuichiro Kobayashi, Toshiki Kijima, Naotaka Fukui, Sachi Kitayama, Yasukazu Nakanishi, Toshihiro Kanda, Hideki Takeshita, Masaya Ito, Masaharu Inoue, Hajime Tanaka, Takayuki Nakayama

2. Purpose of Education

We are committed to offering educational programs to facilitate the development of outstanding academic urologists of the next generation. We believe that one of our missions is to educate students, residents and fellows in the art and science of urology and thereby to train the future leaders in the field. The continuous commitment to clinical and translational research is reflected to publications in international journals, presentations at international meetings and awards, which are listed below.

3. Research Subjects

Clinical Research

1) Innovation and establishment of minimally invasive, gasless single port access urological surgery
2) Development of optimal 3-dimentional prostate needle biopsy
3) Development of nomograms for optimal detection of prostate cancer
4) Sequential combination therapy to prolong survival of advanced prostate cancer patients
5) Development and establishment of curative and minimally invasive bladder preservation using low-dose chemoradiotherapy plus partial cystectomy
6) Development and establishment of minimally invasive, nonischemic nephron-sparing surgery against kidney cancer
7) Development and establishment of focal therapy using hemiablative brachytherapy against prostate cancer
8) Sequential combination therapy to prolong survival of advanced kidney cancer patients, starting with immunotherapy combined with multiple molecular targeted agents
9) Application of diffusion-weighed MRI to diagnosis, assessment of therapeutic effects and monitoring of relapse in urological cancer
10) Application of serum C-reactive protein as a prognostic biomarker of urological malignancies and as a marker for surgical invasiveness

Translational Research

1) Development of differentiation-inducing therapy against hormone-resistant prostate carcinomas
2) Investigation on molecular mechanisms, in particular deregulation of the NO system, underlying voiding and erectile dysfunction to develop rational therapy
3) Overcoming therapeutic resistance to chemo- and/or radiotherapy against urological malignancies using novel molecular targeted agents
4) Investigation on functional roles of p63 protein in urothelial carcinomas
4. Clinical Services

Our mission is to provide the best urological care to all patients. Besides offering urological practices of the international standard, we are making a continuous effort to improve daily practices. The gasless single port access urological surgery, which we have innovated its concept and developed surgical techniques specific to all urological organs, has been officially approved as medical services provided by the Japanese Governmental Health Insurance System in April 2008. These minimally invasive surgical techniques can be fundamentally applied to all patients having urological malignancies, even those having locally advanced disease and previous histories of abdominal surgery.

5. Publications (International)

Original Article


Review Article


Award


Presentations at International Meetings


Kihara K. Successful control of Methicillin-resistant Staphylococcus aureus in a urology ward possibly due to avoidance of antimicrobial prophylaxis in minimally invasive surgery: our 11 years trial. The 106th annual meeting of the American Urological Association, Atlanta, GA, USA, 2012/05/21.


**Invited Lecture and International Symposium**

1. Staffs and Students

Professor: Tatsuyuki KAWANO
Associate Professor: Yoichi KUMAGAI
Project Associate Professor: Yasuaki NAKAJIMA
Junior Associate Professor: Yoshinori INOUE, Tetsuro NISHIKAGE
Assistant Professor: Kagami NAGAI, Toshifumi KUDO, Kenro KAWADA, Yutaka TOKAIRIN, Koji TANAKA, Masatoshi JIBIKI, Takahiro TOYOFUKU
Project Assistant Professor: Yutaka MIYAWAKI
Graduate Student: Tomoyoshi SUZUKI, Akihiro HOSHINO, Takuya OKADA, Hidetoshi UCHIYAMA, Shinya KOIZUMI, Koji YONEKURA, Kimihiro IGARI, Shunsuke OHTA, Tairo RYOTOKUJI, Naoto FUJWARA, Masato NISHIZAWA, Katsumasa SAITO, Hisashi FUJWARA, Sotaro KATSUI, Tuerxun REXIATI, Jirawat SWANGSRI, Ablimitie ZYNUR

2. Purpose of Education

The history of the department started as the First Department of Surgery of TMDU, and many surgeons and researchers in various specialties have gathered and have been keeping a high level of activities. Our main purposes of education are to make the post-graduate physicians grown up to excellent surgeons and to contribute in development of medical/surgical sciences. Surgeons with high-level medical knowledge and techniques are expected to grow up in this department. Moreover, making surgeons with matured humanity is one of the purposes. The department has a peaceful atmosphere and stands for active work in solving difficult problems.

3. Research Subjects

1) Development of esophageal surgery.
2) Development of vascular surgery.

4. Clinical Services

Main clinical services are diagnosis and treatment for esophageal and vascular diseases. Post-graduate students learn and study general surgery and sub-specialty, e.g. esophageal surgery, vascular surgery. The territory of clinics is wide and the department provides a full spectrum of standard and special technologies such as minimally invasive surgery and extended radical surgery for malignancies.

5. Publications


Thoracic Surgery

1. Staffs and Students

Professor: Kenichi OKUBO
Junior Associate Professor: Hironori ISHIBASHI
Assistant Professor: Ryo MAEDA, Naoyuki FUJIWARA
Hospital Staff: Sachiko KUMAZAWA, Ken TAKAHASHI

2. Purpose of Education

Main objective of Thoracic Surgery in the graduate course is to provide students with opportunity to study surgical anatomy, pathophysiology, and combined modality treatment in order to become the specialized surgeons who have international and scientific feelings.

3. Research Subjects

1) Establishing surgical skills and multimodality treatments for thoracic oncology
2) Developing minimal invasive technique/surgery for thoracic diseases
3) Molecular biological approaches for thoracic malignancies

4. Clinical Services

Thoracic Surgery clinic performs surgical treatments for the diseases of lung, chest wall, and mediastinum. Lung cancer, pleural diseases, and mediastinal tumor are mainly treated with surgery using minimal invasive techniques or function-preserved techniques. Advanced diseases are also treated with extended resection and/or multimodality approach.

5. Publications


6. International conference

1. Lateral internal thoracic artery - forgotten in recent famous textbooks - described more than 130 years ago
   Hironori Ishibashi, S. Ohta, M. Hirose, N. Tanio, N. Nakajima 20th European Conference on General Thoracic Surgery, Messe Essen, Essen, Germany, 10-13 June 2012 (Oral)
2. Benefit of 3-dimensional computed tomography for traumatic rib fractures  Hironori Ishibashi, S. Ohta, M. Hirose, N. Tanio, N. Nakajima 20th European Conference on General Thoracic Surgery, Messe Essen, Essen, Germany, 10-13 June 2012 (poster)

7. Invited lecture

Igakuken Disease-oriented Molecular Biology

1. Staffs and Students
Visiting Professor  
Takahiko Hara (November ~)
Visiting Professor  
Masanari Itokawa (November ~)
Visiting Professor  
Masato Hasegawa (November ~)
Visiting Professor  
Haruo Okado (November ~)

2. Purpose of Education
We will educate students for the purpose that they could investigate molecular mechanisms of life-threatening diseases such as cancer, diabetes, schizophrenia, amyotrophic lateral sclerosis, and brain malformations. Trained students will eventually help us to develop novel therapeutic strategies against them. In addition, they must learn the importance of good animal models (including genetically engineered mice), which faithfully reproduce symptom and progression of the diseases.

3. Research Subjects
[Takahiko Hara]  We attempt to elucidate how tissue stem cells (hematopoietic stem cells, skeletal muscle stem cells, etc.) are developed in embryos and maintained in adults by utilizing in vitro differentiation systems of ES/iPS cells and conditional KO mouse strains. In addition, we advance the molecular biology of CXCL14, which is involved in obesity-induced diabetes, carcinogenesis, feeding behavior, etc.

[Masanari Itokawa]  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 samples 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.

4. Publications
Original Articles

Review Articles
Clinical Anatomy

1. Staffs and Students
Professor Keiichi AKITA
Junior Associate Professor Kumiko YAMAGUCHI (Center for Interprofessional Education)
Assistant Professor Akimoto NIMURA, Masayo HARADA
Graduate Student Yasuo NAKAJIMA, Hisayo NASU, Kazuhiro SAKAMOTO, Atsushi TASAKI, Kazuhiro SEKIZAWA, Masataka NAKAZAWA, Hitomi FUJISHIRO, Keiko OKUMURA (April~), Tatsuya TAMAKI (April~), Sachiyuki TUKADA (April~)

2. Purpose of Education
Clinical anatomy is generally considered as the practical application of anatomical knowledge to diagnosis and treatment, however we think that this course is a part of pure anatomical science based on the findings of the morphological observations of the human bodies. Main objective of Clinical anatomy in the graduate course is to make detailed anatomical data to answer the questions developed from clinical fields especially by surgeons and radiologists. We collaborate with many clinicians: ENT, orthopedics, gynecology, thoracic surgery, radiology and so on, and our projects have been broad areas. Students are expected to get fine dissection techniques of human bodies and also learn techniques of histology and embryological experiments. By using these techniques, we study the spatial relationships of organs, vessels nerves, and also try to examine their developmental processes in various projects.

3. Research Subjects
1) Clinical anatomic study of the shoulder joint and rotator cuff.
2) Clinical anatomic study of the anal region for the rectoanal surgery.
3) Cadaveric study of the female pelvis for the gynecologic oncology and colposcopy
4) Analyses of the lamination in the masticatory muscles with special reference of nerve supply
5) Embryological study of the differentiation of cloaca and surrounding muscles.

4. Publications
Original Article
1. Staffs and Students

Professor  Hiroshi ASAHARA
Lecturer  Masahiro SHINOHARA(Oct.-)
Assistant Professor  Toshihiro ARAMAKI(Apr.-), Yoshiaki ITO(Apr.-)
Project Assistant Professor  Yoko TANAKA-Watanabe(Apr.-), Takahide MATSUSHIMA(Apr.-)
Adjunct Professor  Syuji TAKADA, Masafumi INUI(Oct.-)
Research Associate  Tomoki CHIBA(Apr.-), Atsushi KUBO(Apr.-)
Graduate Students  Tempei SATO(-Mar.), Kohei MIYATA, Akiko KUGAI, Takeshi SAITO, Daiki FUKUCHI, Akira TAKAHASHI(Apr.-), Kentaro ABE(Apr.-), Yohei MATSUBARA(Apr.-), Ryo NAKAMICHI(Apr.-), Tomohiro KAYAMA(Apr.-), Masashi NAITO(June-), Yusuke MOCHIZUKI(Oct.-), Naoki KODA(Oct.-)

2. Purpose of Education

Undergraduate:
Conducting “Molecular Genetics”, which is a series of lectures to understand the gene expression machinery and human genetics and their application to current medicine and biology. Undergraduate students can join the lab works to learn the skills for molecular biology and pathology.

Graduate School:
Organizing “Development and Regeneration” lecture series to understand the basis for regenerative medicine and reproduction at the level of molecular genetics.

Students can join the Lab to perform researches using various experimental techniques, such as microarray, Cell-based high throughput screening, etc. Using these techniques, core molecular network for tissue development and inflammatory diseases will be examined at system level.

3. Research Subjects

- The function of non-coding RNA in development and diseases will be examined.
- Development and regeneration using ES and other stem cells 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.

4. Publications

Original Articles
Review Articles


Comprehensive Pathology

1. Staffs and Students
Professor Masanobu KITAGAWA
Assistant Professor Morito KURATA, Shinya ABE, Shinya ABE-Suzuki, Kouhei YAMAMOTO (on administrative leave)
Laboratory Technician Miori INOUE
Technical Assistant Sachiko ISHIBASHI
Graduate Students Yukako MIWA, Iichiro ONISHI, Ruri DAGET, Na LI, Toshiya NAGIRI, Keiko YAGI, Kazuhito SUZUKI, Masafumi INOUE, Kenichiro KATO

2. Purpose of Education
Main objective of comprehensive pathology in the graduate course is to acquire the technique of clinical and basic pathology. This course provides students opportunity to study clinical pathology (for example, histological and cytological diagnosis, autopsy, clinico-pathologic conference) and also basic pathology (molecular pathology and molecular biology).

3. Research Subjects
1) Clinico-pathological study by morphological findings, immunohistochemistry, and electron microscope, etc.
2) Molecular analysis of leukomogenesis induced by Friend leukemia virus (FLV)
3) Enhancement of apoptosis by virus-derived protein and development of apoptosis-induction cancer therapy
4) Molecular pathology of the myelodysplastic syndromes (MDS)
5) Clarification of drug resistance mechanism for hematopoietic malignancies
6) Comprehensive research for aging focus on the decreased immune competence
7) Molecular biology of the cancer progression and metastasis

4. Publications
Original Article

National meeting
Morito Kurata, Yohei Kanno, Tomoko Takahara, Yukari Yamazaki, Daisuke Kitamura, Takuro Nakamura. The role of C/EBpb and Blik cooperation in the pre-B ALL. Ninth international workshop on molecular aspects of myeloid stem cell development and leukemia. 2012 Cincinnati, USA.
Molecular Oncology

1. Staffs and Students

Professor: Yasuhito YUASA
Lecturer: Yoshimitsu AKIYAMA, Hiroshi FUKAMACHI
Assistant Professor: Shu SHIMADA
Secretary: Yoshiko Abe
JSPS Research Fellow: Yutaka HASHIMOTO, Rika TSUCHIDA
Graduate Student: Shogo KOJIMA, Ayuna SAKAMOTO, Taketo NISHIKAWAJI, Kanako BABA
Visiting Professor: Masabumi SHIBUYA

2. Purpose of Education

• Undergraduate course:
Hygiene is our charge. The undergraduate curriculum of hygiene includes lectures, and laboratory studies. Topics of lectures consist of environmental pollution and human health, world-wide environmental problems, carcinogen and occupational cancer, smoking-related diseases, infectious diseases including AIDS and hepatitis, food poisoning, anoxia and heat-related diseases.

• Graduate course:
The graduate students pursue their own projects associated with one of researches being in progress in the division. Every student can learn the basic scientific techniques, such as genetic engineering, cell culture and biochemical procedures. There are also many special lectures on cancer, gene, cell biology and biochemistry for the graduate students. On bi weekly seminars, the students present their own research data and introduce important papers from newly-arrived journals. Once the students get new findings, they are encouraged to present them at the domestic or international meeting and write manuscripts.

3. Research Subjects

1) Cellular and molecular analyses of cancer-related genes, such as oncogenes and tumor suppressor genes, in gastroenterological cancers
2) Molecular mechanism of cell growth, differentiation and apoptosis
3) Involvement of differentiation-related genes in gastroenterological diseases
4) Cancer stem cells
5) DNA methylation and cancer
6) Transcription factors and cancer
7) Mouse model of gastric cancer
8) Effect of environmental factors on gene expression and DNA methylation
9) Involvement of microRNA in gastric carcinogenesis

4. Publications

Original Article


1. Staff and Students

Professor: Yoshinobu EISHI
Associate Professor: Takumi AKASHI
Assistant Professor: Eisaku ITO, Tomonari AMANO, Emiko SUGAWARA
Hospital Staff Doctor: Keiko MIURA
Secretary: Ayako KOBAYASHI

2. Purpose of education

Main object of surgical pathology in the course of graduate school is to provide medical students an opportunity to study diagnosis of core diseases, both neoplastic and non-neoplastic, through biopsy, surgical and autopsy cases. Another important mission is a training of pathology specialist in the post-graduate school through diagnostic services of surgical pathology, cytopathology and autopsy.

3. Research Subjects

1) Improvement of diagnostic methods of gastrointestinal, liver, renal and respiratory diseases by anatomical, immunohistochemical, microbiological and molecular technologies.
2) Analysis of the pathophysiology of the disease, especially invasion mechanism of lung and gastrointestinal cancers by molecular biological technology.

4. Clinical Services

In cooperation with departments of human pathology and comprehensive pathology, department of surgical pathology provides autopsy services (100 case in a year), cytopathology services (12,000 cases in a year) and surgical pathology (10,000 cases in a year) for the clinicians of the affiliated hospital. Diagnosis is mostly done by the organ-subspecialized staffs. Clinico-pathological conferences are held more than one hundred times in a year.

5. Publications

Original Article

Experimental Animal Model for Human Disease

1. Staffs (April, 2012)
   Professor Masami Kanai-Azuma
   Assistant Professor Shu Endo, Miyuri Kawasumi, Hitomi Suzuki (Aug.–)

2. Research Subject
   1) Sox17 function for the foregut endoderm development.
   (Etiology – Mouse Hepatitis)
   2) The functional analysis of SoxF group
   3) Mechanisms of bile duct development
   4) Mechanism of primordial follicle activation in mammalian ovary

3. Publications
   Original Articles
   1. Dynamics of GFRα1-positive Spermatogonia at the Early Stages of Colonization in the Recipient Testes of W/W (vv) Male Mice.
   2. Gut endoderm is involved in the transfer of left-right asymmetry from the node to the lateral plate mesoderm in the mouse embryo.
   3. Expression of matrix metalloproteinases 2 and 9 and tissue inhibitors of matrix metalloproteinases 2 and 1 in the glomeruli of human glomerular diseases: the results of studies using immunofluorescence, in situ hybridization, and immunoelectron microscopy.

   Conference Paper Index
   3. Hitomi Suzuki1, Krishna Jagarlamudi2 and Aleksandar Rajkovic1 (1. University of Pittsburgh Dept. OBGYN-RS, Pittsburgh, PA, 15213. 2.Baylor College of Medicine, Dept. Pathology and Immunology, Houston, TX. 77030): LIM-homeobox protein 8 inhibits primordial oocyte activation that is independent of the KIT signaling pathways. 2012 Germ Cell meeting at Cold Spring Harbor Laboratory (Talk). Oct 2-6 2012, USA.
Human Gene Sciences Center (Signal Gene Regulation)

1. Staff and Student
Professor Masataka NAKAMURA (Director)
Junior Associate Professor Noriko FUNATO
Assistant Professor Mariko MIZUGUCHI (April ~)
Foreign Researcher Hussein Abdelaziz Abdalla (~ March)
Postdoctoral Fellow Mariko MIZUGUCHI (~ March), Mamami YOSHITA (April ~)
Graduate Student Terumi MIZUKOSHI (~ March), Tomoaki KUMAGAI (April ~),
Yating WANG (~ September), Lindsay Preston

2. Purpose of Education
The aim of Human Gene Sciences Center is to provide laboratory equipment, room and information for researches in advanced molecular and cellular biology. In educational objectives in the graduate school, our Center gives lecture, seminar, training course and individual assistance in research fields of molecular genetics, immunology and virology.

3. Research Subject
1) Molecular mechanism of tumorigenesis by human T-cell leukemia virus type I (HTLV-I).
2) Roles of transcription factors in cell differentiation.
3) Implication of prostaglandin D2 receptor (CRTH2) in allergy reactions.

5. Publications
Original Article
Biofunctional Molecular Science

1. Staffs and Students
Associate Professor Tomoya Hirano
Assistant Professor Shigeru Ito, Ayumi Osaki
Technician Hiroyuki Masuno
Graduate Student Shotaro Iihama, Akihito Naka, Yuta Endo, Teppei Komiyama

2. Purpose of Education
Biofunctional Molecular Science covers several aspects of organic chemistry, analytical chemistry, medicinal chemistry and chemical biology. Through this course, students are expected to understand and train the experimental techniques related to these scientific fields.

Our laboratory is working on the developments of functional molecules, which can “modulate” or “sense” the physiological functions, such as enzyme inhibitors and fluorescent sensors for elucidating intracellular or extracellular signal transduction pathway. In addition, we also focus on the development of novel drug and diagnostic tools for various diseases.

3. Research Subject
1) Construction of a facile method to develop various fluorescent sensors for elucidating physiological functions
We construct a facile method to develop various fluorescent sensors, which can sense the change of the concentration or activity of each biologically important analyte.

2) Development of histone methyltransferase inhibitors
Post-translational modification of histone proteins plays an important role in the regulation of gene expression, and can be controlled by histone modifying enzymes, such as histone methyltransferase (HMT). We are developing some inhibitors against these HMTs.

3) Development of fluorescent sensors by modulating the complex formation of fluorophores
The control of intermolecular or intramolecular complex formation between two fluorophores or between a fluorophore and another molecular species has been utilized for the development of fluorescent sensors for some post-translational modifications of tyrosine residues or the visualization of some receptor proteins.

4. Publications
Original articles
Medicinal-Chemical Biology (Medicinal Chemistry)

1. Staffs and Students (April, 2012)

Professor
Hirokazu TAMAMURA

Junior Associate Professor
Wataru NOMURA

Assistant Professor
Tetsuo NARUMI, Haruo AIKAWA

Research Staff
Kyoko ITOTANI

Technical Staff
Nami OHASHI

Secretary
Rika NARUMI

Graduate Student
Yosuke NONAKA, Chie HASHIMOTO,
Akemi MASUDA, Takaharu SUZUKI,
Mamiko KANEKO, Makoto KONNO,
Natsuki MINATO, Atsushi ITO,
Taisuke KOSEKI, Takuya KOBAYAKAWA,
Hikaru TAKANO, Yuki HIROTA,
Daichi MATSUMOTO

2. Purpose of Education
Our department teaches chemical biology targeted to elucidation and regulation of biological phenomena based on organic chemistry and advanced synthetic chemistry, medicinal chemistry and advanced drug discovery of a post-genomena era. Our department performs periodically journal clubs and research progress meetings.

3. Research Subjects

2) Development of bio-probes, bio-sensing, medicinal chemistry towards chemical biology.
3) Structural analysis of the interactions between receptors/enzymes and their ligands.
4) Development of applications of zinc finger protein for gene therapy and nano technology.

4. Publications

Original Article

Books


Medical Instrument (Biomedical Information)

1. Staffs and Students (April, 2012)
   Associate Professor Tomoyuki KANEKO

2. Purpose of Education
   Medical instrument (Biomedical information) is a branch of institute of biomaterials and bioengineering which deals with the measurement of epigenetic information and memorization stored in living system such as brain (neural network system), immune system, and cardio systems caused by environmental hysteresis. Main objective of medical instrument in the graduate course is to provide students opportunity to study fusion of latest technologies of nano- and bio-tech, and to develop artificial organ model on chip for drug discovery and toxicology use.

3. Research Subjects
   1) Studies on Epigenetic Information Stored Living System.
   3) Bio-computing using “Real Neural Network on Chip”.

4. Publications

   Original Articles

   Meetings


Genetic Regulation

1. Staffs and Students (in 2012)

Professor                          Akinori KIMURA
Associate Professor                Takuro ARIMURA
Assistant Professor                Daisuke SAKURAI
Research Associate                 Taeko NARUSE
Graduate Student                   Taisuke ISHIKAWA, Junji IIZULA
Graduate Student (Biomedical Science PhD program)
                                      Jianbo AN, Chika KADOTA.
                                      Kei KATSURAGI
Visiting Graduate Student           Shinya KOIZUMI
Visiting Student (Tokyo University of Science)
                                      Tomoko KATO

2. Purpose of Education

Structural and functional diversity of human genome, are involved in the etiology and pathogenesis of human diseases. Main objective of Genetic Regulation is to identify the gene mutations or polymorphisms and to decipher the molecular mechanisms involved in the etiology and pathogenesis of intractable diseases, in order to develop new strategies for diagnosis, treatment and/or prevention of the diseases. Current research is focused on the intractable cardiovascular diseases (e.g. idiopathic cardiomyopathy, idiopathic arrhythmia, and coronary heart disease), autoimmune diseases (e.g. Burger disease, Graves disease, and rheumatoid arthritis) and infectious diseases (e.g. HIV/AIDS). In addition, genome diversity in immune-related genes is investigated from the view-point of primate evolution.

3. Research Subjects

1) Identification and functional analysis of disease-related genes for cardiovascular diseases
2) Identification and functional analysis of disease-related genes for autoimmune diseases
3) Identification and functional analysis of disease-related genes for infectious diseases
4) Structural, functional and evolutilonal analyses of MHC and immune-related genes in vaccination

4. Publications

Original Article


Applied Genetics (Molecular Genetics)

1. Staffs and Students (April, 2012)

Professor Yoshio MIKI
Project Associate Professor Akira NAKANISHI
Assistant professor Katsuya TAKENAKA
Project Assistant Professor Ken Miyaguchi
Graduate Student Miho TAKAOKA, Nadila WALI, Nurmaa DASHZEVEG, Hitomi KIMURA, Kazuya NAKAZAWA, Takenori YAMAMOTO, Shota WADA, Shota TESHIROGI

2. Purpose of Education

Our research is directed at understanding the molecular mechanism of carcinogenesis, based on basic molecular cell biology and molecular genetics. We have applied new findings and information obtained by basic research to develop the new diagnosis, treatment, and prevention of cancer. Our objective in the graduate course is to provide students opportunity to study basic science and applied genome science for cancer research.

3. Research Subject

1) Functional analysis of the BRCA2 gene.
   ① Synthetic lethality effect for chemotherapy using BRCA1/2-deficient breast cancers
   ② Identification of novel BRCA2-associated proteins functioning in DNA damage repair.
   ③ Identification of novel BRCA2-associated proteins and analyses of functions of their association in numerical integrity of centrosomes.

2) Regulatory mechanisms of tumor cells in the apoptotic response to DNA damage
   ① PKCdelta regulates Mdm2 independently negative regulator of p53 in the apoptotic response to DNA damage.
   ② Identification of Evi-1 as a novel effector of PKCdelta in the apoptotic response to DNA damage.

3) Identification of UVSSA gene as the responsible gene for UV-sensitive syndrome.

4. Publication

Original Article


Histol Histopathol, 27, 949-59.


Advanced Therapeutic Sciences

Molecular Cytogenetics

1. Staffs and Students

Professor
Johji Inazawa  M.D., Ph.D.

Associate Professor
Ken-ichi Kozaki  D.D.S., Ph.D.

Assistant Professor
Jun Inoue  Ph.D.

Assistant Professor
Kosuke Tanimoto  Ph.D.

Tokunin Lecturer
Shin Hayashi  M.D., Ph.D.

Doctoral course students (DC2)
Mayuko Furuta, Tomoki Muramatsu

Global COE program Advanced I super student (AISS)
Nuylan Michelle Loyola, Daniela Tiaki Uehara

Graduate Student
Mitsuyo Naganawa, Sujata Sakha

Research Student
Hiroaki Nagata, Reiko Iwadate

2. Purpose of Education

The principal aim of the Department of Molecular Cytogenetics (MCG) is to understand the molecular mechanism underlying intractable diseases, such as cancer and uncharacterized genetic diseases. Main objective of MCG in the graduate course is to provide students opportunity to study molecular cytogenetic approach for intractable diseases, identify genes responsible for those diseases, and develop innovative techniques/practically useful tools for detection of genomic and epigenomic aberrations in those diseases. It is our goal to bridge the gap between basic and clinical research for the benefit of each of the patients.

3. Research Subjects

1. Identification of genes responsible for intractable diseases including cancer and genomic disorders through integrative genomics and epigenomics.

2. Discovery of molecular mechanisms of cancer-related genes, including microRNAs, in the multistep processes of carcinogenesis and cancer progression, such as cancer stem cell, epithelial-mesenchymal transition (EMT), invasion and metastasis using systems biology.

3. Establishment of autophagy-based diagnosis and therapy in human cancers by understanding cellular context-dependent role of autophagy.

4. Multiple genomic analyses of genetic disorders of unknown etiology, e.g. mental retardation or epilepsy, to detect causative genes and clarify the etiology. Also, an array chip for diagnosis of known congenital disorders, ‘Genome Disorder Array’, was developed and released for a practical use at 2009.

5. Development of innovative techniques for genomics and epigenomics in medical science.


4. Clinical Services

5. Publications

Original Article


Review Article

Biochemical Genetics and Genome Structure and Regulation

1. Staffs and Students (April, 2012)
Professor Shigetaka Kitajima MD, PhD
Associate Professor Yuijiro Tanaka MD, PhD
Assistant Professor Junya Kawauchi MD, PhD
Secretary Kuniko Takayanagi
Graduate Student Makoto Inoue, Hiroto Goshima, Makoto Edagawa
Research Student Satoshi Fukumoto, Yohei Uchida, Takuya Takahashi
Foreign Scholar Liu Jia, MD

2. Purpose of Education
Transcriptional regulation is one of the most important processes by which genome information is expressed from DNA to mRNA to protein. The faithful synthesis of mRNA is achieved by transcriptional machinery comprised of RNA polymerase II, basal factors and many other protein factors, whose dysfunction is implicated in various human diseases. Our research interest is focused on the basic mechanism of transcription cycle and implication of early response transcription factors in determining cell fate in stress response.

Key words
・To provide novel paradigm of transcriptional regulation
・To understand role of transcription factor in cell fate determination

3. Research Subjects
1) Transcription
・Elongin A plays dual roles in stress response
・A novel function of FCP1
2) Cell fate determination by activating transcription factor (ATF) 3
・Pro-apoptotic role of ATF3 and its implication in anti-cancer therapy
・Genome-wide screen of the role of ATF3 in stress response and human cancer
・ATF3 complex: transcriptional repressor or activator
・ATF3 transcriptionally regulates microRNA
3) H3K36-specific histone methyltransferase ASH1.

4. Clinical Services
none

5. Publications
Original Article
Hematology

1. Staffs and Students

Professor Osamu MIURA
Junior Associate Professor Ayako ARAI
Assistant Professor Tetsuya FUKUDA, Tetsuya KUROSU, Masahide YAMAMOTO, Toshikage NAGAO
Hospital Staff Hiroki AKIYAMA, Dsisuke WATANABE, Megumi AKIYAMA, Keigo OKADA
Hospital Staff/Graduate Student Shihoko SUWA
Graduate Student Minako JINTA, Ken WATANABE, Ayako ICHIKAWA, Ayako NOGAMI, Nan WU, Lu Dan Wang

2. Purpose of Education

The major objective of the course is to understand the pathophysiology of blood cells, blood cell-forming organs, and hemostasis to provide a basis for rational diagnosis and treatment of their disorders. We offer the lectures of basic knowledge of hematological diseases for the 4th grade medical students, and we provide the opportunity to study process of diagnosis and management of hematological disorder for the 5th and 6th grade medical students as clinical clerkship, CC1 and CC3.

In our clinical residency, the junior resident have the opportunity to obtain knowledge and skills for dissolving hematological, oncological and infectious problems.

The senior residents are making profound efforts in their clinical experiences to be hematological experts.

3. Research Subjects

1) Cell signaling for the hematopoiesis and hematological oncogenesis
2) Molecular mechanism of lymphomagenesis
3) Regulation of hematopoietic cell death after chemotherapeutic reagents
4) Mechanism of resistance against tyrosine kinase inhibitors
5) Mechanism of EB virus associated disease

4. Clinical Services

We provide the highest quality of patient care for a wide spectrum of blood diseases and cancers.

5. Publications

Advanced Therapeutic Sciences

Molecular Endocrinology and Metabolism

1. Staffs and Students (2012)

Professor
Yoshihiro Ogawa

Junior Associate Professor
Takanobu Yoshimoto, Hajime Izumiyama

Assistant Professor
Masatomo Mihara, Isao Minami, Masako Kato

Project Junior Associate Professor
Toru Sugiyama

Project Junior Assistant Professor
Misa Saijo, Michiya Kida

Resident
Eri Hayakawa, Yuichiro Nishio, Kazutaka Tsujimoto, Noriaki Okiba, Tamaki Ando

Graduate Students

Medical Fellow
Miyako Tanaka

JSPS RPD Fellow
Rumi Hachiya

Student
Yukino Hatazawa

Department of Organ Network and Metabolism

Project Professor
Yasutomi Kamei

Project Assistant Professor
Michiko Ito, Xunmei Yuan, Mayumi Takahashi, Ibuki Shirakawa

Department of Molecular Medicine and Metabolism

Associate Professor
Takayoshi Suganami

GCOE Project Junior Associate Professor
Naoki Sawada

2. Purpose of Education

Our training program enables postdoctoral trainees to prepare for the future academic careers and the clinical practice in the broad discipline of endocrinology and metabolism. 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. This training program is designed to educate and establish ‘physician・scientist’ in the field of endocrinology and metabolism.

3. Research Subjects

1) Role of adipose tissue inflammation in the metabolic syndrome
2) Molecular mechanisms of saturated fatty acid-induced chronic inflammation
3) Molecular mechanism of vascular injury in diabetes, endocrine and metabolic diseases
4) Role of epigenetic regulation in metabolism
5) Mechanism of pathogenesis in endocrine tumors
6) Development of novel diagnostic and therapeutic tools in endocrine and metabolic diseases

4. Clinical Services

Comprehensive inpatient and outpatient services in the area of endocrine and metabolic disorders, including:
- diseases of the thyroid, pituitary and adrenal glands.
- diabetes mellitus, diabetic complications, metabolic syndrome, and obesity
• primary and secondary hypertension
• disorders of calcium metabolism

5. Publications

1) Peer-reviewed Journal


2) International Meeting


4. Ogawa Y: Chronic Inflammation, A Molecular Basis Underlying the Metabolic Syndrome: *2012 Shanghai Symposium on Obesity & Diabetes.* Shanghai, China (2012.4)


Hepato-Biliary-Pancreatic Surgery

1. Staffs and Students

Professor  Shigeki Arii (~March, 2012)
Associate Professor  Shinnji Tanaka
Assistant Professor  Noriaki Nakamura, Atsushi Kudo,
                    Takumi Irie, Takenori Ochiai,
                    Daisuke Ban, Arihiro Aihara (~March, 2012),
                    Satoshi Matsumura (April, 2012~)
Tokunin Assistant Professor  Yasen Mahmut (~November, 2012)
Graduate Student  Rama Adikrisna (~September, 2012),
                    Syunsuke Muramatsu (~March, 2012),
                    Chisato Okajima, Kouta Sato,
                    Kousuke Ogawa, Yuichiro Watanabe,
                    Tomoya Miura, Hiroko Matsunaga,
                    Eriko Katsuta, Takaki Furuyama,
                    Hiromitsu Ito, Keisuke Nakao,
                    Keiichi Akahoshi (April, 2012~),
                    Xirali Mamat, Maynur Abdurahman

2. Educational Vision

Medical School Education: Our mission is to educate students and transform them into high quality surgeons. Leading edge training, from basic to advanced, is provided through one-on-one interaction with advisers. Furthermore, students, as medical professionals, learn how to interact with patients, and establish strong ethics and morals. Especially, in regard to breaking bad news, students learn by dealing with real cases. While students mainly acquire surgical techniques during post-graduate clinical internships, their interest in surgery is nurtured through medical education.

Post-graduate Education: Our mission is to cultivate the capability of students as surgeons and physicians, in order to provide the highest quality patient care. Each student is expected to obtain a specialization in surgery within 5 or 6 years after graduation from medical school. During post-graduate education, we provide incentives for students to become excellent surgeons, conduct original medical research, and allow them to demonstrate their capability in the real world.

3. Research

We are making researches in the important issues which are remained to be resolved in the hepato-biliary-pancreatic surgery and diseases. The research subjects are as follows:

1) Research in the molecular mechanisms on the progression of hepato-biliary -pancreatic malignancies
2) Research in development of the molecular-targeting therapy for hepato-biliary -pancreatic malignancies.
3) Research in the extended indication of the hepatic resection for hepato-biliary malignancies.
4) Research in the transporter for bile metabolism
5) Research in the improvement of liver preservation
6) Research in the microcirculation of the liver
7) Research in immunological torelance for organ transplantation
8) Research in technical improvement of laparoscopic surgery

4. Clinical practice

The major diseases we treat are those of liver, biliary tract including gallbaladder, pancreas, and spleen, particularly malignant diseases of those organs. Especially, our mission is to treat advanced cancers with multidisciplinary strategy although our mainstay is surgical method. Living liver transplantation is also undertaken for end -stage liver diseases. Laparoscopic surgery is applied to neoplastic diseases as well as benign diseases from the viewpoint of less invasive surgery. The malignant cases we resected was 135 on 2012, which was ranked among high volume centers of our country.

5. Publications
Review Article, Case Report, etc.


International Presentation


Orthopaedic and spinal surgery

1. Staffs and Students (April, 2012)

Professor Atsushi OKAWA
Junior Associate Professor Tetsuya JINNO, Yoshiaki WAKABAYASHI,
Shigenori KAWABATA
Assistant Professor Tsuyoshi KATO, Daisuke KOGA,
Toshihaka YOSHII, Chigusa SAWAMURA,
Hiroyuki INOSE
Graduate Student Hirotaka KOYANAGI, Masato YUASA,
Dai UKEGAWA, Tsuyoshi YAMADA,
Takashi TANIYAMA, Yoto OH,
Madoka UKEGAWA, Yuki FUNAUCHI,
Sei JO, Ren XU,
Chengshan MA, Gaku KOYANO,
Hidetoshi KABURAGI, Satoshi SUMIYA,
Hidetsugu SUZUKI, Masanori SAITO

Department of Orthopaedics Research and Development
Associate Professor Shinichi Sotome, Yoshinori Asou

2. Activities

As the department of orthopaedic surgery, we execute medical treatment, research, and education in cooperation with the section of Orthopaedic Joint Surgery. Orthopaedics deals with musculoskeletal systems such as bone, cartilage, joint, tendon and muscle in addition to nervous systems such as spinal cord and peripheral nerves. Orthopedaics treats various disorders such as trauma, degeneration, neoplasm, and systemic disease. Thus, our research should be extended to a broad area of basic and clinical fields. Currently, our research projects include reconstruction of motor function, clinical application of regenerative medicine, development of biomaterials and artificial joints, and pain control.

(1) Research Subjects

1) Development and evaluation of a novel artificial bone – porous hydroxyapatite / collagen composite
2) Reconstruction of bone defects using bone marrow stromal cells and artificial bone substitutes
3) Reconstruction of bone defects using bone morphogenetic proteins and artificial bone substitutes
4) Analysis of the mechanisms of musculoskeletal aging and its prevention
5) Genome-wide analysis for bone and soft tissue tumor
6) Clinical applications of spinal cord evoked potentials
7) Development of novel diagnostic method for spinal cord function using magnetic field
8) Development of cell therapy to repair injured spinal cord
9) Development of multidisciplinary therapy for musculoskeletal malignant neoplasm

(2) Clinical Services

With the popularity of sports and aging society, the need for orthopaedic medicine is growing rapidly. We carry out not only treatment of the associated diseases but also the repair of functional disability for the improvement of QOL by advancing therapeutic strategies.

In spinal operation unit, microscopic or endoscopic surgery and spinal cord monitoring yield safety and secure decompression, resulting in early postoperative ambulation and satisfactory outcome.

Hand and upper limb surgery unit has applied microsurgical technique for atraumatic operation and micro-vascular anastomosis. Today, microsurgery is indispensable for re-implantation, nerve repair and transfer, and vascularized tissue transfer. Arthroscopic surgery for the upper limb is also available, and provides less-invasive operation alternative.

In musculoskeletal tumor surgery, limb-salvaging surgery is the first choice based on the concept of safety surgical margin from the systematic evaluation of surgical specimens. Also, functional reconstruction of the affected limb after tumor surgery is exerted by plastic and microsurgery technique and through the application of regenerative medicine.
Examples of advanced treatments for adult hip diseases are one-stage bilateral total hip arthroplasty, less-invasive technique for adult hip reconstruction, and accelerated rehabilitation after hip arthroplasty.

(3) Education

The faculty in the department is responsible for assisting graduate students in developing professional research, and teaching the skills of both clinical and basic science in the field of orthopaedic surgery. Morning conferences are held three times a week, and special guest lectures are sometimes provided to give up-to-date information. We are participating in the center of excellence program, frontier research on molecular destruction and reconstruction of tooth and bone in the Tokyo medical and dental university and providing a learning environment for the students.

For first year orthopaedic residents, an annual meeting is held to discuss clinical and basic research with the faculty outside of Tokyo. Furthermore, we provide several open meetings and many orthopaedic surgeons join our educational lectures to study recent clinical applications via special guest speakers or oral presentation of case reports by the residents.

3. Publications

Original Article


Biomedical Devices and Instrumentation

1. Staffs and Students (April 2012)

Professor
Kohji MITSUBAYASHI

Associate Professor
Hiroyuki KUDO

Assistant Professor
Takahiro ARAKAWA

Lecturer (part-time)
Kazuyoshi YANO

Research Staff
Mika HAYASHI

Graduate Student
Elito KAZAWA, Tomoko GESSEI,
Munkhjargal MUNKHBAYAR, Kumiko MIYAJIMA,
Ming YE, Koji MIZUKOSHI,
Rei SATO, Sota YAMASHITA

2. Education

We provide opportunity to study advanced biomedical devices and instrumentation. Students in our laboratory are working on the research projects as follows.

3. Research Subjects

1) Soft contact-lens biosensor
   Based on advanced polymer microelectromechanical systems (MEMS) techniques, a soft contact-lens biosensor have been developed. The biosensor provides novel biomonitoring such as glucose monitoring in tear fluids.

2) Biological odor measurement and smell communication
   High selective gas-sensors “Bio-sniffers” have been constructed with molecular recognition of enzyme in human liver. Potential applications of the bio-sniffer and –nose includes halitosis analysis, breath alcohol & aldehyde measurement, environmental VOC monitoring, etc.

3) Spatiotemporal gas visualization system for imaging of ‘odor’ information
   A visualization system for spatial distribution of volatile chemicals have been developed. The visualization system is expected to be used in future medical screening or dental health.

4) ‘Organic engine’ based on chemo-mechanical energy conversion
   A novel chemo-mechanical energy conversion system (organic engine) that utilizes enzyme reactions and active transport of chemicals have been constructed. Biomedical applications (chemical pumps, drug release systems, etc.) are also investigated.

4. Publications

Original Article


Biomedical Information

1. Staffs and Students (April, 2012)
Professor Kenji YASUDA
Associate Professor Tomoyuki KANEKO
Assistant Professor Fumimasa NOMURA
Project Assistant Professor Tomoyo HAYASHI (HAMADA)
Fernando LOPEZ-REDONDO
Graduate Student Tetsuo KITAMURA

2. Purpose of Education
Medical instrument (Biomedical information) is a branch of institute of biomaterials and bioengineering which deals with the measurement of epigenetic information and memorization stored in living system such as brain (neural network system), immune system, and cardio systems caused by environmental hysteresis. Main objective of medical instrument in the graduate course is to provide students opportunity to study fusion of latest technologies of nano- and bio-tech, and to develop artificial organ model on chip for drug discovery and toxicology use.

3. Research Subjects
1) Studies on Epigenetic Information Stored Living System.
3) Bio-computing using “Real Neural Network on Chip”.

4. Publications
Original Articles

Invited Talks

Meetings


1. Staffs and Students
Professor Yuji MIYAHARA
Associate Professor Akira MATSUMOTO
Assistant Professor Tatsuro GODA
Project Assistant Professor Yasuhiro MAEDA
Project Assistant Professor Mai SANJOH
Project Assistant Professor Miyuki TABATA
Project Assistant Professor Daniel SCHAFFHAUSER
Graduate Student Eriko YAMADA

2. Purpose of Education
(1) Charge: A part of the lecture of biomedical engineering for master's course, a part of the lecture of bio-intelligence science as a graduate education, and the research guidance of the master and the doctor's course are done.
(2) Scope: A lot of biochemical components in serum play an important role in the metabolic cycle, and the homeostasis of those concentrations appears as a result of dynamic equilibrium in the living body. When some change takes place in this metabolic pathway, concentration of biochemical component shifts from the reference value. The detection methodology of the biochemical components and control mechanism of their concentration are studied from the viewpoint of integration of the materials science and the device technology, with biological and medical science.
(3) Knowledge and the technology to be acquired: The processing methods for DNA, proteins, and cells, are acquired. The techniques for measuring the function of the biomolecules and the cells are actually experienced, and the operational theories and principles studied are confirmed. By participating in the on-going research in this laboratory, the meaning of the experiment, how to make the research plan, how to advance the research, and how to analyze the results are learnt.

3. Research Subjects
1. Study on chemical modification and nano-structure formation at the solid/liquid interface for efficient biomolecular recognition
Interaction between materials surfaces and biomolecules, cell, and organisms plays an important role for designing many biosensors, biochips, and biomaterials. In order to realize effective biomolecular recognition on the surface of a substrate material, functional nano-interface is investigated through chemical modification and formation of nano-structures at the solid/liquid interface.
2. Study on signal transduction mechanism for biomolecular and cellular activities
Electrostatic interaction between biomolecules and semiconductor materials and devices is investigated to elucidate mechanism for signal transduction from biomolecular recognition into electrical signals. In order to achieve compatibility between biomolecules and semiconductor materials, functional interface molecules are designed and synthesized at the bio/semiconductor interface for efficient signal transduction. Based on these studies on detection methodologies for biomolecules and cell functions, new types of bio-transistors are studied for medical and pharmaceutical applications.
3. Synthesis of biofunctional polymer and development of bio-regulation system
Through the design of functional polymers that are able to imitate, recognize and feedback information to biology, develop novel materials and devices that assist in medicine and biology. These include alternative materials and devices to insufficiency of the body, nano-materials that realize new mode of pharmacokinetics in cells as well as live cell imaging technologies.
4. Fundamental study on Bioelectronics
Interdisciplinary field between biotechnology and electronics is explored and investigated. Cell-based biotransistors employing signal processing inside cells are investigated for application to life science field. Information processing devices using both electrons and ions as information carriers are investigated for new types of information processing.

4. Publications
Original Articles


**Books**


Functional Materials (Applied Functional Molecules)

1. Staffs and Students

Professor Akio KISHIDA
Assistant Professor Tsuyoshi KIMURA, Kwangwoo NAM
Secretary Naomi HIWATARI
Graduate Student Jun NEGISHI, Naoko NAKAMURA, PingLi WU, Mitsuki UEKI, Rie MATSUSHIMA, Satoshi Honda, Ayumi TANZAWA
Research Student Takuya IWATA

2. Purpose of Education

In order to develop technology which may contribute to the advance in the medical science, lectures on functional molecules from basic to advanced knowledge on molecular design for specific purpose, mainly concentrated on medical application would be executed. Theories on functional molecules and overviews on medical system would be lectured in Graduate School of Medical and Dental Sciences. Students would have chances to learn about Genomics and Bio-intelligent system in Graduate School of Biomedical Science.

3. Research Subjects

1) Decellularization of native tissue for regenerative medicine

In order to obtain a novel scaffold which can be applied for regenerative tissue, ultra-high pressurization method was developed for the complete elimination of the cells and inactivation of the viruses.

2) Inducing molecular aggregation using ultra-high pressurization

The basic and applied science on molecular aggregation triggered by hydrogen bonding at over 6,000 atm is studied. This technique is being applied for hybridization of DNA with polymer for drug delivery system.

3) Bio-interface

To investigate how the materials interact with biological cues such as phospholipids, proteins, or cells, precisely controlled surface via atomic transfer radical polymerization was prepared. The basic research on physical and biological properties of this surface is being investigated.

4) Control of cell functions by physical stimuli.

Using physical stimuli such as nano-vibration or pressure, the technology for the control of cell functions such as the proliferation and differentiation is being developed.

4. Clinical Services

The development of functional molecules can provide novel materials for the clinical application such as blood vessel, cornea, skin, or bone. Unlike the conventional materials which have been used in clinics so far, it would be possible to promote or suppress specific biological response using functionalized materials. Furthermore, the screening essential drug compound for certain purpose, it would help the patients to be treated with higher efficiency and less pain.

5. Publications

2) Kwangwoo Nam, Yuuki Sakai, Yoshihide Hashimoto, Tsuyoshi Kimura, Akio Kishida, Fabrication of a heterostructural fibrillated collagen matrix for the regeneration of soft tissue function, Soft Matter 2012; 8; 472-480.
Organic and Medicinal Chemistry

1. Staffs and Students (April 2010)

Professor Hiroyuki KAGECHIKA
Assistant Professor Shinya FUJII
Assistant Professor Syuichi MORI
Assistant Professor Mari YUASA

Graduate Student Ayumi YAMADA, Takashi FUJIWARA,
Minoru IMAI, Takuya SHIRAISHI,
Akitaka SHIMIZU, Asuka TAKAGUCHI,
Yuki TAKEUCHI, Seika NOJO,
Tomoaki HIGUCHI, Noriko FUJIWARA,
Yuko WATANABE, Yosiaki MUSYA,
Kenako OSHIRO, Kasumi OHIRA,
Toshihiko SAKAI, Haruka TSUKADA,
Kenji, HATTA, Yohei WATANABE

2. Purpose of Education

Organic and Medicinal Chemistry covers several aspects of organic chemistry, medicinal chemistry and chemical biology. Through this course, students are expected to understand the fundamental knowledge, recent topics, and experimental techniques related to these fields.

3. Research Subject

1) Medicinal Chemistry of Retinoids

Retinoids regulates various significant biological phenomena, such as cell differentiation, proliferation, morphogenesis, metabolism and homeostasis. We have developed novel synthetic retinoid, Am80 (tamibarotene) as drug for acute promyelocytic leukemia. Novel synthetic retinoids have been developed for clinical use in the field of autoimmune diseases, neurodegenerative diseases and metabolic syndromes.

2) Medicinal Chemistry of Nuclear Receptors

Small hydrophobic molecules such as steroid hormones and activated vitamins A/D control various biological phenomena, including growth, development, metabolism, and homeostasis, by binding to and activating specific nuclear receptors. Nuclear receptors have become one of the most significant molecular targets for drug discovery in the fields of cancer, metabolic syndrome, autoimmune diseases, and so on. In this project, novel ligands of various nuclear receptors have been developed.

3) Development of Novel Functional Fluorescent Molecules for Elucidation of Intracellular Signal Transduction Pathways

Functional fluorescent molecules useful in many fields of scientific research, including analytical chemistry or cell biology have been developed.

4) Aromatic Architecture Based on the Steric Properties of N-Methylated Amides

The amide bond structure of amide derivatives often plays a key role in functions such as molecular recognition events or biological activities. In contrast to the extended trans structures of most secondary amides, the corresponding N-methylated compounds exist in cis form in the crystals and predominantly in cis form in various solvents. The cis conformational preference is useful as a building block to construct aromatic molecules with unique crystal or solution structures.

4. Publications

Original articles


Chemical Bioscience

1. Staffs and Students
Professor Takamitsu HOSOYA
Assistant Professor Suguru YOSHIDA
Assistant Professor Yuto SUMIDA
Technical Assistant Tomoe KATO, Takako NONAKA
Yoshihiro MISAWA
Clerical Assistant Naomi SAITA
Graduate Students Ryu HARADA, Takamoto MORITA
Collaborator Kimiyuki KANNO, Keisuke UCHIDA, Junko TANAKA

2. Purpose of Education
Developing new synthetic methods, new chemical methodologies, and new chemical tools, those are useful for biological researches and drug discovery.

3. Research Subjects
1) Development of new azide chemistry for chemical biology researches.
2) Development of new methodology, photoreactive functional groups, and molecular probes for radioisotope-free (non-RI) photoaffinity labeling to identify target proteins of bioactive small compounds.
3) Design and synthesis of efficient substrates for bioluminescence reactions and fluorescent probes for bioimaging and diagnosis of diseases.
4) Drug seeds development based on new synthetic methodologies.
5) Design and synthesis of new PET (positron emission tomography) probe candidates for in vivo imaging to promote drug discovery.

4. Publications
Original Articles
Metallic Biomaterials

1. Staffs and Students

Associate Professor  Naoyuki NOMURA
Professor  Takao HANAWA
Assistant Professor  Hisashi DOI,  Yusuke TSUTSUMII
Research Assistant  Osamu FUKUSHIMA
Project Assistant Professor  SUYALATU,  Satoshi MIGITA
Secretary  Toshie NAKANISHI,  Yasuko SEKI
Graduate Student  Ryota KONDO,  Takahiro SAKAI

2. Purpose of Education

Metallic biomaterials play an important role as medical devices. Our laboratory mainly deals with effects of crystal structure, process, and thermal treatment on mechanical properties (e.g. strength or toughness). We also focus on structure and property of nanometer-scaled surface phenomena: Formation of living tissue on metals, especially, reactions between biomolecules or cells and metals, changes in surface oxide layers in living tissues, and electrochemical property of metallic biomaterials. The aim of the education is perfect understanding of metallic biomaterials, enabling students to select a proper material for medical treatments or researches.

3. Research Subjects

1) Bio-functionalization of metals with electrochemical surface modification

Bio-functionalization of metals is investigated with surface treatment techniques such as molecule immobilization and anodic oxidation. These surface treatments make it possible to inhibit protein adsorption, platelet adhesion and biofilm formation, and to enhance wear resistance and hard-tissue compatibility.

2) Development of novel alloys and porous composites for biomedical applications

Novel alloy systems for biomedical applications are designed from the viewpoints of mechanical properties and biocompatibility. Co-Cr-Mo alloys having high strength and ductility for dental applications are developed. The porous alloys having low Young's modulus are obtained with selective laser melting technique.

3) Development of Zr-based alloys for minimizing MRI artifacts

Zr-based alloys with low magnetic susceptibility, high strength and corrosion resistance are investigated for minimizing MRI artifacts by controlling their microstructure and constituent phase for aneurysm clips, artificial joints, and dental implants, etc.

4) Effort to minimize metal allergy

Countermeasure techniques for metal ion release from metallic biomaterials which causes metal allergy are investigated. Novel reagents of patch testing for the detection of sensitization to metal ions are developed.

4. Publications

Original Articles


1. Staffs and Students (April, 2012)
Professor Nobuhiko YUI
Associate Professor Yoshihiro SASAKI
Assistant Professor Ji-Hun SEO
Research Assistant Professor Atsushi TAMURA
Secretary Nanae NISHI
Graduate Student Junichi YASUOKA, Yuji TSUCHIDO,
Nanako Yokoyama, Hajime TANAKA

2. Purpose of Education
Courses: Biomaterials, Advanced Medical Materials, Advanced Organic Materials

3. Research Subjects
1) Design of Dynamic Biomaterials Surfaces
2) Modulation of Cellular Functions by Dynamic Ligand-Polymers
3) Design of Intracellularly Functionalizing Biomaterials
4) Design of Liposomal Device and Hybrid Nanomaterials

4. Clinical Services

5. Publications
Original Articles


# Molecular Cell Biology

## 1. Staffs and Students

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor</td>
<td>Hiroshi Shibuya</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>Toshiyasu Goto</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>Atsushi Sato</td>
</tr>
<tr>
<td>Graduate Students</td>
<td>Masahiro Shimizu, Yu-ichi Okuma</td>
</tr>
</tbody>
</table>

## 2. Purpose of Education

Various signaling molecules inducing the cell-growth and differentiation regulate morphogenesis and organogenesis of the vertebrate. The failure of these signal molecules has also been caused with induction of the diseases. Therefore, the elucidation of signal transduction network regulating generation and differentiation is important upon clarifying the mechanism of morphogenesis, organogenesis and diseases. Our research aim is to clarify the signal transduction network regulating the mechanisms of morphogenesis and organogenesis in developmental process. We serve these research and following education to provide graduate students who will become senior scientists in life sciences.

## 3. Research Subjects

1. WNK protein kinases, the causative genes of pseudohypoaldosteronism type II (PHAII) disease
2. Roles of IQGAP1 on the canonical Wnt signaling.

## 5. Publications

1. Staffs and Students (April, 2012)
Professor Hiroshi NISHINA
Associate Professor Jun HIRAYAMA
Assistant Professor Yoichi ASAOKA
Project Assistant Professor Tokiwa YAMASAKI, Shoji HATA, Mamiko IWATSUKI
Graduate Students Makoto YAMAMOTO, Eiichiro NODA

2. Purpose of Education
Our goal is to define the molecular basis for the mechanism of organ formation and regeneration using knockout mice and mutant fishes. To accomplish this goal, we have focused on defining signaling molecules and pathways that regulate liver formation and stress responses. Moreover, we are trying to establish a cell therapy for intractable diseases such as liver failures using self-bone marrow cells. Our study will provide new insights into understanding the precise molecular mechanisms that underlie organ failures found in human disease and will lead to he development of new rational therapy for the diseases.

3. Research Subjects
1) Studies on the stress-activated protein kinase (SAPK/JNK) signaling pathway
2) Studies on the Hippo signaling pathway
3) Studies on the cell differentiation of mouse ES cells
4) Studies on liver formation using a small fish, Medaka, Oryzias Latipes
5) Studies on liver regeneration using mice
6) Studies on circadian clock using zebrafish and mice

4. Publications
Original Article
8. Toshiyuki Oishi, Shuji Terai, Shinya Kuwashiro, Koichi Fujisawa, Toshihiko Matsumoto, Hiroshi Nishina and Isao


Immunology

1. Staffs and Students
Professor Takeshi TSUBATA, M.D., Ph.D.
Associate Professor Takahiro ADACHI, Ph.D.
Assistant Professor Kozo WATANABE, Ph.D.
Assistant Professor Yusuke KISHI, Naoko MATSUBARA
Technician Yukie KURUSU
Secretary Hiroko TAKAHASHI
Graduate Student XU Miduo, TANG Miao,
Toshitaro TAKATA, Satoya OMORI,
Shirly PHOON, Ayse Ucar KONUSKAN,
Sumiyo EZAKI, JIAO Xuyang

2. Purpose of Education
Lecture course on immunology at the master course aims at giving the students the basic ideas how immune system recognize and respond to the antigens, and how immune system efficiently remove pathogens without responding to self-antigens and environmental antigens. In the lecture course in bioscience at the doctor course, lectures on immune responses are given so that the students are introduced with the current topics in the field of humoral immune responses. Research projects in both master and doctor courses aims at training the students to acquire basic research techniques on immunology, molecular biology and biochemistry, and abilities to conduct good research by themselves under supervision.

3. Research Subjects
The nature of immune responses depends on whether they respond to protein or non-protein antigens because T lymphocytes recognize only protein antigens. Normal immune system removes pathogens and cancer cells but does not respond to non-microbial foreign substances or self-antigens. Immune responses to non-microbial foreign substances and self-antigens cause allergy and autoimmune diseases, respectively. How immune system distinguishes pathogens from non-microbial antigens and self-antigens is already clarified for protein antigens. However, little is known about such distinction for non-protein antigens. Immune responses to non-protein antigens play crucial roles in host defense against pathogens such as tuberculosis bacilli and meningococci, and autoimmune diseases such as lupus and immuno-neurological disorders. Thus, immune responses to non-protein antigens constitute a remaining frontier in immunology research. Followings are our research subjects.

1) Elucidation of the mechanisms for humoral immune responses to glycans, glyco-lipids and nucleic acids-related antigens.
2) Elucidation of the role of glycan signals in the regulation of humoral immune responses, and application of glycan signals to therapy.
3) Analysis of pathogenesis of lupus and immuno-neurological disorders.

4. Publications
[Original Article]
Epigenetics

1. Staffs and Students

Professor Fumitoshi ISHINO
Associate Professor Takashi KOHDA
GCOE Lecturer Jiyoung LEE
Adjunct Lecturer Shin KOBAYASHI,
Assistant Professor Ryuichi ONO,
Tokunin Assistant Professor Mie NARUSE
Secretary Ikuko MAEDA
Technical assistant Masayuki ISHII
Graduate students Yuki YAMAGUCHI, Mami OIKAWA,
Saori TAKASHI, Miki SOMA,
Kiyotaka TAKAGI, Moe KITAZAWA,
Narutoshi KAWASHIRI

2. Purpose of Education

“Epigenetics” coupled with “Genetics” enables us to elucidate several ‘genomic functions’ in inheritance, development and evolution of organisms including our human beings. Genomic imprinting is one of the mammalian specific gene regulation mechanisms that gives rise to functional differences between paternally- and maternally-derived genomes in development, behavior and growth. Somatic cloned animals give us unique chances to examine ‘genetically identical but epigenetically diverged animals’. These studies show us how Epigenetics is important in mammalian biology. Our department focuses these mammalian specific genomic functions to elucidate how these genomic functions work and how new genomic functions have been evolved during evolution. Our final goal is to contribute to the 21th’s medicine and human biology by novel understanding of genomic functions.

3. Research Subjects

1) Genomic imprinting in human and mammalian development.
2) Placenta function and its evolution in mammals.
3) Somatic cloning: its epigenetic effects and application to regenerative medicine.
4) Assisted reproductive technology: its epigenetic effects and safer application.
5) Role of retrotransposon-derived genes in mammalian specific genomic functions.

4. Publications

Original Article

1. Staffs and Students

Professor: Hiroshi Tanaka
Associate Professor: Yoshihito Niimura
Assistant Professor: Soichi Ogishima (~April), Kaoru Mogushi (June~)
Project Associate Professor: Fengrong Ren, Takako Takai (~April), Jun Nakaya (~March)
Project Lecturer: Kanae Oda (~March)
Project Assistant Professor: Fengrong Ren, Takeshi Hase, Kaoru Mogushi (~May), Naoki Hasegawa (~March), Kumiko Iijima
Technical Staff: Ken Miyaguchi (~March)

2. Purpose of Education

Prof. Tanaka is in charge of the education of medical informatics and bioinformatics. For undergraduates, he teaches “Clinical Informatics”, “Statistics for Health Sciences”, “Practice in Clinical Informatics II”, “Project Research”, and “Basics of Clinical Informatics”. For graduate students, he teaches “Computational Biology”, “Systems Pathology”, “Clinical Informatics”, “Integrated Bioinformatics”, “Integrated Translational Research”, and “Statistics for Nurses”. He supervises 31 students in total (18 PhD and one Master course students in Graduate School of Medical and Dental Sciences and six PhD and six Master course students in Biomedical Science PhD Program).

3. Research Subjects

Our mission is “system-level understanding of biological systems” in molecular biology and evolution (systems evolution) and medicine (omics-based medicine, systems pathology). Recently, the whole genome sequences of diverse organisms have become available. Moreover, various “omics” information such as a proteome, transcriptome, and metabolome are currently accumulating. Our goal is to establish a grand-theory of biological sciences from the viewpoint of “evolving networks composed of biological molecules” by integrating omics information. Genomic and omics data are also utilized in the field of medicine. It has been revealed that most diseases are caused by the interaction among abnormalities of multiple genes, those at the tissue level, and environments. It is therefore possible to consider diseases as a system. From this standpoint, we try to establish the omics-based medicine and systems pathology.

1) Analysis of disease mechanism using omics-based approaches

Recent advances in analysis techniques in molecular biology have led to the investigation of genome-wide data such as genome, transcriptome and proteome. In order to reveal the underlying biological mechanisms from such a large amount of “omics” data, integration of biomedical knowledge with multivariate statistical analysis or machine learning methods is one of the most crucial tasks for bioinformatics research. We have been performing collaborative research with our university hospital and other institutes mainly based on transcriptome analysis using DNA microarray, including the
following topics: 1) identification of diagnosis marker for prognosis prediction in hepatocellular carcinoma patients, 2) development of predictive marker for metastatic relapse in colorectal cancer, and 3) analysis of spinocerebellar ataxia and hepatocellular carcinoma using next generation sequencing technologies.

2) Systems pathology analyses on disease progression of cancer, metastasis, and Alzheimer’s disease

Our mission is systems pathology studies on cancer, metastasis (epithelial-mesenchymal transition: EMT), and neurodegenerative disease (Alzheimer’s disease) using large-scale molecular biology data, so-called omics data. We inferred transcriptional, gene regulatory and protein interaction networks of disease progression, and then explored master regulator, that is key molecule in their networks. We then estimated an attractor for each cellular state based on gene regulatory network for disease progression, cellular transformation (EMT), and cellular differentiation (iPSC/ESC) processes, showing transition of attractors along with these processes. For omics data analyses, data integration is necessary. We worked on integration of incurable diseases data using Linked Data technology.

3) i2b2: A novel technology of clinical databases as an infrastructure of translational informatics

Translational informatics is an emerging research field of computational technology for facilitating translation of genome information into the clinical application. It targets collection and computation of clinical and genomic information on the basis of mathematical models for diseases. It is a part of promoted researches after the completion of human genome sequencing, which includes industry and academia partnership in drug development and patient-centered translational research. Among the ongoing projects, the i2b2 provides an ontology-based object-oriented database system for integration of clinical information dispersed in different laboratories and different hospitals. Due to its highly flexible data-schema, the i2b2 enables persons without expert knowledge of database to collect clinical information into a database. We constructed i2b2 database with 392 clinical patients’ data collected in the university hospital of Tokyo Medical and Dental University. The patients’ data includes biomedical and clinicopathological information extracted from carcinoma and non-carcinoma specimens of cancer patients recorded in ‘Integrated Clinical Omics Database’ iCOD). We transferred 8,580 English and 54,579 Japanese descriptions into i2b2. We employed Japanese NLP technologies in order to extract clinical terms from doctors’ comments in Japanese free texts. We built a pipeline for extraction of clinical terms and translation of the extracted terms into English computationally.

4) Analyses of the human protein-protein interaction networks and their applications to drug discovery

Since proteins exert their functions though interaction to other proteins, networks of protein-protein interactions are inevitable to discover novel drug-target genes. To discover novel targets, it is of use to understand topological and statistical characteristics of protein-protein interaction networks (PINs), and how the target-genes are distributed over the PINs. To uncover the topological features of PINs, we developed a novel method to decompose a very large complex network into simple sub-networks. Our method decomposed the genome-wide human PIN into several small simple sub-networks. Among the sub-networks, a sub-network contains almost 60% of target-genomes of small molecule drugs (e.g., kinase inhibitors) for cancerous diseases. Further, pathway enrichment analyses revealed that genes in the sub-network are involved in cancer-related signaling pathways (e.g., vascular endothelial growth factor signaling pathway). These results indicate that the listing of genes and interactions in the sub-network may help drug companies to search more efficiently for mechanisms of drug action and novel target genes for cancerous diseases.

5) Diversity of olfactory receptor gene repertoires among mammals

Olfaction, the sense of smell, is essential for the survival of animals. Odor molecules in the environment are detected by olfactory receptors (ORs) encoded by a large multigene family. To investigate the diversity of OR gene repertoires among mammals, I extensively identified the OR genes from the draft genome sequences of 38 diverse mammals. The results demonstrated that the estimated numbers of functional OR genes are extremely variable, ranging from only ~10 in dolphins to ~2,000 in elephants. However, the number of functional OR genes is not correlated with the fractions of pseudogenes. Identification of orthologous gene sets among 13 eutherian mammals with the genome of deep coverage (>6x) revealed that hundreds of gene gains and losses have occurred during eutherian evolution, suggesting dynamic changes of OR gene repertoires depending on each species’ living environment. I also examined OR genes from two turtle species with the whole genome sequences, showing drastic class I OR gene expansion, which is characteristic to turtles among amniotes.

6) Omics Research about mechanism of liver cancer progression

The complete sequencing of the human genome has ushered in a new era of systems biology referred to as Omics. The “Omics” refers to the comprehensive analysis of biological systems. Likewise, the field of bioinformatics has grown in parallel and with the help of rapid data analysis and information exchange is now possible. We have been collecting clinical and Omics (Genomics, Transcriptomics, Proteomics, Epigenomics, etc.) data. This includes both comprehensive molecular
Omics information and comprehensive clinical information from almost 400 patients who has liver cancer at TMD-Hospital. In case of liver cancer, it is very difficult to find the related gene for subtypes of liver cancer, but could find possible relation using data cleaning and integrated analysis, along with molecular biological analysis. Omics will not only have an impact on our understanding of biological processes, but the prospect of more accurately diagnosing and treating disease will soon become a reality.

7) Inferring evolutionary dynamics of SIV/HIV-1 Vpu and its co-evolution with Nef and Tetherin

Many studies on the function changes of SIV/HIV-1 Vpu after cross-species transmission have been reported in recent years, but little is known about the evolutionary history of this accessory gene. To elucidate possible evolutionary mechanisms responsible for the functional change, we conducted a computational analysis to investigate the evolutionary dynamics of Vpu and also its co-evolution with SIV/HIV Nef and primate Tetherin. Eighty-seven Vpu genes, 108 Nef genes and 35 primate Tetherin genes were retrieved from public databases. The reconstructed phylogenetic tree of Vpu was consistent with those reported in previous studies. The positive selection detection revealed that both Vpu and Tetherin had experienced adaptive evolution. Importantly, the tRMCA of SIVcpz Nef was estimated to be more ancient than that of SIVcpz Vpu, suggesting that the recombination event might be an evolutionary force driving the function loss of Vpu in SIVcpz. Notably, two SIVcpz sub-clades, SIVcpzPtt and SIVcpzPts, showed very different features at both molecular and structural levels. These results provided important information on the Vpu evolution and its co-evolutin with Nef and Tetherin, which would give a new insight into the studies of SIV/HIV Vpu in future.

4. Publications

Original Article


Reviews


Book chapters


1. Staffs and Students
Professor Nobutoshi ITO
Associate Professor Teikichi IKURA
Assistant Professor Nobutaka NUMOTO
Project Assistant Professor Minako ABE
Technical Assistant Michiko HATTORI
Graduate Students Kenrou Shinagawa, Michika MIYASHITA

2. Purpose of Education
The students learn theoretical basis of structure determination, mainly X-ray crystallography, of proteins and other biomacromolecules. Recent advance in structural biology is also discussed in seminar. Students learn lab techniques related to large-scale production, purification and crystallization of protein samples. They also learn computational methods to determine and refine crystal structure.

3. Research Subjects
1) Physicochemical analysis on the mechanism of the signal transduction for activation of T cells
2) Structural and functional analysis of bone morphogenetic protein
3) Analysis of interactions between tau protein and Pin1
4) Structural analyses of potential drug targets
5) Improvement in Protein Data Bank

4. Publications
Original Articles
Bio-informational Pharmacology

1. Staffs and Students
Associate Professor Junko KUROKAWA
Graduate Students Min LI

2. Purpose of Education
Bio-informational pharmacology treats diverse area of life sciences by using pharmacological tools. This laboratory focuses on understanding fundamental physiological roles of ion channels and transporters in cardiovascular system. We employ multidisciplinary approach (patch-clamp, cell biology, fluorescent imaging, and comprehensive analysis) in order to seek novel regulatory mechanisms and modulatory molecules/compounds of ion channels and transporters in cardiovascular organs.

Our ultimate goal is to discover novel diagnostic and therapeutic strategy for intractable cardiovascular diseases, such as sudden death, life-threatening arrhythmias, and atherosclerosis, by modulating ion channels and transporters.

3. Research Subjects
(1) Gender specific medicine in cardiovascular diseases
(2) Cardiac arrhythmias and iPS cells
   (A) Cardiac disease models of iPS-derived cardiomyocytes from long QT syndrome patients
   (B) Drug safety screening system using human iPS cells-derived cardiomyocytes
(3) New technologies in cardiovascular research
   (A) In vitro cardiomyocyte contraction assay system using the motion vector technology
   (B) Generation of 3-D simulator for cardiac electrical activity

4. Clinical Services
None.

5. Publications

Original Articles


Review articles


Books

Therapeutic Genomics

1. Staffs
Associate Professor Ken-ichi Kozaki  D.D.S., Ph.D.
Assistant Professor Jun Inoue  Ph.D.

2. Purpose of Education
The principal aims of our practice are to understand (1) integrative approaches for genetic and epigenetic analyses using the bio-resources of cancers, lifestyle-related diseases, and genetic diseases, (2) molecular mechanisms underlying these diseases, and (3) therapeutic genomics for Personalized Medicine in these diseases.

3. Research Subjects
1. Functional genomics-based approach for identification of tumor-suppressive microRNAs having potential as therapeutic agents for cancer.
2. Discovery of aberrant DNA methylation specific to pathophysiological conditions during multistep processes with the acquisition of malignant properties in cancer cells.

4. Clinical Services

5. Publications
Original Article

Review Article
Molecular Genetics

1. Staffs and Students (April, 2012)

Professor Yosho MIKI
Associate Professor Kiyotsugu YOSHIDA
Project Associate Professor Akira NAKANISHI
Assistant Professor Katsuya TAKENAKA
Project Assistant Professor Ken MIYAGUCHI
Graduate Student Miho TAKAOKA, Nadila WALI, Nurmaa DASHZEVEG, Yuya KAGAMI, Hitomi KIMURA, Ryoko TAKIZAWA, Kazuya NAKAZAWA, Takenori YAMAMOTO, Shota WADA, Shota TESHIROGI

2. Purpose of Education

Our research is directed at understanding the molecular mechanism of carcinogenesis, based on basic molecular cell biology and molecular genetics. We have applied new findings and information obtained by basic research to develop the new diagnosis, treatment, and prevention of cancer. Our objective in the graduate course is to provide students opportunity to study basic science and applied genome science for cancer research.

3. Research Subject

1) Functional analysis of the BRCA2 gene.
   ① Synthetic lethality effect for chemotherapy using BRCA1/2-deficient breast cancers
   ② Identification of novel BRCA2-associated proteins functioning in DNA damage repair.
   ③ Identification of novel BRCA2-associated proteins and analyses of functions of their association in numerical integrity of centrosomes.

2) Regulatory mechanisms of tumor cells in the apoptotic response to DNA damage
   ① PKCdelta regulates Mdm2 independently negative regulator of p53 in the apoptotic response to DNA damage.
   ② Identification of Evi-1 as a novel effector of PKCdelta in the apoptotic response to DNA damage.

4. Publication

Original Article


Epigenetic Epidemiology

1. Staffs and Students
Professor Masaaki MURAMATSU
Associate Professor Noriko SATO
Assistant Professor Shinobu IKEDA
Adjunct Instructor Katsuko SUDO
Graduate Student Miki Yamada, Kyo Chan Ko, Nay Chi Htun, Atsuko Hiraishi, Zhao Chen-xi, Mia Sawabe, Research Students Khin Thet Thet Zaw, Azusa Sengoku

2. Education
Many common diseases such as diabetes, hypertension, obesity, metabolic syndrome, and atherosclerosis are caused by multiple genetic and environmental factors. We aim to decipher these factors as well as their interactions by applying the technology and information of human genome to epidemiology. Our goal is not only to identify disease genes and polymorphisms but also to elucidate gene-environment interactions that contribute to the onset and progression of the diseases. We also study the role of epigenetic changes in common diseases. A new project has been started to build methods for educating genome-based health literacy from information generated by personal genome sequence.

3. Research Subjects
1. Gene-environment interaction that affects the onset of metabolic syndrome and its related phenotypes.
2. Genetic factors that affect the severity of pathological atherosclerosis.
3. Severe cutaneous adverse response (Stevens-Johnson's Syndrome) and HLA genotypes.
4. The role of epigenetic regulation and fetal programming in common diseases.
5. Annotation of personal genome sequence produced by next generation sequencer.

4. Publications
RIKEN Molecular and Chemical Somatology

1. Staffs and Students
Visiting Professor                  Soichi Kojima
Visiting Professor                 Hiroyuki Osada
Visiting Professor                 Mikiko Sodeoka
Visiting Professor                 Yoshiki Yamaguchi
Visiting Professor                 Takashi Saito
Visiting Professor                 Tatsuro Toyoda
Visiting Lecturer                  Naoko Imamoto
Visiting Lecturer                  Tamio Saito
Visiting Lecturer                  Masashi Ueki
Visiting Lecturer                  Takeshi Nakano
Visiting Lecturer                  Kenji Ogawa
Visiting Lecturer                  Go Hirai
Visiting Lecturer                  Shinya Hanashima
Visiting Lecturer                  Arata Takeuchi
Graduate Students                  D3 Marie Kato
                                      D2 Kenji Hayamizu
                                      D1 Rajan Shrestha
                                      M2 Motonari Sakai. Eri Nishizawa
                                      M1 Kumiko Ugata, Asami Shibuya,
                                      Rin Tokunaga, Yuka Yamamoto.

2. Purpose of Education
Molecular and Chemical Somatology is an interdisciplinary fields to understand basis of Bioorganic Chemistry, Chemical Biology, Structural Biology, Molecular Immunology, and Integrating Bioinformatics 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, sugars, 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.

3. Research Subjects
1) Synthesis, screening, and targets of natural products focusing on microbial metabolites
2) Synthesis of bioactive molecules and research on chemical biology based on synthetic organic chemistry
3) Clarification of pathogenesis of diseases at molecular and cellular levels using molecules that regulate cellular functions (bioprobes)
4) Structural and functional analysis of glycoproteins and lectins.
5) Regulatory mechanisms for the lymphocyte activation and immune responses
6) Knowledge discoveries through integrating multiple datasets and information by next generation sequencers

4. Publications
Original Articles
1 forms negative costimulatory microclusters that directly inhibit T cell receptor signals by recruitment of phosphatase SHP2. J. Exp. Med. 209:1201-1217, 2012.

Review Articles

Books

Meetings & Conferences

Miscellaneous
<Invited Lectures>

<Patent>
Department of Pharmacovigilance

1. Staffs and Students (April, 2012)
Professor
Masayoshi Harigai
Associate Professor
Ryuji Koike, Toshihiro Nanki
Assistant Professor
Kaori Watanabe, Ryoko Sakai
Graduate Student
Hayato Yamazaki, Mari Kihara, Sayoko Harada, Masako Hongo, Shoko Kasai
Research Pharmacist
Marie Yajima
Secretary
Tomoko Takahashi

2. Purpose of Education
Department of Pharmacovigilance has established since 2005 and dedicated to pharmacovigilance activity in the field of rheumatology. Main objective of Department of Pharmacovigilance in the graduate course is to provide students opportunity to study basics of pharmacoepidemiology including clinical statistics and to implement epidemiological studies in pharmacovigilance using some databases which have been maintained by this department.

3. Research Subjects
1. Registry of Japanese rheumatoid arthritis patients on biologics for long-term safety (REAL study)
2. Safety of biologics in clinical use in Japanese patients with rheumatoid arthritis in long-term (SECURE study)
3. Pulmonary infections in patients receiving immunosuppressive treatment for rheumatic diseases (PREVENT)
4. Identification of susceptibility genes associated with anti-neutrophil cytoplasm antibody-associated vasculitis in Japanese
5. Effectiveness and safety in clinical practice of abatacept in Japanese patients with rheumatoid arthritis
6. A prospective cohort study of early arthritis in clinical practice evaluating development of rheumatoid arthritis (PRECEDE)
7. Clinical characteristics and risk factors for Pneumocystis jirovecii pneumonia in patients with rheumatoid arthritis receiving TNF inhibitors
8. Evaluation of co-morbidities in rheumatoid arthritis (COMORA study)
9. Clinical epidemiological study of treat-to-target strategy in rheumatoid arthritis patients with moderate to high disease activity
10. Efficacy and safety of programmed intensive treatment with methotrexate in patients with active rheumatoid arthritis
11. Analysis of pulmonary images on thoracic computed tomography in patients with microscopic polyangiitis
12. Clinical outcomes of Japanese rheumatoid arthritis patients in real world commencing targeted therapy (CORRECT)

4. Clinical Service
Most of the members of Department of Pharmacovigilance are rheumatologists and engaged in clinical services in the field of rheumatology as specialists.

5. Publications
Original Article

— 292 —


Department of Nanomedicine (DNP)

1. Staffs and Students
Associate Professor Motohiro KOMAKI, D.D.S., Ph.D.
Assistant Professor Kengo IWASAKI, D.D.S., Ph.D.
Visiting Researcher Naoki YOKOYAMA (DNP), Hirohito AYAME (DNP)

2. Purpose of Education
Understand the mechanisms of wound healing process and connect the knowledge to the regenerative medicine

3. Research Subject
In our department, you can learn stem cell culture, bio-imaging using FACS and confocal fluorescence microscopy, animal models for intrauterine infection, skin decubitus ulcer, hind limb ischemia, and periodontal-/bone-defect.

What we do are:
1) Identification of stem cells from various human tissues
2) Investigation of MSC-conditioned medium and its effects
3) Isolation of stem cell derived-exosomes and evaluate their effects
4) Treatment of periventricular leukomalacia using stem cells and stem cell derived factors.
5) The regeneration of periodontal tissues by transplanting stem cells using cell-transfer technology.
6) The regeneration of periodontal tissues by PDLSC conditioned medium.

4. Clinical Services
Out department members are working in periodontology clinic of Tokyo Medical and Dental University dental hospital. We provide periodontal treatments to patients and are instructors for dental hygienist and dentist.

5. Publications
Department for Hepatitis Control

1. Staffs and Students

Professor: Yasuhiro ASAHINA (04/2012)
Associate Professor: Naoya SAKAMOTO (02/2012), Sei KAKINUMA
Graduate Student (collaboration with Department of Gastroenterology and Hepatology in TMDU): Akiko KITAZUME (03/2012), Kei KIYOHASHI (03/2012), Sayuri NITTA (03/2012), Miyako MURAKAWA, Kouhei YOSHINO, Junko FUJIKI, Fukiko KAWAI, Hideto YAMANAKA, Satoshi OHTANI, Fumio GOTOH (04/2012)

2. Education Principles

Patients died from chronic liver diseases, including liver cancer, are about 40,000 persons per a year in Japan. Liver transplantation remains the only effective treatment available to patients with liver failure. Because of a serious shortage of donors, an alternative therapy is needed. Prevention of hepatocarcinogenesis and hepatic fibrosis is also necessary for patients with chronic hepatitis, and the development of effective treatent for chronic liver diseases has been essential. Our section is a department collaborating with the Department of gastroenterology and hepatology in TMDU.

We believe that the central role of clinical departments in the graduate school is to establish basis for the innovative medical treatment in the next generation. To achieve our mission, both basic research lead by clinical concepts and development of novel therapeutics established upon basic research are required. Our primary goal is to train highly educated and experienced clinician-researchers in the field of hepatology. In the clinical section, we pursue development and application of highly advanced technologies, including novel procedures, for sophisticated diagnosis and treatment of liver diseases. In basic research, our principle is to achieve a research evoked from various clinical problems, and also directed to launch innovative therapeutic procedures to the daily clinical practice. Based on these concepts, we are running research projects to prevent progression of chronic liver diseases, by expanding our distinct basic research findings in the area of virology, immunology, stem cell biology, and cell biology to various clinical settings.

Moreover, we promote both intra- and inter-national exchanges of researchers, and provide good opportunities to study abroad. The final goal of our education is to promote students to become a well-developed hepatologist, and also a leading expert in the field of hepatology.

3. Basic Research Projects

- Analysis of molecular mechanisms for interferon-resistance of hepatitis C virus.
- Analysis of molecular mechanisms for proliferation and differentiation of hepatic stem/progenitor cells.
- Exploration of liver disease-related genes essential for disease progression.
- Regenerative medical science of liver.

4. Expert Areas in Clinical Practice

- Prevention of chronic hepatitis progression to hepatocellular cancer and liver failure, by virology-based treatment strategy.
- Clinical trial of innovative treatment for hepatocellular carcinoma.

5. Publications


Endowed Departments


Department of Advanced GI Therapeutics

1. Staffs and Students (2012)

Associate Professor  Ryuichi OKAMOTO, Tetsuya NAKAMURA
Junior Associate Professor  Kichiro TSUCHIYA
Assistant Professor  Shigeru OSHIMA
Medical Fellow  Shiro YUI, Tomohiro MIZUTANI
Graduate Student  Hiromichi SHIMIZU, Tatsuro MURANO, Naoto TSUGE, Masayoshi FUKUDA, Yu MATSUZAWA, Kengo NOZAKI, Yuki YAMAUCHI

2. Education Principles

The fundamental concept of the department is “Establishment of novel and challenging therapeutic strategies that can be spread worldwide from Japan”. Our main interest is set to analysis and treatment of inflammatory bowel diseases, and thus has organized inflammatory bowel disease-oriented researchers, supported by a number of companies from different areas. We have first established this department on April 2007, and since then, we have succeeded to gain a number of outstanding scientific achievements, including publication of high-quality papers. In addition, in the clinical field, we have directed and played a major role in nation-wide survey and multi-center researches of inflammatory bowel diseases, which was funded by the Japanese Ministry of Health, Labor and Welfare (Chief researcher; Prof. Mamoru Watanabe).

Main principle of our department upon graduate school education is to promote students to become unique and outstanding clinician-researcher, especially engaged in conquering refractory inflammatory bowel diseases. We share the basic research concepts with Department of Gastroenterology and Hepatology, and collaborate to pursue “clinical science”, a research started from, and always coming back to, clinical findings and problems. Also we strongly promote interchange of ideas and personnel between labs, institutes and foreign countries, and thereby facilitate students and researchers to become cross-sectional, distinguished leaders in the field of inflammatory bowel disease research.

3. Basic Research Projects

- Elucidating pathophysiology of inflammatory bowel diseases, and establishment of novel treatments by disease-specific immune-regulation.
- Research and development of regenerative medicine in gastrointestinal diseases.
- Identification of the molecular mechanism promoting regeneration of inflamed mucosa, and application of molecular-targeted mucosal regeneration therapy in inflammatory bowel diseases.
- Establishment of cell- or tissue-transplantation therapy for refractory GI ulcers.
- Analysis of crosstalk between epithelial cells and micro-organisms, and establishment of novel immunomodulating therapy for inflammatory bowel diseases.

4. Expert Areas in Clinical Practice

- Immunomodulating treatment of inflammatory bowel diseases.
- Establishing improved treatment protocol of immunomodulators by pharmacokinetic analysis.
- Development of minimally-invasive diagnostic modalities for inflammatory bowel diseases (i.e. MRE).
- Diagnosis and treatment of small intestinal lesions of inflammatory bowel diseases by double-balloon enteroscopy.

5. Publications


Department of Sleep Modulatory Medicine

1. Staff and Students
Professor Naohiko Inase (Department of Integrated Pulmonology)
Associate Professor Meiyo Tamaoka
Assistant Professor Mizue Hobo

2. Purpose of Education
No lectures in our department.

3. Research Subjects
- Effects of NMDA-type glutamate receptor co-agonist on gamma oscillations and sleep in schizophrenia.
- Open-label trial of ramelteon for diabetes mellitus with sleep disorder.
- The effect of chronotherapy with the angiotensin-antagonist in hypertension with sleep apnea syndrome.
- The efficacy of home-oxygen therapy in patients with sleep apnea and pulmonary fibrosis.
- Development of the evaluation system for the efficacy of oral appliances on obstructive sleep apnea syndrome.
- Open-label trial of hyperbaric oxygen therapy on sleep quality.

4. Clinical Services
Clinical Center for Pleasant Sleep provides a variety of medical service for sleep disorder especially for sleep apnea syndrome.

- Out-patient Clinic
  Monday: AM Dr. Tsutsui (Pulmonary Medicine)  PM Dr. Fujie (Pulmonary Medicine)
  Tuesday: AM Dr. Hirai (Health Service Center)  AM Dr. Miyazaki (Health Service Center)
  Wednesday: AM Dr. Tamaoka (Sleep Modulatory Medicine)  PM Dr. Tamaoka (Sleep Modulatory Medicine)
  Thursday: AM Dr. Uezato (Psychiatry)  AM Dr. Tateishi (Pulmonary Medicine)  PM Dr. Tateishi (Pulmonary Medicine)

5. Publication
Department of Women’s Health

1. Staffs
Associate Professor Masakazu Terauchi (April 2012–)
Assistant Professor Kimio Wakana (April 2012–, concurrent)

2. Education
As a branch of the Department of Obstetrics and Gynecology, we shared responsibility in the education of Obstetrics and Gynecology, Maternal Nursing, and Human Genetics, as well as in the training of medical students on clinical clerkship.

3. Research Subjects
Our research, mainly focusing on the relationship between food and women's health, deals with a variety of topics listed below in 2012, summarized as “the effects of nutrients and other bioactive substances contained in food and drugs on women's physical and mental aging”:
- Effects of grape seed extract on middle-aged women’s health-related quality of life
- Effects of hormone therapy and keishibukuryogan on blood pressure in perimenopausal and postmenopausal women
- Effects of nonbenzodiazepine, melatonin receptor agonist, and Kampo medication on sleep disturbances in perimenopausal and postmenopausal women
- Effects of selective serotonin reuptake inhibitors on subjective and objective sleep parameters in middle-aged women with depression
- Effects of oral contraceptive pills on sleep disturbances in young women with primary dysmenorrhea

4. Clinical Services
As a branch of the Department of Obstetrics and Gynecology, we provide a comprehensive diagnosis, treatment and disease management solution for women suffering from:
- menopausal symptoms
- premature ovarian insufficiency
- postmenopausal osteoporosis
- dyslipidemia
- hypertension
- pelvic organ prolapse
- lower urinary tract syndrome
- depression
- anxiety disorder
- insomnia
- dysmenorrhea
- premenstrual syndrome
- etc.

5. Publications
Original Articles

Poster Presentation
Clinical Laboratory

1. Staffs
General Manager (Junior Associate Professor)  
Naoko Tojo
Associate Manager (Associate Professor)  
Shuji Tohda
Assistant Professor  
Naomi Murakami
Ryoko Azuma
Naoki Tadashi Kanouchi

2. Purpose of Education
Main purpose of education in the department is to provide the students opportunities to study the clinical laboratory medicine and medical technology. The staffs lecture on clinical laboratory medicine and give technical training on clinical laboratory tests not only the medical students and medical technologist students in the faculty of medicine of the university but also students in the another vocational schools for medical technologists.

Besides the students, eleven residents of the medical hospital of our university had a general training for clinical laboratory medicine, including ultrasonography. Hands-on seminars of Gram staining, abdominal ultrasonography and so on have been repeatedly held for young doctors in the hospital. Four clinical laboratory technicians in the other hospital were also given a short term of practical training in our clinical laboratory.

3. Research Subjects
1) Evidence-based laboratory medicine
2) Standardization of respiratory function tests.
3) Development of molecular diagnostic tests for hematological diseases.
4) Development of electrophysiological diagnostic tests for peripheral neuropathies.
5) Clinical and electrophysiological study for amyotrophic lateral sclerosis.

4. Clinical Services
High quality and advanced laboratory tests are being done speedily in the clinical laboratory all day all the time. Items of emergency laboratory tests have been in increase, including smear test for tubercle bacillus and cell counting of the cerebrospinal fluid. Since November 2011, blood-taking and analysis have been started at 8:05, 30 minutes earlier than before. It results in shortening the waiting time of patients and in more speedy reporting the results of analysis. The results of physiological examinations are online reported quickly and correctly. The updated information on antibiotic sensitivity of the pathogens in each ward is also provided online regularly. In the night time, the laboratory also provides appropriate blood products for transfusion, in cooperation with blood transfusion service of the hospital.

5. Publications
Original Article
Review Article

Department of Blood Transfusion Medicine

1. Staffs
Director (Lecturer) Michiko KAJIWARA
Assistant Director (Medical Technologist) Naoki OHTOMO

2. Purpose of Education
Transfusion therapy is a supplementation of the blood component, but it also has aspects of cell therapy and transplantation. So, it is important to practice safe and appropriate transfusion therapy. Clinical tests of transfusion, such as blood type test, are most basic immunological test technique. The accurate understanding and practice of these tests is also necessary for the safety of medical treatment. From this point of view, we educate the students of school of medicine, school of allied health sciences, graduate school of medical and dental sciences, medical doctors, and co-medicals.

3. Research Subjects
1) Practice of safe and appropriate transfusion therapy (including prevention of medical accident related transfusion)
2) Basic and clinical research of hematopoietic stem cell transplantation

4. Clinical Services (The result of 2012)
1) The amount of blood products used
   - Red cell component products 12,305 Units (6,207 bags)
   - Platelet concentration 26,236 Units (2,183 bags)
   - Fresh frozen plasma 8,177.5 Units (3,850 bags)
2) Autologous blood collection and transfusion
   - Autologous blood collection 395 cases (525 times, 1,017 Units)
   - Autologous blood transfusion 351 cases (869 Units)
3) The number of clinical tests of transfusion
   - Blood typing 8,496
   - Anti red blood cell antibody test 3,774
   - Cross match 10,045
4) Hematopoietic stem cell harvest
   - Autologous peripheral blood stem cell harvest 9 cases 19 times
   - Allogenic peripheral blood stem cell harvest 5 cases 6 times
   - Autologous peripheral mononuclear cell harvest 1 case 1 time
   - Allogenic bone marrow harvest 11 cases 11 times
      (Including Japan Marrow Donor Program donors)
5) Hematopoietic stem cell transplantation
   (The evaluation and preservation of the stem cells were done in our department)
   - Autologous peripheral blood stem cell transplantation 12 cases 12 times
   - Allogenic peripheral blood stem cell transplantation 4 cases 4 times
   - Autologous peripheral mononuclear cell transplantation 1 case 1 time
   - Allogenic bone marrow transplantation 9 cases 9 times
   - Allogenic umbilical cord blood transplantation 6 cases 6 times

5. Publications
Original articles
Department of Blood Purification

Associate Professor  Tatemitsu RAI
Assistant Professor  Eisei SOHARA, Katsumasa OI
Hospital Staff  Miyuki YOSHIZAKI, Keita KUSAKA

(1) Education
The Department of Blood Purification has been engaged in such educational activities as follows.
1) Clinical clerkship of 6th year students of Medical School
2) Preclinical lectures of 5th year students of Medical School
3) Lectures of 4th year students of Medical School
4) Lectures of students of Dental School
5) Hospital training of postgraduate master course students of Medical School
6) Hospital training of clinical engineering technologists and nurses (2 trainees)

(2) Research
The Department of Blood Purification has been engaged in such research activities as follows.
1) Pathophysiology and treatment of chronic renal failure
2) Pathophysiology and treatment of acute renal failure
3) New techniques in blood purification

(3) Clinical Services
The achievements of clinical services of The Department of Blood Purification in 2011 are as follows:

Total number of blood purification sessions 5294
Number of hemodialysis (HD) sessions 4299
Number of plasma exchange (PE) sessions 145
Number of plasma adsorption sessions 99
Number of continuous hemodiafiltration (CHDF) sessions 526
Number of leukapheresis sessions 62
Number of endotoxin adsorption sessions 35
Number of cell-free concentrated ascites reinfusion (CART) sessions 6

(4) Publications

[Original articles]

**[Scientific meetings]**


1. Staffs and Students

Director Tomohiro Morio (Department of Pediatrics)
Vise Director Ichiro Sekiya (Department of Orthopedic Surgery)
Quality control manager Michiko Kajiwara (Chief Administrator, Department of Blood Transfusion Medicine)
Product manager Norio Shimizu (Division of Virology, Medical Research Institute)
Technicians Shizuko Minegishi (to June 2012), Yuri Kohno, Naomi Terada (from May 2012), Akane Miyasaka (from May 2012)

Technicians (From Collaborative Research)
Takashi Kosaka

Clerical Assistant Akiko Hoshikawa, Jun Kusano

2. Purpose of Education

Our center is the first ISO9001:2000(2008)-certified cell processing center in Japan. We provide assistance to prepare standard operation procedure (SOP) and also offer on-the-job training for cell processing/manipulating procedures and that for quality assurance at the center.

3. Research Subjects

1. Development of innovative techniques for quality assurance of cell products
2. Development of a novel measure for rapid and sensitive detection of multiple pathogens
3. Clinical study on ex-vivo expanded donor T-cell infusion for patients who underwent hematopoietic stem cell transplantation (HSCT)
4. Development of multi-virus specific T lymphocytes for adoptive immunotherapy
5. Development of short tandem repeat method as a molecular ID for personal identification
6. Research on a regeneration system of the cartilage bone from the synovial membrane (Department of Orthopedic Surgery)
7. Development of novel peptide-pulsed dendritic therapy for adult T-cell leukemia (Department of Immunotherapeutics)

4. Clinical Services

Our center has four independent cell processing rooms (class 10,000 clean rooms) and has received ISO9001:2000(2008) certificate. All the rooms are equipped with a bio-safety cabinet. The hardware as well as software used in our center fulfills all the guidelines that are required for the preparation of cell products of clinical grade.

The cell products prepared in our centers include

#1 Ex-vivo expanded T-lymphocytes
#2 Synovium-derived mesenchymal stem cells
#3 Bone marrow-derived mesenchymal stem cells
#4 Processed peripheral blood stem cells

The center offers our novel detection system for 12 different viruses in rapid and sensitive manner for the doctors in our medical hospital. We also measure virus loads of the detected virus using a real time PCR system. We measured 1,593 samples in year 2012 in total.

5. Publications

Original articles
murine vasculitis through the suppression of neutrophil migration and activation. *Arthritis Rheumatism.* (in press), 2012.


Hyperbaric Medical Center

1. Staffs
Center Chief and Junior Associate Professor
Kazuyoshi YAGISHITA
Tokunin Junior Associate Professor Mitsuhiro ENOMOTO
Medical Staff Takashi HIRAI, Hidetoshi KABURAGI
Tokunin Assistant Professor Seiichiro TOGAWA, Yasushi KOJIMA
Researcher Masaharu SHIBAYAMA, Masaki HORIE,
Manabu SHIMODA, Kazuo YAMAMOTO,
Naoko SUZUKI
Secretary Kiyomi ITOH
Professor Emeritus Yoshihiro MANO

2. Purpose of Education
Hyperbaric oxygen therapy (HBO), which can dissolve oxygen in serum in population to atomic pressure and transport oxygen to ischemic tissue, is an established therapy for treatment of several conditions, including decompression illness, carbon monoxide poisoning, acute arterial disturbance, and peripheral ischemic disease. The mechanism of HBO can be described as hyperoxygenation in ischemic soft tissues, reduction of edema, stimulation of fibroblast proliferation and differentiation, increased collagen formation and cross-linking, angiogenesis, and improved preservation of energy metabolism.

This curious treatment has clinically many kinds of efficacy, however, the mechanism of the effect has not been fully understood, and many researchers in the world still attempt to reveal the mechanism of the effect of HBO.

This HBO can stimulate the interest of medical students, basic researchers, and clinical doctors, and this hyperbaric medical center can provide opportunities to study hyperbaric oxygen therapy field.

3. Research Subjects
1) Soft tissue injuries related with sports activities
2) HBO for conditioning in sports activities
3) Diving medicine
4) Hyperbaric oxygen therapy

4. Clinical Services
Hyperbaric Medical Center in Tokyo Medical and Dental University hospital is the center institute of hyperbaric oxygen therapy and research in Japan, and one of the largest hyperbaric oxygen chamber in the world is set up in Hyperbaric Medical Center, which can contain the maximum number of 16 persons.

As described above, HBO is applied for several conditions, including decompression illness, carbon monoxide poisoning, infection, wound healing, delayed radiation injury, acute arterial disturbance, and peripheral ischemic disease. In 2012, 5,117 times hyperbaric oxygen therapy (HBO) in 580 patients were performed in our university hospital. In addition, for the purpose of rapid recovery from injury, we now perform HBO aggressively for soft tissue injury related with sports activities including compartment syndrome, ankle sprain, knee ligament injury, and muscle contusion.

5. Publication
Original articles


Clean Room, University Hospital, Faculty of Dentistry

1. Staffs and Students (April, 2012)
   Associate Professor  Mitsuhiro SUNAKAWA
   Assistant Professor  Hiroyuki MATSUMOTO

2. Purpose of Education
   The improvement of the nosocominal infection control system in the University Hospital, Faculty of Dentistry, Tokyo Medical and Dental University to spread the actual infection control method to all staff and clinical course students.

3. Research Subjects
   1) The development of disposal, hygienic materials for dental use.
   2) The survey for the oral diseases in patients with HIV.
   3) The survey for the relationship between the consciously of the staff and students with hospital and the need accident.

[Articles]

[Meeting]
2. Uraiwan Chokuchanachaisakul, Tomoatsu Kaneko, Yusuke Yamanaka, Reika Kaneko, Mitsuhiro Sunakawa, Takashi Okiji and Hideaki Suda: Expression of p38 MAP kinase family in the rat central nervous system is regulated by signals from the tooth pulp. The 136th JSCD Annual Meeting, Okinawa, 2012.6.28-29
Center for Development of Devices and Drugs in Dentistry

1. Staffs (April, 2012)
Director
Junji TAGAMI
Co-Director
Hidekazu TAKAHASHI, Hideki HARASAWA, Naoko HARADA
Member
Miwako WAGAI (CRC), Emiko NAGAE (CRC)

2. Overview
Center for development of devices and drugs in dentistry was established in April, 2004 and is committed to a wide range of activities, such as education, consultation for new devices and drugs application, and support for clinical trials in University Hospital of Dentistry.

3. Purpose of Education
We provide a program for the 3rd year students of the School of Dentistry, also for the 2nd year students of the School of Oral Health Care Sciences majoring in Oral Health Engineering to help them to gain fundamental knowledge of Pharmaceutical Affairs Act which is required for development and application of dental devices.
Collaborating with the Institute of Biomaterials and Bioengineering, we lecture the 1st year students in Master’s Program at Graduate School of Medical and Dental Sciences on issues and systems related to the mission that many outcomes from studies about innovative dental devices and materials will be put into use without “device-lag”.

4. Clinical trial supporting Services
In order to accomplish clinical trials successfully, we manage and support from planning, paper work to patient care as a main office of clinical trials in University Hospital of Dentistry.

5. Consultation Services
We provide consultation services about various issues concerning the Pharmaceutical Affairs Act, not only for pharmaceutical and dental companies but also for dentists and researchers in our University.
By the supporting services of clinical trials, we hope that applicant will be able to form a protocol adequately and effectively, and to start the clinical trial swiftly.

6. Achievements
Consultation
As of today, one clinical trial and one clinical research (study) are ongoing (from January 1 to December 31, 2012).
The 152 consultation services concerning dental devices were performed in 2012.

7. Publications
Original Article
Review Article
Book
Center of Sports Medicine and Sports Dentistry

1. Staffs
○ Clinical Center of Sports Medicine
  Center Chief and Junior Associate Professor
  Kazuyoshi YAGISHITA
  Tokunin Junior Associate Professor Mitsuhiro ENOMOTO
  Chief of Athletic Rehabilitation Junya AIZAWA
  Researcher Shunsuke OHJI

○ Sports Medicine/Dentistry
  Associate Professor Toshiaki UENO
  Assistant Professor Toshiyuki TAKAHASHI, Hiroshi CHUREI
  Hospital Staff Sachiko FUJINO, Katsuhide KUROKAWA
  Graduate Student Keisuke ABE, Sharika SHAHRIN, Ruman Uddin CHOWDHURY, Takayuki ISHIGAMI, Kairi HAYASHI, Mai TANABE, Akihiro MITSUYAMA, Sintaro FUKASAWA, Abhishek SHRESTHA

2. Purpose of Education

Center of Sports Medicine and Sports Dentistry is established as a bridgehead for sports medical science and sports dental science which deals the clinical management of trauma and disorder for athletes and sports-active people, and the safety measures and prevention of sports-related traumatic injuries and disorders. Center of Sports Medicine and Sports Dentistry is consisted of Clinical Center of Sports Medicine in University Hospital of Medicine and Sports Medicine/Dentistry and Sports dentistry clinic in University Hospital of Dentistry.

3. Research Subjects

○ Clinical Center of Sports Medicine
  1) Athletic rehabilitation for rapid recovery from injury and high performance in athletes.
     1)-a Intervention of core strength in patients with anterior cruciate ligament reconstruction.
     1)-b Treatment from the aspect of core function in patients with overuse and fatigue fracture.
  2) Evaluation methods for core function.
  3) Development of dynamic stability.
  4) Hyperbaric oxygen treatment
     4)-a Soft tissue injuries related with sports activities.
     4)-b Conditioning in sports activities

○ Sports Medicine/Dentistry
  1) Oral health promotion of athletes and sports-active people
     1)-a Field survey of oral health conditions in athletes and sports-active people
     1)-b Changes of oral environment associated with physical and sporting activities
     1)-c Influences of sports drinks and supplements on oral health
  2) Safety measures of sports-related dental and maxillofacial traumatic injuries
     2)-a Diagnosis and treatment techniques for sports-related dental and maxillofacial injuries
     2)-b Development and innovation of sports mouthguard
     2)-c Development and innovation of sports faceguard
     2)-d Development and innovation of scuba diving mouthpiece
  3) Correlations between occlusion and general motor functions
     3)-a Biomechanical assessment of motor performance associated with occlusion
     3)-b Electrophysiological analysis of neuromuscular function associated with occlusion
  4) Correlations between occlusion and body posture
  5) Relations between mastication and occlusion and brain functions
6) Application of HBO therapy to sports-related dental diseases and traumatic injury

4. Clinical trial Services

Center of Sports Medicine and Sports Dentistry clinic offers comprehensive care and clinical management for athletes and sports-active people suffered traumatic injuries, overuse disorders, disorders related with internal medicine, and dental diseases.

○Clinical Center of Sports Medicine

Number of patients (From April to December, 2012)
  Section of out-patient clinic: 712
  Section of athletic rehabilitation: 1,154

○Sports Medicine/Dentistry, Sports dentistry clinic

Sports dentistry clinic offers comprehensive care and clinical management for athletes and sports-active people suffered dental diseases and traumatic injuries. Custom-fitted protective gears such as mouthguard and faceguard against sports-related dental and maxillofacial trauma are also handled for participants in contact sports such as a boxing, American football, rugby football, hockey, lacrosse, and martial art.

5. Publications

Original article


Lifetime Oral Health Care Science

1. Staffs and Students (April, 2012)
Professor Shinichi ARAKAWA (July~)
Junior Associate Professor Keiko KONDO (April~)

2. Purpose of Education
Main objective of Lifetime Oral Health Care Sciences is to understand and learn how oral health care contributes to the preservation of general health and healthy life expectancy. Students also learn the newest knowledge on oral pathology and oral health promotion, and are trained to master the modality of oral health care.

3. Research Subjects
1) Clinical and basic studies on Ozone nano-bubble water (NBW3)
2) Study on virulence factors of periodontopathic bacteria
3) Development of education system for dental (oral) hygienists to prevent oral diseases
4) Development of assessment program in technical education for dental (oral) hygienists

4. Clinical Services
Oral care clinic provides prevention of oral diseases, such as dental caries or periodontal diseases for maintaining patients' oral and general health in a lifetime.

5. Publications
Original article
Oral Care for Systemic Health Support

1. Staffs and Student(April, 2012)
Professor Hidemi YOSHIMASU
Junior Associate Professor Mitsue ONODERA

2. Purpose of Education
“Oral care for systemic health support” is a branch of oral health care sciences.
Students are taught oral health diagnosis, nutritional sciences, diet education, introduction to care nursing, oral and maxillofacial surgery, and oral health care of medically compromised patient.

3. Research Subjects
1) Oral health care of patients with oral cancer, cleft lip and palate and other oral diseases
2) Oral health related QOL of patients with oral cancer, cleft lip and palate, dry mouth.
3) Basic research of tooth brush, peeling sponge and tooth paste
4) Morphological, functional research and oral health of patients with cleft lip and palate
5) Research for safety in supplements in oral functions
6) Basic research for pathophysiological roles of gap junction

4. Clinical Services
1) High quality oral cleaning programs in collaboration with dental hygienists at Oral Health Care Clinic in Dental Hospital and at wards in Medical Hospital.
2) Diagnosis and treatment of patients with oral and maxillofacial diseases at Oral and Maxillofacial Surgery Clinic.

5. Publications
Preventive Oral Health Care Science

1. Staffs and Students (2012)
   Professor Kayoko SHINADA
   Associate Professor Keiko ENDO
   Assistant Professor Hiromi OTSUKA
   Part-time Lecturer Yuki OHARA, Chizuru TAZAWA, Akie KOUNO, Miyuki YAMASAKI, Masako OKADA, Noriko IIDA, Masayo YASUDA
   Graduate Students Master Course Yuka SHIZUMA, Ayako KUBOTA

2. Purpose of Education
   In order to cultivate students’ abilities to prevent and detect oral diseases at an early stage, which are important to maintain and improve the nation’s health, we help students acquire deep academic knowledge and high standard skills in preventive oral health care such as skills to check over the condition of oral cavities. Additionally, we help students develop skills to provide oral health counseling and oral health promotion, and nurture human resources who can actively contribute the development of oral health promotion.

3. Research Subjects
   1) Preventive Oral Health Care Sciences
      ① Incident factors and preventive methods on dental caries
      ② Incident factors and preventive methods on periodontal disease
      ③ Incident factors and preventive methods on oral malodor
      ④ Incident factors and preventive methods on other oral diseases
   2) Development of education system for the patients to prevent oral diseases, and for the dental hygiene students.

4. Clinical Services
   In our Oral Health Care Clinic, dental hygienists support patients’ oral health care, and prevent dental caries and periodontal diseases, for the patients to maintain their oral health for the entire lifetime.

5. Publications
   Original article
Oral Health Care Science for Community and Welfare

1. Staffs and Student

Professor Chiyoko Hakuta (April, 2012)
Junior Associate Professor Keiko Endo (July, 2012)
Student Rena Nakayama (April, 2012)

2. Purpose of Education

In this course, our lectures will be focused on oral health hygiene for community and welfare. Through these lectures, students as dental hygienists will be able to learn how to create own oral health care and welfare programs based on each community’s circumstances.

Furthermore, because of progressing of the aged society in recent years, the healthcare professionals who are in charge of health and medical services need to have extremely close cooperation of each other. Therefore, dental healthcare workers also need to gain enough social welfare knowledge and skills, and they need to understand and support people from both aspects of health and living. Under these circumstances, in addition to conventional social dentistry study, we have had the 4 weeks on-the-spot training in various welfare fields for our students, so that they could experience how to support people from social and welfare point of view. As faculties of this course, we would pay a visit and give our students some instructions and advices for meeting with success of their practical training.

3. Our research

Followings are our researches:

1. Development of education & educational materials for community health activities
2. Upbringing & improving oral cavity function (from infant to elderly)
3. Health education and behavior changes in community
4. Development of the program to promote community health from both health and welfare point of view
5. Preventive long-time care in day care services
6. Adult guardian system for highly advanced functional disorder
7. Special diet to preserve elderly people’s health
Oral Health Care Education

1. Staffs and Students (April, 2012)
Professor Kayo TERAOKA

2. Purpose of Education
Oral health care education is special field of study which deals with establishment of theoretic and skill for health promotion to contribute to the development of the national health. Educational objects of Oral health care education in the graduate course is to foster human resources who will be able to implement health promotion program in collaboration with other career or residents in many fields.

3. Research Subjects
1) Oral health promotion program.
2) Oral health and long-term preventive care for the elderly.
3) Oral care management system for hospitalized person.
4) Oral health administration system in local communities.
Basic Sciences of Oral Health Care

1. Staff.
Professor Akira Yamaguchi
Junior Associate Professor Yujiro Sakamoto

2. Purpose of Education.
Basic sciences of oral health care is a branch of morphological sciences, developmental biology, pathology and the neurosciences to understand the structure and function of human body and its pathological conditions. Students are taught in more detail about the normal tooth anatomy and occlusal function as well as the anatomy of the head and neck with specific attention to the skull, muscles, nerves, and arteries associated with the mouth and teeth. In addition, students are also taught the oral pathology and dental pharmacology and pharmaceutics.

Subjects and contents.
- Structure and function of human body I and II: anatomy, histology, physiology, embryology, oral anatomy, oral histology, oral physiology.
- Mechanism of disease and promotion of recovery process: pathology, oral pathology, microbiology, immunology, pharmacology.
- Graduation thesis:

3. Research Subjects
1) Basic medical and dental studies for oral health care
2) Basic study on clinical application of oral health care
3) Gross anatomical study of head and neck region

4. Publications
Original Articles


Review Articles

5. International meetings


6. Invited Lectures
Basic Oral Health Science

1. Staffs and Students
   Professor Kumiko Sugimoto

2. Purpose of Education
   Basic oral health science is a section of oral health care sciences which deals with the basic oral health sciences to perform evidence-based oral health care and to support people to attain healthy and happy living. Main objective of Basic oral health science in the undergraduate course is to provide students opportunity to study the structure and function of the human body as well as stomatognathic region, pharmacology, laboratory practice of physiology and research process.

3. Research Subjects
   1) Changes in autonomic nerve and brain activities induced by taste stimulation
   2) The sensivities to taste, olfactory and capsaicin stimulations in the patients of congenital insensitivity to pain with anhidrosis
   3) Evaluation of oral care for the elderly by dental professionals
   4) Objective assessment of internal stress during dental treatment by analysis of autonomic nervous activities

4. Publications
   Original Articles
Comprehensive Oral Health Engineering

1. Staff
Associate Professor Meiko Oki

2. Purpose of Education
The goal of the education program in Comprehensive Oral Health Engineering is to provide the knowledge and skills of the figurative arts, design, and the health welfare for oral health engineering students.

The first grade oral health engineering students participate in the tutorial lessons of general knowledge of oral health and specialists, and are introduced to clinical dentistry visiting the hospital clinics, dental technical laboratory, and dental material corporation. Scientific English was provided to learn basic dental terms. The second grade students attend lectures of health promotion, the tutorial lessons of general knowledge of oral and health promotion, Japanese and world dental technic situations, and statistic data analysis. Process device engineering was provided the outlines of 3D CAD/CAM/CAE, especially about 3D printer. The third grade students will attend lectures and clinical laboratories to acquire a broad range of general knowledge and skills of a wide variety of maxillofacial defects, cleft lip and palate, oral appliances to support masticatory, swallowing and speech, and involvement of treatment procedures, by means of the high-advanced dental and medical cares. Scientific English II will provide to read some English papers about prosthodontics.

3. Research Subjects
1) The fabrication of facial prostheses using three dimensional rapid manufacturing method
2) Clinical studies of treatments for patients with maxillofacial defects

4. Clinical Services
In the Maxillofacial Prosthetic Clinic, I treat patients with cleft lip and/or palate, maxillary defect, mandibular defect, tongue defect, and facial defect, to improve their masticatory and swallowing functions, speech, and esthetic problems with the Maxillofacial Prosthetic staffs in the University Dental Hospital.
Clinical Oral Science

1. Staffs and Students
Lecturer Masaomi Ikeda

2. Purpose of Education
This course provides education for students to become professional dental technologists with the ability to apply newly developed materials and technologies to clinical dentistry and contribute not only to community dental medicine but also to dental research or educational institution internationally. At present, the latest technologies such as dental implant, dental CAD/DAM, etc are becoming more popular because of the progress of dental materials and technologies. Therefore, it is important to learn about new materials and technologies, and acquire skills in order to perform laboratory works properly. Communication skills are important because giving the information about materials and technologies to dentists and dental hygienists is necessary for the best outcome of dental treatment. Goal of this course is to produce dental technicians with extensive knowledge, high skill, and communication ability.

3. Research Subjects
1) Application of antibacterial materials to dental materials
2) Evaluation of adhesive systems
3) Traceability and quality control of restorative materials

5. Publications
Original Articles
Oral Health Information Technology

1. Staffs and Students
   Lecturer: Haruo OKAYASU

2. Purpose of Education
   Oral Health Information Technology educates the present conditions of dentistry, the basic manner as the medical person, and a necessary technique as an expert. This section brings up professionals involved in the maintenance and promotion of people’s health.

3. Research Subjects
   1) The role of the dental technician during large-scale disasters
Oral Biomaterials Engineering

1. Staffs and Students
Professor Hidekazu TAKAHASHI
Assistant Professor Naohiko IWASAKI
Special guest researcher Sasipin Lauvahutanon

2. Purpose of Education
Dental material science is not only one of basic medical and dental science but also one of clinical dental science. In our department, we will educate students to obtain practical knowledge of the dental materials and devices used in dentistry and to improve skill how to deal with these materials and devices. Our goals of education are to achieve high quality of dental practice with well-understanding dental material and devices.

The aim for education is to obtain the basic knowledge of dental material science and technology. The lecture is simultaneously provided with the laboratory instructions within the limit of the possible.

3. Research Subjects
1. Evaluation of various factors on mechanical properties of teeth substance.
2. Evaluation of fatigue properties of dentin and dental materials using miniature testing pieces
3. Measurement of characteristics of dental ceramic materials and establishment of new testing methods for dental ceramics
4. Measurement of precise deformation using non-contact methods
5. Development of new composite resin with similar machinability of dentin
6. Study on dental root fracture mechanism
7. Application of various types of fiberglass for dentistry
8. Evaluation of composite resin mechanical properties and improvement their bonding efficiency to various materials.
9. Evaluation of impact force absorption of mouthguard and face protect materials

4. Publication
Original articles
Fixed Prosthetic Engineering

1. Staffs and Students
   Junior Associate Professor  Tohru Yasue

2. Purpose of Education
   Our instruction will include provision of knowledge and technical training of dental laboratory techniques necessary for
dental crown restorative procedures to solve morphological, functional and esthetics problems that have been
accompanied with eventual loss of tooth substance and body in the oral tissues. Intensive learning of tooth morphology
that should be fundamental to every phase of dental laboratory techniques will be scheduled by practical courses based on
the science of shape recognition construction. And our teaching will refer to not only provision of forms and occlusal
functions to be best suited for individual patients in crown restoration engineering and plate denture engineering, but also
fabrication techniques of restorations with highly color matching together with prosthetic restoration methods using most
advanced materials.

3. Research Subjects
   From the technicians’ viewpoint of fabricating dental crown restorations, our research and development will be ready in
an approach toward a new technology of dental laboratory engineering and a new material science, especially in the study
of advanced restorative engineering using digital equipments.

4. Clinical Services
   As far as crown restorations are concerned in dental esthetics based on Zirconia materials with CAD/CAM machining,
functional efficiency and durability will be identified in the oral cavity environment, and crown restorations with highly
demanding esthetics will be fabricated.
Oral Prosthetic Engineering

1. Staffs and Students (April, 2012)
   Professor                 Tetsuya SUZUKI
   Research Associate        Kouichi HUKAWA

2. Purpose of Education
   Oral Prosthetic Engineering is one of the dental sciences which propose to restore and maintain oral function, form and health for partially and/or complete edentulous patients. Main object of Oral Prosthetic Engineering is to provide students to obtain the basic knowledge and technical skill of complete denture prosthodontics, removable partial denture prosthodontics and dental occlusion.

3. Research Subjects
   1. Standardization of education for dental technicians
   2. Optimal occlusion for removable dentures.
   4. Evaluation of oral function in elderly.
   5. Influence of masticatory function on brain activity.

4. Publication
   Original articles