Open Windows Leading to the Global World
TMDU's activities are reported through the open windows to the world.
The window represents TMDU as the Global base for its speedy exchange of information.

TMDU

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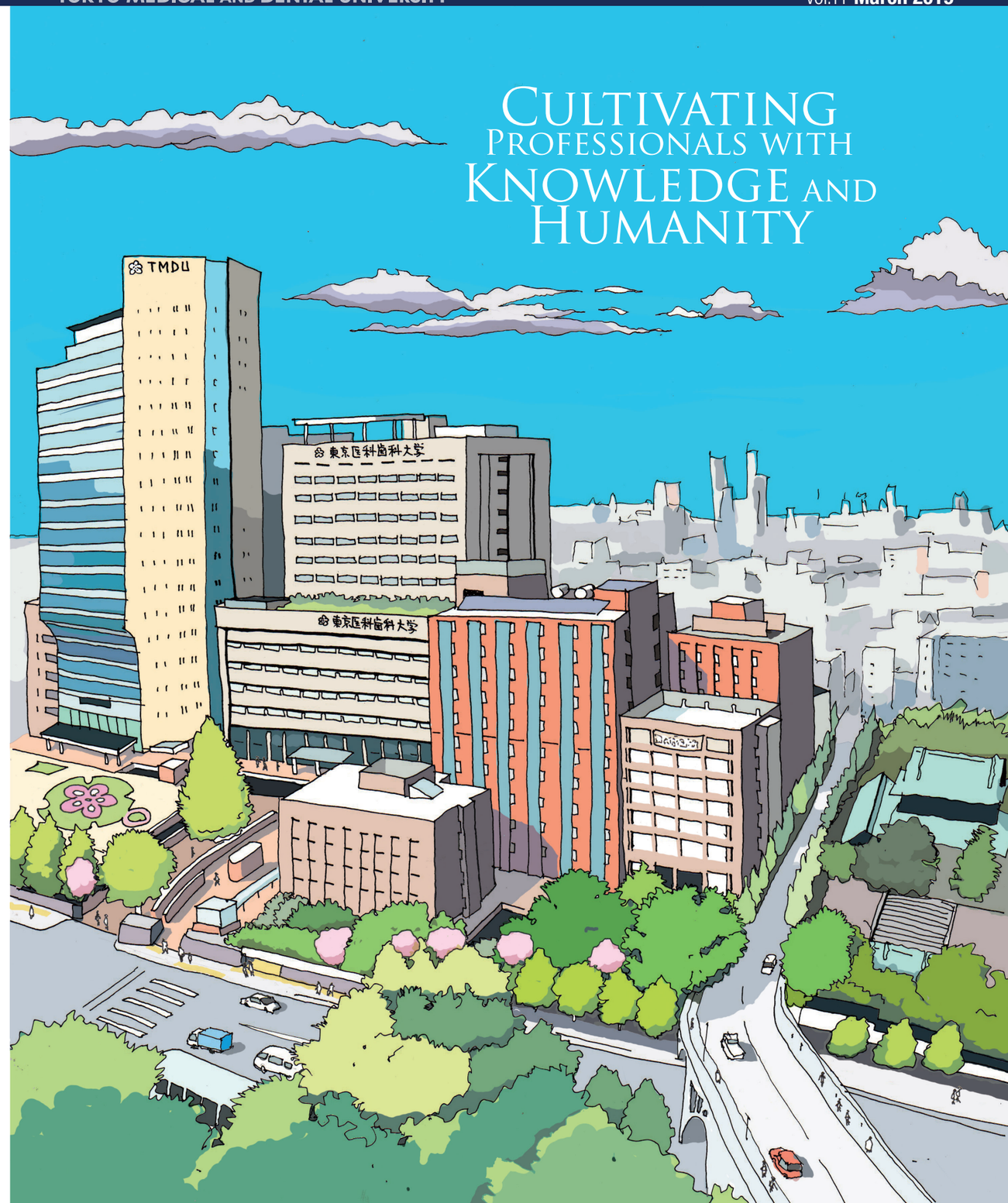
NATIONAL UNIVERSITY CORPORATION

TMDU ANNUAL NEWS

TOKYO MEDICAL AND DENTAL UNIVERSITY
Vol.11 March 2019

CULTIVATING PROFESSIONALS WITH KNOWLEDGE AND HUMANITY



History and Location of TMDU

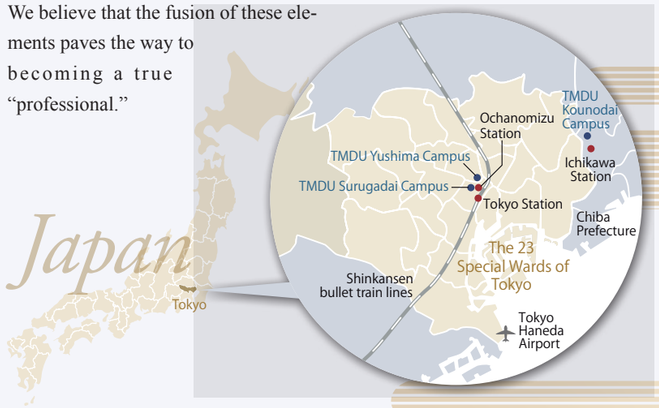
Standing at the sacred birthplace of scholarship in Japan

Tokyo Medical and Dental University was established as a national medical and dental educational institution on October 12, 1928. Currently, TMDU is located in the Yushima / Shoheizaka area of Tokyo, which is considered sacred ground for scholarship and learning in Japan. As Japan's only comprehensive medical university and graduate school, TMDU has provided advanced medical treatment through a fusion of the medical and dental fields. It has worked to cultivate professionals with knowledge and humanity, thereby contributing to human health and the well-being of society. The "knowledge" referred to here includes learning, technology, and self-identity, while "humanity" means culture, sensitivity, and the ability to communicate openly and accept diversity.

We believe that the fusion of these elements paves the way to becoming a true "professional."

TOKYO - The past and present

This landscape shows a view of Ochanomizu, where TMDU is located today. The buildings on the right-hand side, Yushima Seido and Shoheizaka School, were the center of scholarship since the 17th century during the Edo Period in Japan. Mt. Fuji can be seen in the far distance.



1800s

View of the Eastern Capital, Edo-Ochanomizu (woodblock by Shotei Hokuju)

1928

The Tokyo National School of Dentistry, the predecessor of TMDU, was established at Hitotsubashi.

2019

Today, TMDU is still located in Ochanomizu/ Yushima district where its predecessor the Tokyo National School of Dentistry, had moved in 1930, two years after its founding. TMDU has become known as one of the most excellent research universities in Japan.

Present-day Ochanomizu, showing the same view as in the above woodblock. Ochanomizu Station is at the left and the TMDU Main Campus is at the right, with the Kanda River flowing between them.

TMDU: Did you know...?

University Ranking by Subject

	Medicine	Dentistry
National Rank	3	1
World Rank	51-100	10

SOURCE: QS World University Ranking by Subject 2019

World's Best Small Universities

Ranked #1 in Japan and #15 in the World

SOURCE: Times Higher Education World's Best Small Universities 2018

University Hospitals Promoting Our Research

	Beds	Outpatients Per Year
Medical Hospital	753	555,861
Dental Hospital	60	421,853

International Students

	No. of International Students	No. of Countries
Graduate Schools	331*	38

* About 19% of graduate school students are **International Students**

How do you like life at TMDU?

TMDU cultivates an environment that fosters scientific research achievement among professionals from diverse backgrounds. This setting enabled me to progress in my graduate studies. I was able to develop ways to support the application of research in an atmosphere that also helps an individual develop proficiency in academia. The education offered provides assurance towards precise accumulation of knowledge and skills pertinent in dealing with the needs of the society.

Kathryn Siongco
(Philippines)

TMDU is not only one of the world's top-ranking universities where you can gain academic experience and knowledge, it also offers excellent opportunities to explore Japanese culture and traditions through various activities. As a foreign student, I can say that the foreign student support unit will help you with any problems. Studying and working at TMDU has been one of the greatest experiences in my life.

Peerapong Wamasing
(Thailand)

Studying abroad, the acquisition of a new language, and engaging in a new life environment could all be challenges but each one brings a lifetime of benefits. TMDU offers multiple opportunities, ranging from scholarships to the acquisition of high-level research skills. At TMDU, I received a high-quality education, training from exceptional scientists, and the chance to unlock my inner potential. In addition, I was able to experience the rich culture of Japan, acquire a third language and share my culture with many international colleagues.

Hind Al-Busani
(Yemen)

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Joint Degree Program (JDP) in Dentistry between Chulalongkorn University and TMDU

IN THE THIRD year of the Joint Degree Program (JDP) in Dentistry between Chulalongkorn University (CU) and TMDU, which was launched in August 2016, three Thai students were newly matriculated after a strict admission examination. In August, Prof. Ono and Prof. Moriyama held freshman orientation for them, introducing program activities and research life at TMDU. Other students who passed required exams, including the qualifying examination and thesis/dissertation proposal examination, successfully moved on to the next academic year. As 2nd-year students, they will spend a full academic year at TMDU to pursue their studies and research work either in the labs at the Department of Orthodontic Science or at the Department of Maxillofacial Orthognathics. A liaison council, self/external assessment and faculty development seminar will be held in January-April 2019 and is expected to enhance the program through multilateral review.

Prof. Moriyama and Prof. Ono with CU faculty members

Prof. Moriyama with students after the freshman orientation

Research work at TMDU

Collaboration with Mahidol University (Thailand)

Faculty of Medicine Siriraj Hospital

FOLLOWING FY2017, TMDU and Siriraj Hospital Faculty of Medicine, Mahidol University actively continued discussions to launch a Joint Degree Program (JDP). In June 2018, TMDU delegates visited Siriraj Hospital for further consultation and over 200 of Siriraj's young surgeons attended the lectures given by Prof. Minoru Tanabe and Prof. Tetsuya Taga. In August, Dean Prof. Prasit Watanapa and other faculty members visited TMDU in order to exchange opinions with TMDU faculty members. Both universities conducted surveys to investigate possible candidates' degrees of interest in the program. The results revealed high expectations both in Thailand and Japan. After MEXT approves the establishment of the JDP, a signing ceremony for the program agreement between TMDU and MU is planned to be held in Bangkok in August 2019 with TMDU President Yoshizawa in attendance.

Prof.Tanabe and Prof.Taga introduced the latest research activities of TMDU

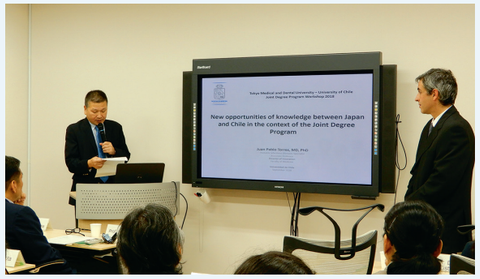
Dean Prasit Watanapa and three faculty members visited TMDU in August 2018

Joint Degree Program (JDP) in Medicine between University of Chile and TMDU

THREE YEARS AGO in April 2016, TMDU started a JDP course in medicine with the University of Chile (UCh), which was established in 1842 and is one of the most historic and renowned universities in Latin America, in academic collaboration with Clinica Las Condes. This program is designed to provide medical experiences and opportunities for investigation in each country, and to develop doctors with global leadership perspectives. JDP students participate in collaborative research work in Japan and Chile, and consequently achieve a Ph.D. degree accredited by both TMDU and UCh, as a "joint degree." The students can earn not only an international diploma, but also medical specialties in Upper Digestive Surgery, Colorectal Surgery or Gastroenterology. From 2016 to 2018, two students from TMDU and two from UCh were enrolled in all three courses and supervisors from both universities support the students at all times. The committee members of JDP from TMDU and UCh meet frequently to have face-to-face meetings on improving the program, in addition to monthly teleconferences. In September, TMDU and UCh professors gathered at the Joint Degree Program Workshop 2018 at TMDU. Experts from both universities gave wonderful presentations on each field, followed by meaningful discussions with the participants.

Dr. Matsumiya (JDP student) and CLC laboratory staff

Meeting between TMDU and UCh professors

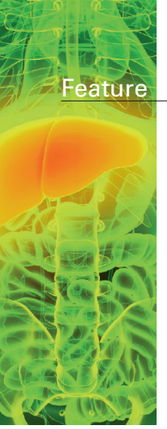


Joint Workshop 2018 at TMDU

Faculty of Dentistry

ON OCT 5, 2018, TMDU and the Faculty of Dentistry, Mahidol University (MU) concluded an MOU with the intention of establishing a Joint Degree Program to develop their cooperative relationship in research and education. This new program will be designed for enthusiastic dental scientists who are eager to obtain a doctoral degree. Faculty members from each university will exchange further ideas for the program moving forward.

Dr. Pisol Senawongse, Faculty of Dentistry, Mahidol University and TMDU faculty members in May 2018



Taking the Next Step from Regeneration to Neogenesis

Organ and Tissue Neogenesis Consortium Launched

In September 2017, based on the key concept of "taking the next step from regeneration to neogenesis," TMDU established the Organ and Tissue Neogenesis Consortium consisting of nine multidisciplinary units that transcend the boundaries of traditional divisions and labs. Dr. Yasuyuki Yoshizawa, TMDU President, and Dr. Mamoru Watanabe, Executive Director and Executive Vice President responsible for Innovative Research and Collaboration, explained the background to the establishment of the consortium. Further, the unit leaders discussed how they intend to cultivate regenerative medicine, a field in which TMDU excels, in order to create a new paradigm of "organ and tissue neogenesis."

Consortium established

Reinforcing TMDU's strengths symbolized by the five petals of a plum blossom

Yoshizawa: TMDU's predecessor, Tokyo National School of Dentistry, was established in 1928. The school was later renamed Tokyo Medical and Dental College, and then finally, in 1951, it was reorganized as Tokyo Medical and Dental University under Japan's new educational system. At that time three organizations were established, the Faculty of Medicine and the Faculty of Dentistry, the Research Institute for Dental Materials, which was the predecessor of the present-day Institute of Biomaterials and Bioengineering. Two more followed, the College of Liberal Arts and Sciences in 1965 and the Medical Research Institute in 1973. These five organizations are symbolized by the five petals of a plum blossom (TMDU's official symbol), representing each organization's concerted efforts to heal people, thereby enabling their lives to blossom. Now, after a long history of informal collaboration between these five organizations, the university has decided to create an overarching system to more effectively coordinate their respective strengths.

My first task upon becoming TMDU President was to implement an academic field-based system. Since TMDU is a relatively small medical university, we have combined those elements of education, research, and clinical practice to reinforce effective and ideal cooperation among all five organizations. The consortium takes this a step further. We have established the Institute of Research, led by Dr. Mamoru Watanabe, Executive Vice President of Innovative Research and Collaboration, and Dr. Akinori Kimura, Executive Senior Vice President of Research, Accreditation and Evaluation, to strengthen the research capabilities of TMDU as a whole.

Research fields in which TMDU excels include regenerative medicine, intractable immune diseases, and genomic medicine. We will promote multidisciplinary research by leveraging the strengths of each field. Our first initiative is in the field of "organ and tissue neogenesis." Although this is usually considered a facet of regenerative medicine, we call it "organ and tissue neogensis" to express our ambition to pioneer a new academic field that transcends regenerative medicine. This was the context in which we established the Organ and Tissue Neogenesis Consortium.

Yasuyuki Yoshizawa
President
TMDU

Mamoru Watanabe
Executive Director and Executive Vice President
Innovative Research and Collaboration

Watanabe: Let me discuss the Organ and Tissue Neogenesis Consortium. The consortium has three characteristics. Firstly, the research targets: Conventionally, regenerative medicine focuses on organs that do not regenerate once destroyed, such as the heart and the nervous system. In contrast, TMDU has conducted numerous research projects targeting organs with high regenerative capacity, such as the intestines, the liver, and the hair roots. Our concept of "taking the next step from regeneration to neogensis" envisions the creation of organs, taking regenerative medicine a step further. Secondly, the research methodology: Whereas regenerative medicine typically uses cell sheets or separated cells, we also tackle the creation of organs. We are working to realize "organoid medicine" through production of three-dimensional miniaturized organs. Thirdly, an emphasis on fostering next-generation researchers in an effort to pioneer a new discipline: We have invited young researchers working overseas to return to TMDU to take on leading roles in the consortium. They include Professor Takanori Takebe from Cincinnati Children's Hospital Medical Center and Assistant Professor Shiro Yui from the University of Copenhagen.

Characteristics of the units

From basic to clinical research with a view to organ production

Yoshizawa: Now I would like to address some questions to the leaders of the units. Professor Ichiya Sekiya of the Center for Stem Cell and Regenerative Medicine is spearheading TMDU's research into regenerative medicine. How do you propose to take the next step from regeneration to neogenesis?

Sekiya: I first used cells for treatment of cartilage in 2008. At that time, al-

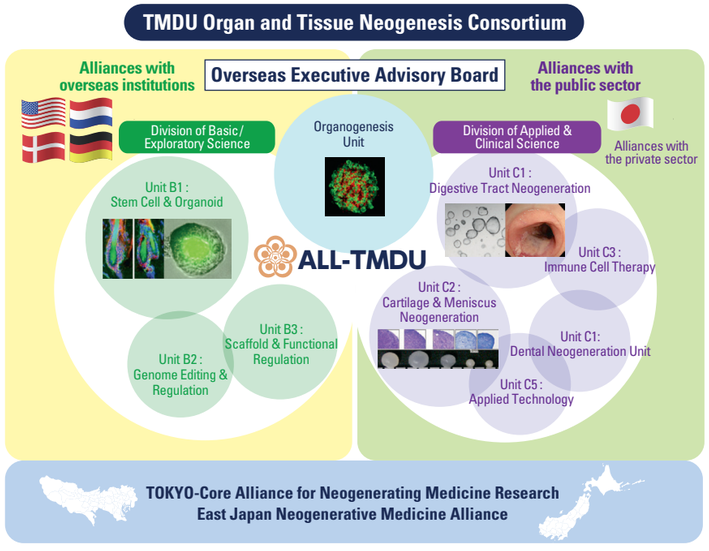
though there were guidelines for treatment using human stem cells, safety criteria were vague and so we had to inch our way forward. But the clinical application of iPS cells and their transplantation to patients was a watershed. There has subsequently been further progress and the transplantation of iPS cells manipulated in various ways in advance is already underway.

Our innovative concept of "organ and tissue neogenesis" has an important bearing on the future of regenerative medicine and it is significant that TMDU is a pioneer. We aim to develop a new treatment for knee osteoarthritis involving simultaneous regeneration of joint cartilage and the meniscus.

Yui: I moved from the University of Copenhagen to TMDU in October 2017. I had studied gastroenterology at TMDU graduate school where I was involved in development of unique intestinal epithelial cells cultured using collagen fibers, which are known as "TMDU cells." As a result of their transplantation into mice, we found that they can be used for treatment of intestinal inflammation.

As TMDU cells can serve as a model for inflamed intestinal epithelium, I think they will also be useful for development of new markers specific to such diseases as ulcerative colitis. By pioneering the application of TMDU cells to other organs and cancer cells, I want to enhance their versatility, expanding their application field to include various diseases and organs, and use them for personalized medicine, thus maximizing the utility of TMDU cells. Although TMDU is highly regarded overseas, awareness of TMDU cells is still low. TMDU should publicize the attributes of these eponymous cells that it has developed.

Nishimura: Our lab has been doing research on hair follicle stem cells and melanocyte stem cells. The objectives are to prevent loss of stem cells due to aging or disease, and furthermore to prevent loss of mini-organs or organ dysfunction by preserving remaining tissue stem cells and then increasing their number. This is the research approach promoted by the Stem Cell & Organoid Unit. For example, niche cells are known to play an important role in stem cell maintenance and self-renewal, but as one ages, the number of molecules maintaining stem cells decreases or stem cells themselves are lost. This mechanism has become clearer and we are trying to develop a method of controlling cells by utilizing it.



The Organ and Tissue Neogenesis Consortium consists of nine research units. In addition to promoting collaborative research involving individual units, multiple units, and other participating research institutions and companies, the consortium is also expected to foster the development of talented personnel who will play an active role internationally.

Professor
Ichiro Sekiya
Unit C2: Cartilage & Meniscus Neogeneration

Okamoto: Our lab is working on the world's first treatment using organoids for intestinal epithelia. The use of organoids is a key objective of this consortium and it is our lab's mission to accomplish this. Through our research we want to demonstrate the effectiveness of organoid medicine and share the technology with researchers not only within the consortium but also around the world. Dr. Yui has already clarified the fundamental technology in the basic research he mentioned earlier. On the assumption that the research outcomes will be applied in the treatment of patients, we are accumulating cell technology to enhance safety and effectiveness.

Watanabe: Dr. Sekiya and Dr. Nishimura bring both clinical and research experience to this work. With regard to intestinal epithelium cells, basic research by Dr. Yui and clinical studies by Dr. Okamoto are connected seamlessly, constituting a vital strength of TMDU.

Takebe: I used to be very clinically oriented. In fact, my original ambition was to become a surgeon and I was considering studying transplantation therapy in the U.S. Although I am pursuing basic research, what motivates me to continue this work is my determination to achieve results within 10 years that can lead to the saving of even a single patient. Otherwise, I may quit. Having set myself milestones, one every three years, I am advancing step by step. Some six years have passed since I started this research. The next three to four years will be devoted to research that benefits the prognosis of patients based on the outcomes of the basic research done so far. The "neogenesis" concept fits my research perfectly.

The current mainstream approach in medical research follows a reductive path from organs to cells and molecules. In contrast, our approach is "reverse reductionism." In the case of the liver, by paying attention to those factors, besides hepatocytes, that enable the liver to function while also taking cells that play supportive roles into consideration, we have been doing research that augments our understanding of the organ. In this consortium, we are taking our research to a higher level by envisioning simultaneous regeneration of multiple organs, including the bile ducts, the pancreas, and tubular organs such as the duodenum, all of which are intimately related to the functions of the liver.

Fortunately, TMDU has many excellent intestine researchers conducting research with a view to practical applications. Thanks to the efforts of the doctors here today, we have a good chance of creating a new paradigm. This is a thrilling prospect.

Professor
Takanori Takebe
Organogenesis Unit

Professor
Emi Nishimura
Unit B1: Stem Cell & Organoid

Fostering next-generation reseachers
An environment where young researchers can actively transcend the limits of their disciplines

Watanabe: TMDU is also committed to fostering young researchers. We have established the Next Generation Researchers Development Unit* objective is to nurture highly capable individuals of the caliber of Dr. Takebe and Dr. Yui by providing research funding to selected young researchers.

Takebe: From the perspective of young researchers benefiting from this research funding, communication plays a vital role in helping them develop their capabilities. Also essential for young researchers are opportunities for discussion that transcend the conventional limits of departments, divisions, or specialties. I recently had an opportunity to discuss matters of mutual interest with Dr. Okamoto. It would certainly be desirable to create mechanisms encouraging labs in related fields to engage in fruitful cooperation, for example, by setting up a reading circle for researchers from different labs. In fact, this consortium is triggering such initiatives. As a young researcher, I am eager to participate and contribute to their success.

Yui: I also think it is vital to cultivate an environment where many people can be involved in one's research. Young researchers need to publicize their research themes in Japan and overseas in order to secure funding. In regard to TMDU cells, we need to communicate the value of our research far and wide so as to broaden their application field to include more diseases and organs rather than only focusing on a single disease. So the recent symposium on neogenerative medicine was a welcome opportunity.

Yoshizawa: In addition to supporting young researchers, research funding is also necessary for mid-career researchers within the framework of research expenditure. Young researchers who are receiving substantial funding are expected to rapidly establish their career trajectories.

Okamoto: I agree. But TMDU's labs have become invigorated and are yielding good results, not least because of the participation of Dr. Takebe and Dr. Yui as well as excellent graduate students. While mid-career researchers should make efforts to secure funding, I

*provisional name

am also convinced of the need to communicate the attractiveness of research to undergraduate students and high-school students, who will be the next generation of researchers.

Watanabe: This consortium is also promoting industry-academia-government collaboration with a particular emphasis on collaboration with industry. Dr. Sekiya has been working with the private sector and we welcome his advice.

Industry-academia-government collaboration

Systematic support for industry-academia-government collaboration so researchers can concentrate on research

Sekiya: In recent years when applying for funding from the Japan Agency for Medical Research and Development (AMED), AMED requires that TMDU and the private-sector partner submit a joint research agreement clarifying the exit strategy. To ensure research outcomes are useful in practice, over and above doing excellent research and presenting great papers, it is necessary to target medicine that will be beneficial and practical with a an eye to future inclusion in insurance coverage and commercialization. Although researchers previously tended to accumulate know-how while working alone, nowadays the know-how needs to be shared to secure substantial research funding because practical application of research outcomes is required. With this in mind, TMDU has already held two seminars in which Dr. Tetsuro Watabe and I discussed how best to set about securing sufficient research funding. We spoke about all the difficulties we had encountered and how we dealt with them. I would like other researchers to learn from our experience.

Yoshizawa: Recognizing that the university should systematically support researchers, TMDU is establishing a system for that purpose. No doubt you have encountered difficulties in pursuing your research but the Open Innovation Institute will take care of miscellaneous tasks from now on.

Professor
Ryuichi Okamoto
Unit C1: Digestive Tract Neogeneration

Assistant Professor
Shiro Yui
Unit C1: Digestive Tract Neogeneration

Nishimura: Hair was not originally a particular interest of mine. Having suffered from atopic dermatitis as a child, I wanted to understand the mechanism of that disease and eventually became a dermatologist. In clinical practice, I came to recognize various issues and social needs. While searching for stem cells and endeavoring to elucidate their mechanism, I gravitated to my research theme, namely, graying hair and hair loss, which obviously could lead to commercial opportunities.

Yoshizawa: To date, collaboration with companies has largely been driven by individual researchers' personal connections. I want to make the open innovation system function officially and effectively to facilitate collaboration between the university and companies.

Watanabe: This consortium not only views collaboration as taking place within TMDU only but also emphasizes creating alliances with AMED and the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Health, Labour and Welfare, and other governmental organizations. The field of neogenerative medicine and regenerative medicine is complicated, involving numerous technologies. Therefore within the open innovation system we have established an affiliate program that a company can join for a modest fee. Our objective is to tell the world about TMDU. We are also considering alliances with overseas institutions and also alliances with organizations nearby in Tokyo or East Japan. Starting with organ and tissue neogenesis, our initiative will expand its scope to include genomic medicine and intractable immune diseases.

Yoshizawa: I agree with you. It is often said that TMDU's considerable brand power is largely untapped and consequently our strengths have not gained the appropriate recognition they deserve. By launching this consortium and enhancing our organizational power so that we can compete effectively in the academic field, I believe TMDU's capabilities as a formidable contender on the global stage will be communicated. I greatly appreciate your cooperation in these endeavors.

Organ and Tissue Neogenesis Consortium Unit introduction

"Organ and Tissue Neogenesis Consortium" established in September 2017 consists of nine research units focusing on the research field that Tokyo Medical and Dental University has advantages. From re-generative medicine to neo-generative medicine, introduce what each unit aims and research contents.

Organogenesis Unit 1

Create organoids from human stem cells towards transplantation therapy and drug discovery

Professor Takanori Takebe
Cluster of Advanced Multidisciplinary Research, Institute of Research

Stem cell & Organoid Unit 2

Contributing to the realization of health and longevity by controlling stem cells to elucidate the aging and regeneration of organs

Professor Emi Nishimura
Department of Stem Cell Biology, Medical Research Institute

Digestive Tract Neogeneration Unit 3

Preserving the health of the whole body through the creation of digestive organs, such as intestinal epithelial organoids

Professor Ryuichi Okamoto
Center for Stem Cell and Regenerative Medicine, Institute of Research

Genome Editing & Regulation Unit 4

Creating disease models using genome editing technology, and developing mRNA drugs

Professor Fumitoshi Ishino
Department of Epigenetics, Medical Research Institute

Cartilage & Meniscus Neogeneration Unit 5

Developing new therapies, such as the regeneration of cartilage and meniscus using stem cells

Professor Ichiro Sekiya
Center for Stem Cell and Regenerative Medicine, Institute of Research

Scaffold & Functional Regulation Unit 6

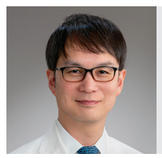
Assisting the field of organ and tissue neogenesis with unprecedented biomaterials

Professor Akio Kishida
Department of Material-Based Medical Engineering, Institute of Biomaterials and Bioengineering

Immune Cell Therapy Unit 7

Developing immune cell therapies and strengthening and creating immune functions, such as the controlling of organ engraftment

Professor Tomohiro Morio
Department of Pediatrics and Developmental Biology, Graduate School of Medical and Dental Sciences



Dental Neogeneration Unit 8

Hard and soft tissue regeneration with stem cell and cell sheet technology

Professor Takanori Iwata
Department of Periodontology, Graduate School of Medical and Dental Sciences

Applied Technology Unit 9

Ensuring microbial safety in regenerative medicine, and developing comprehensive and rapid microbial testing systems

Associate Professor Norio Shimizu
Center for Stem Cell and Regenerative Medicine, Institute of Research

Feature

Promoting industry-academia collaboration at the organizational level

Open Innovation Institute

Having been selected by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) for its program to support creation of a framework conducive to open innovation, TMDU established the Open Innovation Institute on December 1, 2018. TMDU has traditionally viewed industry-academia collaboration as part of its mission and several large-scale projects are already underway. The institute is developing a system for fostering innovation through a continuous stream of such projects. TMDU President Yasuyuki Yoshizawa, Open Innovation Institute Director Mamoru Watanabe and Open Innovation Institute Acting Directors Akinori Kimura and Kaori Iida discussed their plans and expectations.

Roundtable Discussion:

Prospects for Open Innovation Institute

Kaori Iida
Acting Director,
Open Innovation Institute
Professor, Director of Research
Center for Industry Alliances

Mamoru Watanabe
Director,
Open Innovation Institute
Executive Director / Executive
Vice President of Innovative
Research and Collaboration

Yasuyuki Yoshizawa
President, TMDU

Akinori Kimura
Acting Director,
Open Innovation Institute
Executive Senior Vice President
of Research, Accreditation and
Evaluation

New base for collaboration capitalizing on track record of industry-academia collaboration

Yoshizawa: The open innovation that we envision is not just about collaboration in the short term in order to create a new product. It also encompasses a more fundamental and new approach, including the creation of new academic areas of research. What we anticipate is a virtuous cycle that allows us to break down the barriers between academia and companies to engage together in basic research; establish joint projects to commercialize once we have reached a certain stage; and, finally, re-invest some of the commercial profits back into basic research. The organization designed to realize these goals is the Open Innovation Institute. I believe this initiative will accelerate the pace of cooperation between academia and industry while also transforming how researchers understand their role in society.

Watanabe: I would like to comment on MEXT's open innovation program for which TMDU was selected. The program was conceived to help achieve the Japanese government's goal of tripling the funds invested by industry in academic and other research by 2025—in the process boosting this figure above the OECD average—as part of the National Revitalization Strategy 2016. It recognizes the need to set up a system for promoting co-creation that involves full-scale collaboration between industry, academia and the public sector, based on open innovation within and across borders. Spe-

Promoting industry-academia collaboration at the organizational level

cifically, the program requires universities to recruit people from the private sector who have the requisite management and R&D experience to help build the system. Nineteen universities across Japan applied to be part of the program, of which eight were selected. The fact that TMDU was chosen to take part in the program as a specialist tertiary institution is a positive reflection on the reputation we have gained for stimulating innovation in medical fields.

Yoshizawa: Since my appointment as TMDU president, we have been working to develop a broad framework for industry-academia collaboration, not at the level of individuals, but at the organizational and systemic level. This initiative aims to accelerate the process.

Watanabe: One of the reasons why TMDU was selected for the MEXT program was our excellent track record in realizing large-scale collaboration with companies such as Sony, Hitachi and Yamaha.

Matching IP seeds with industry needs to create new projects

Watanabe: One of the aims of the Open Innovation Institute is to unify all the intellectual property of TMDU so we can make use of it based on thorough analysis. Making this happen will be the Creative Management Team, a core unit of the institute.

Iida: We need experts from industry with experience in project management and corporate development in order to promote large-scale industry-academia collaboration at the organizational level. We have recruited experienced people from diverse industries to work as the Institute's Creative Manager and its Creative Associates—talented professionals who have executive-level experience at a pharmaceutical company and who have experience in corporate planning at a major electronics manufacturer. Such expertise, rare at TMDU in the past, will be indispensable to achieving university goals in the future.

The primary task of such experts is to identify IP seeds at TMDU, create wide-ranging opportunities collaboration research opportunities with industry, and help the university find ways to scale up projects into comprehensive research agendas that contribute to industry and society beyond the university.

Kimura: I am mainly responsible for managing the research side of identifying IP seeds. TMDU is blessed with many excellent researchers who generate a lot of great ideas. The issue, however, is that individual researchers often do not have the resources to act on those ideas.

The Institute is interviewing TMDU researchers in every field so that we can ensure that all promising research is incorporated into the framework of industry- academia collaboration. Having already interviewed about half of our researchers, we know that many of them are engaged in research of exceptional importance.

Yoshizawa: Universities are in a position to provide essential support to conventional joint research projects by individual researchers and private companies to ensure medically and socially comprehensive outcomes. For example, through closer collaboration at the organization level the Institute can help individual researchers speed up the pace of research; further, it can help private companies incorporate a more comprehensive medical ethos and broader social aims into their business strategies.

Iida: Companies are eager to gain access to the frontlines of medicine at our university. Under our system of collaboration based on open innovation, we are granting companies access to those frontlines, including medicine and surgery, which will uncover new cutting-edge medical problems and create new themes for joint research that focus on medical needs and related issues.

Kimura: My view is that we need to manage research from the early stages where patents and other types of IP are being created. Managing the research process can yield greater results.

TMDU's remuneration system for researchers determines salary and bonuses based on the previous year's performance. Yet it is difficult to create significant results after only one year of IP-generating research. That is why we plan to start evaluating research not only based on the results, but also by assessing the research process over several years.

Another aim is to upgrade conditions for research from various perspectives, such as through the allocation of specialized research facilities based on the nature of the research and the equipment required.

Expected to expand into non-medical fields

Watanabe: As part of the driving force in the open innovation of TMDU, we have specifically designated five areas of medicine, regenerative medicine, genomic medicine, medical equipment, and non-medicine. We think the area of non-medicine is one with significant potential. We are looking forward to building relationships with small and medium-size companies interested in entering the medical field.

Iida: Until now, the main reason for university-industry collaboration was to sponsor research conference presentations and papers. Going forward, the Institute's Creative Manager will facilitate marketing of TMDU's research and IP assets on the basis of future projects.

Kimura: Awareness among researchers is also likely to change as a result. Research that is driven by short-term profits seldom works well. Research is more likely to be of ultimate benefit to society if the aim is to create something useful, even if it is unclear what the project might produce within a short span.

Iida: The Open Innovation Institute will have all the information on industry-academia collaboration. We want companies to make full use of the wide variety of research, skill, knowledge, experience and network that TMDU has to offer. We intend to create a framework so that we can collaborate with companies on an "all TMDU" basis. To move toward this goal, the Open Innovation Institute also facilitates interdisciplinary collaboration among researchers throughout TMDU.

Watanabe: The strength of TMDU is that industry-academia collaboration can be directly linked to the university's management. Indeed, the Open Innovation Institute reports directly to the President. So we are in an excellent position to offer support that propels outstanding research to an even higher level of excellence.

Yoshizawa: Going forward, I hope to see industry-academia collaboration lead to startups supported by the Open Innovation Institute. The idea is to systematize this process. Thank you for all that you are doing to make this happen.

Growing TMDU Network in Latin American Countries: Academic, Educational and Clinical Collaborations

Latin American Collaborative Research Center,
Tokyo Medical and Dental University, Santiago, Chile

Masanobu Kitagawa
MD, PhD
Professor, Comprehensive Pathology, TMDU
Director of Satellite Office in Chile

Hiroyuki Uetake
MD, PhD
Professor, Specialized Surgeries, TMDU

Takuya Okada
MD, PhD
Junior Associate Professor, Gastrointestinal Surgery, TMDU

Tomoyuki Odagaki
MD, Assistant Professor, Latin American Collaborative Research Center in Chile, TMDU

IN 1968, PROFESSOR Tadashige Murakami, former professor of surgery of TMDU, visited Chile to give a lecture on gastric cancer. This was the start of a long relationship between TMDU and Chile. In the 1970s, the Japan International Cooperation Agency (JICA) launched a project for the early detection of gastric cancers in order to reduce their high mortality rate. The Gastric Cancer Center in Santiago was founded in 1977 at the Hospital Paula Jaraquemada (now the Hospital Clinico San Borja Arriaran), and this center has long played a major role in the project. TMDU has dispatched numerous experts there to support the prevention of gastric cancer. The Gastric Cancer Center was later renamed the Chilean-Japanese Institute for Digestive Diseases, and it still contributes to maintaining the health of the Chilean people.

Colorectal Cancer Screening in Chile, Supported by TMDU

In Chile, mortality from colorectal cancer has been increasing in the last two decades, and thus the need for colorectal cancer screening has grown rapidly. Approval was given in 2009 to start a screening project based on a proposal from Dr. Lopez of Clinica Las Condes (CLC), one of the biggest and most advanced hospitals in Chile. Due to the long history between TMDU and Chile, TMDU was invited to supervise the project. In 2009, the Ministry of Health of Chile, CLC and TMDU signed a collaborative agreement concerning colorectal cancer screening, and the Latin American Collaborative Research Center (LACRC) was established at CLC in 2010. Over the years, TMDU has continuously sent experts in pathology, endoscopy and research to LACRC. Since 2012, PRENEC (the Prevention Project for Neoplasia of Colon and Rectum) has been implemented, using the Japanese method, which includes an immunological fecal occult blood test and colonoscopy.

1 Dr. Yasuno performing a surgical procedure

The Chilean-Japanese Institute for Digestive Diseases at the Hospital San Borja Arriaran is the main facility for PRENEC in Santiago. The institute also serves as a training center for endoscopy. Many Chilean doctors have taken a training course in endoscopy, acquiring the skills required for cancer screening. The institute's endoscopy unit has been redesigned for PRENEC, with extensive support from the Japanese Embassy in Chile.

In December 2017, TMDU's ex-president Takashi Ohyama received the Order of Bernardo O'Higgins from the Government of Chile in appreciation of TMDU's contributions in Chile.

LACRC Members and University Activities

LACRC has been staffed by experts from the pathology, endoscopy and molecular biology divisions of TMDU. As of 2010, LACRC has been operated by nine TMDU doctors: Dr. Takashi Ito (April 2010 to March 2012) and Dr. Hiroshi Kawachi (March 2012 to March 2015) as pathologists, Dr. Hiroyuki Uetake (July and August 2010), Dr. Tetsuro Nishikage (January 2011 to January 2012), Dr. Koji Tanaka (January 2012 to April 2013), Dr. Takuya Okada (April 2013 to March 2015), Dr. Masahiro Tsubaki (October 2014 to September 2015) and Dr. Tomoyuki Odagaki (November 2014 to present) as endoscopists and Dr. Maki Kobayashi as a molecular biologist (July 2012 to March 2015). In November 2017 and August 2018, Dr. Masamichi Yasuno visited Chile to supervise colorectal surgery conducted by local surgeons (Fig. 1).

LACRC is currently operated at TMDU headquarters by Prof. Tetsuya Taga (Executive Senior Vice President), Prof. Masanobu Kitagawa (Principal Deputy Director of Faculty of Medicine, Department of Comprehensive Pathology), Prof. Uetake (Department of Specialized Surgeries) and other staff members. In order to inspect LACRC's activities, Prof. Taga visited Chile in July 2018 (Fig. 2).

2 Dr. Chomali (the director of CLC), Prof. Taga, Dr. Mañalich (the CEO of CLC) and Dr. Lopez (the chief of PRENEC)
3 Dr. Odagaki performing an endoscopic procedure
4 Prof. Eishi giving a presentation at Endosur

In Chile, Dr. Odagaki is the present chief of LACRC, and he is engaged in PRENEC as an instructor of colonoscopy to Chilean doctors. His prominent techniques, including endoscopic resection for superficial cancer, have been in great demand. Many patients are referred to him not only from Santiago, but also from other parts of Chile (Fig. 3). Dr. Odagaki is also a supervisor in the stomach cancer screening project conducted by the Chilean Endoscopic Society.

TMDU operates the Project Semester Program, appointing medical students to institutions overseas. In 2018, two medical students from TMDU were sent to laboratories at the University of Chile, and they conducted advanced research in collaboration with local doctors.

Public Release of PRENEC Results in Medical Journals and Congresses

The colorectal cancer screening system of PRENEC has achieved excellent results, detecting many cancer cases. Owing to the experts from TMDU, the completion rate of the screening procedure and the detection rate of colorectal cancer have improved remarkably. Furthermore, most of the cancers detected by PRENEC were early intramucosal cancers without risk of metastasis, and these lesions were treated successfully by endoscopy. These results have been reported in various medical journals by past doctors. More reports related to PRENEC results are in progress for future publication.

In June 2018, Dr. Odagaki made a presentation on the PRENEC colonoscopy training system at an international congress (Digestive Disease Week in Washington DC).

In August 2018, Endosur, an international symposium on digestive disease, was held in Santiago. Prof. Yoshinobu Eishi (Department of Human Pathology) and Dr. Yasuno from TMDU and Dr. Odagaki from LACRC participated in this symposium and gave presentations (Fig. 4).

Expanding TMDU-PRENEC Network in Latin America

PRENEC and supporting activities by TMDU are now recognized as essential aspects of Chilean healthcare. Increasing numbers of participants have enrolled in PRENEC in six major cities: Santiago, Valparaiso, Punta Arenas, Coquimbo, Osorno and Valdivia. While the TMDU-PRENEC network is still spreading throughout the country, additional cities and facilities have concluded agreements to join PRENEC in the near future.

TMDU has also promoted the same screening system in other Latin American counties, in association with JICA and the International Cooperation Agency of Chile (AGCI). In August 2015, the First International Training Course for Colorectal Cancer Screening took place in Santiago. TMDU experts participated in the course as instructors and gave lectures to doctors from Ecuador and Colombia. In 2016 and 2017, the same training course was held in Santiago for medical professionals from Bolivia, Paraguay and Peru. In Paraguay, the PRENEC pilot study has finished and preparation for PRENEC's full-scale launch is underway (Fig. 5).

5 A symposium related to PRENEC in Paraguay

Activities for Strengthening Relationships between TMDU and Thai Universities

CU-TMDU Research and Education Collaboration Center, Thailand

Yoko Kawaguchi
DDS, PhD
Professor, Oral Health Promotion, TMDU,
Director of Satellite Office in Thailand

Student Exchange Programs between TMDU and Thai Universities

In 2018, fruitful active student exchange programs were conducted between TMDU and Thai universities. Table 1 shows the number of inbound and outbound students in each affiliation. A total of 42 Thai students came to TMDU and 40 TMDU students visited Thailand for short-term exchange programs or research projects. Table 2 shows the number of Thai students, most of them post-graduates, who have studied under the official TMDU curriculum during the 20 years between 1998 and 2018. After graduation from TMDU, they have been contributing to the expansion of healthcare field networks.

International Faculty Development Course

International Faculty Development Course (IFDC) was established in 2016 with the purpose of introducing TMDU's expertise in dentistry to other countries. Since conception, it has been expanding and improving its offerings and scope. The dental faculty of TMDU have always set a goal of responding proactively to overseas needs in terms of research, education and service. IFDC, developed and taught by our experienced faculty, welcomes dental healthcare professionals from all over the world.

IFDC 2018 was held from November 27 to December 6, and in a joint discussion with Thai alumni and university faculty, this year's theme was set as "Gerodontology." Many lectures and hands-on sessions were provided to update and improve the skills of participants from Thailand, Indonesia and Myanmar. Ten Thai dental professionals (university faculty) with various specialties joined this program. TMDU has a long history of actively supporting student exchanges, and this course also promotes positive exchange between faculty and dental professionals.

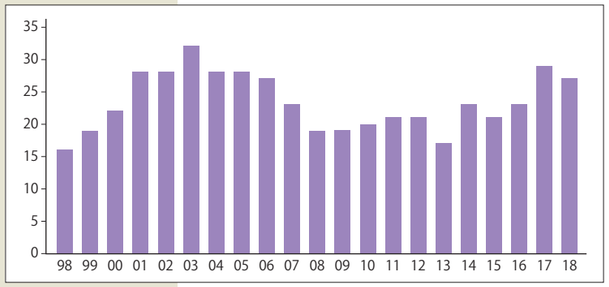
In accordance with the theme, this course covered various topics pertinent to aging or aged societies. For example, the lecture "The current stream of implant overdenture" gave a perspective on the use of new implant overdenture (IOD) (1-IOD and mini implant overdenture) as another option to the standard IOD for edentulous jaws. Also, the lecture and hands-on session "Composite resin restoration for tooth wear" covered the power of direct composite restorations, followed by discussion about its potential for severe tooth wear from clinical and scientific perspectives. The lecture and hands-on session on periodontology detailed updated regenerative therapy using various biomaterials and minimally invasive modalities through the use of advanced periodontitis cases.

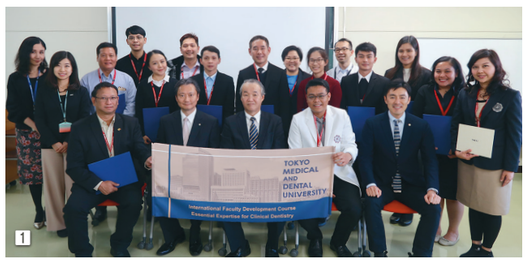
In addition to the above line-up, the topics of "management of patients with systemic diseases for dental treatment," "implantology," "dysphagia," and more were also covered, along with a dental materials company tour and a TMDU dental hospital observation experience. Needless to say, as an educational institution, we felt the need to introduce the educational possibilities of ICT through "simultaneous broadcasting," a new type of live lecture that broadcasted the clinical scene of border molding to the classroom. Through this technology, an entire classroom can easily observe the clinical situation and ask questions during a procedure, which reduces crowding in a clinical setting. We received wonderful feedback from participants and were honored to have a new group of doctors complete the IFDC course.

Table1 Number of exchange students between TMDU and Thai universities in 2018

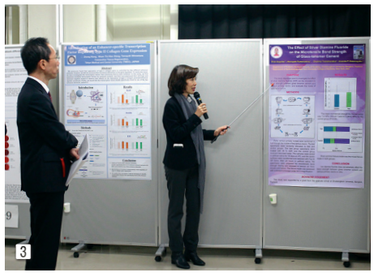
	Inbound	Outbound
Faculty of Medicine	13	23
Faculty of Dentistry	15	15
Graduate School of Medical and Dental Sciences	0	2
Institute of Biomaterials and Bioengineering	14	0
Total	42	40

Table2 Number of Thai students in TMDU (1998-2018)





1 Participants of IFDC 2018 with TMDU faculty



2 Hands-on session at IFDC 2018
3 Poster session at the Tri-University Consortium
4 Prof. Tetsuya Taga (left) and Dr. Atiphan Pimkhaokham (right)

Then, the latest research results of each university were introduced. From TMDU, Professors Shibata and Ono gave lectures entitled "Structural features of developing mandibular condylar cartilage" and "Do you always need the golden axe? The temporary anchorage device and an alternative." There were also oral presentation sessions in the morning.

In the afternoon, a visit to the GC Corporate Center laboratory was offered with the support of the GC Corporation. The participants observed and learned the current development of Japanese dental materials and equipment. The company's initiative for dysphagia rehabilitation was also introduced.

A poster presentation session was conducted in the evening, which was a joint program with the annual meeting of the Stomatology Society of Japan. Twenty posters were presented by members of the Tri-universities. The consortium successfully concluded through wonderful collaboration of all participants of the Tri-universities and many TMDU staff.

After the poster presentation session, all participants enjoyed a joint banquet of the Tri-University Consortium and the Stomatology Society of Japan. Here, guests from CU and PU deepened their camaraderie with the TMDU participants. Through the Tri-University Consortium, the relationships of all three participating universities were strengthened. Further inter-university collaboration on research and education is expected.

Tri-University Consortium

The 6th Tri-University Consortium was held on November 30, 2018 at TMDU. This consortium was contracted in 2010 between Chulalongkorn University (CU), Peking University (PU) and TMDU. The first meeting was held in 2011 at CU, with following meetings held every year in rotation. This was the second time TMDU hosted the meeting. Prof. Guo, Dean of the School of Stomatology, PU, and Prof. Poolthong, Dean of Faculty of Dentistry, CU, attended this meeting alongside 19 participants from their respective universities.

The morning session started with keynote presentations by the deans from PU, CU and TMDU. First, TMDU's Prof. Okiji, dean of the Faculty of Dentistry, introduced TMDU's educational system and recent research activities and developments, including an active discussion on cutting-edge research topics and dental education systems for the next generation.

Coordinator of CU-TMDU Center

TMDU re-appointed Dr. Atiphan Pimkhaokham as the coordinator of the CU-TMDU Research and Education Collaboration Center for 2018 and 2019. He is a visiting Associate Professor at TMDU and also an Associate Professor in the Faculty of Dentistry at CU. Prof. Tetsuya Taga, Director of Institute of Global Affairs, presented the certificate to him at TMDU.

Research Partnership between TMDU and the Noguchi Memorial Institute for Medical Research, University of Ghana

Ghana-Tokyo Medical and Dental University Research Collaboration Center

Shiroh Iwanaga
PhD
Professor, Environmental Parasitology, TMDU
Leader of TMDU-AMED/JGRID Project in Ghana

Overview of the TMDU-AMED/J-GRID Project

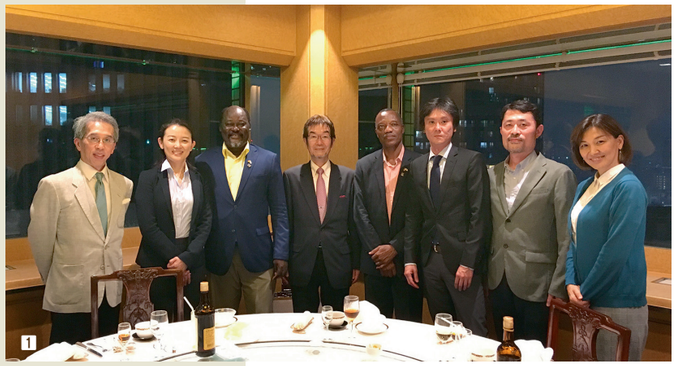
The Japanese Initiative for Global Research Network on Infectious Diseases (J-GRID) program has been carried out between TMDU and the Noguchi Memorial Institute for Medical Research (NMIMR) since 2008. The first and second terms of the J-GRID program, which were supported by the Japanese Ministry of Education, Culture, Sports and Technology (MEXT), were completed at the end of Japanese FY2014. The third term of the project started in FY2015 under the support of the Japan Agency for Medical Research and Development (AMED).

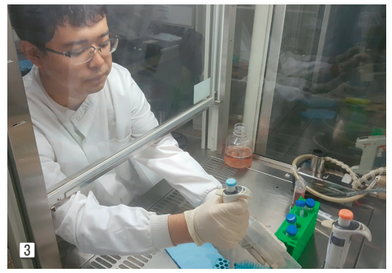
Dr. Mitsuko Ohashi, the TMDU professor associated with the project, was dispatched to Ghana as the team leader in 2015 and has since managed the Ghana-TMDU research collaboration center. Dr. Takaya Hayashi, project lecturer at TMDU, joined the project from FY2017 and started to work with her in Ghana. Currently, ten Japanese and ten Ghanaian researchers participate in the project, cooperating on multiple research projects. The main focus of the AMED/J-GRID project is to promote innovative research collaboration with researcher counterparts for developing new diagnostic methods, finding lead compounds for new drugs and identifying candidates for new vaccines.

Under this concept, the TMDU AMED/J-GRID project conducts the following three research projects: (1) the surveillance and isolation of dengue viruses prevalent in Ghana; (2) the genetic analysis of rotavirus, which is the causative agent of acute diarrhea; and (3) the identification of carbapenem-resistant bacteria. To conduct research more efficiently, TMDU invited Japanese experts from Kitasato University and Nagasaki International University to build an "all-Japan collaboration team." In 2018, we successfully isolated the dengue type 2 virus from Ghanaian patients. Interestingly, this virus possessed the same genotype as the outbreak strain found in Burkina Faso in 2016. This result suggested that the specific virus strain might spread further in Western Africa. Our genetic analysis of the rota virus showed that the vaccine strain disappeared from the field sites after the introduction of the vaccine, but re-emerged in 2018. Similar reemergence of vaccine strains was found in other geographic areas, such as India and Indonesia, suggesting this may be a global trend in the effect of the vaccine on rotavirus. The carbapenem-resistant bacteria was first found in Ghana in 2017 and the NDM-1 gene was then identified as the drug resistance gene within FY2017. The NDM-1 gene was encoded on a large plasmid DNA, the size of which was over 200 kbp. This plasmid was encoded with several drug resistance genes in addition to NDM-1. This is because the carbapenem-resistant bacteria accumulated other drug resistance genes which survived in Ghana, where antibiotics can be misused.

In 2018, a new research building named Noguchi Advanced Research Laboratories began operations. This building has several P3 laboratories and new equipment for infectious disease research. It is expected to accelerate collaborative research between TMDU and NMIMR. To achieve their goals, the Japanese-Ghanaian teams are actively pursuing further research.

1 Vice President T. Taga and TMDU-AMED J-GRID members





2 Noguchi Advanced Research Laboratories
3 A TMDU medical student in the laboratory
4 TMDU medical student working in the field

Important Collaboration between TMDU and NMIMR, University of Ghana, in the Development of Human Resources

Collaboration between TMDU and NMIMR plays an important role in the development of human resources in Japan and Ghana. TMDU implements an educational program for medical students who want to gain experience at medical institutions overseas. Under this program, undergraduate students stay to carry out their research projects for a few months at NMIM. In 2008, NMIMR had one such student. The visiting student worked with young Ghanaian scientists in the laboratory and field. The visit was a good chance for him to observe the medical system and research in a developing country such as Ghana, and will certainly prove useful for his career development. TMDU accepts young, talented researchers as Ph.D. students under the scholarship program supported by MEXT. In 2018, four Ph.D. students from NMIMR entered the doctoral course at TMDU. They joined the parasitology, virology and biochemistry departments of medicine at TMDU and started a "new research life." They are expected to bridge TMDU and NMIMR moving forward, contributing to collaboration between the two institutions. Taking the importance of education of young Japanese and Ghanaian students and researchers into consideration, TMDU has expanded more intensive exchange activities not only with NMIMR, but also with the University of Ghana. President Y. Yoshizawa of TMDU and Vice-Chancellor E. O. Owusu of the University of Ghana signed a MOU of University-level exchange, and a new student exchange arrangement commenced. This University agreement between TMDU and the University of Ghana (including NMIMR) will strengthen the partnership between them even further.

90th Anniversary Symposium of Dr. Hideyo Noguchi's Arrival in Ghana

Dr. Hideyo Noguchi arrived at Ghana in 1927 and tried to identify the causal pathogen of yellow fever. Unfortunately, he died in the same year due to an infection caused by the same disease. When he died, an autopsy document was recorded, but nobody knew where it was stored for a long time. TMDU staff at the Ghana-TMDU collaboration center conducted a search and found it in the archives. The Japanese embassy and the Dr. Hideyo Noguchi Memorial Museum in Fukushima prefecture were informed of this news, and the autopsy record was finally gifted to the museum through the kind support of NMIMR. Because Dr. Noguchi belonged to the Rockefeller Institute for Medical Research when he died, his body was transferred from Ghana to New York and buried there. Thus, there were no historical documents or materials related to his death in Japan, making the autopsy document a valuable record for Japan. A presentation ceremony for the autopsy record was held in June 2018. In addition to TMDU staff in Japan and Ghana, Mr. Himeno, the ambassador of Japan to Ghana and Professor Anang, the director of NMIMR, attended the ceremony. News of the event was reported on television and in newspapers, attracting considerable attention.

5 The autopsy record of Dr. Hideyo Noguchi
6 The presentation ceremony at Dr. Hideyo Noguchi Memorial Museum in Fukushima prefecture

Activity Report of 2018

As one of the Top Global Universities selected by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT), TMDU has been promoting governance system restructuring, comprehensive university-wide curriculum reform, an expansion of international outreach, and creation of next generation professionals for global health promotion. As one of the driving forces of such globalization, AGAT, the Advancement of Global Accessibility Team, has been placed under the Institute of Global Affairs (IGA). AGAT was created by President Yoshizawa and is overseen by the Global Affairs Advancement Steering Committee to help globalize the university. The team consists of faculty members from the IGA and the College of Liberal Arts and Sciences. AGAT's vision is to assist in creating an environment that is global in reach and rich in international quality, attracting diverse, motivated individuals to the university community by broadly increasing the accessibility of university resources and facilities to all international students, foreign faculty, staff, patients and visitors across university campuses and programs.

Tetsuya Taga
Professor, Executive Senior Vice President of Global Affairs
Director, Institute of Global Affairs, TMDU

David Cannell
Associate Professor, Institute of Global Affairs, TMDU

The First "Datathon" in Japan

From February 24-25 2018 TMDU hosted Japan's First-ever datathon,"1st Big Data Machine Learning in Healthcare" on it's yushima campus. Big data in healthcare has come into the global spotlight as one of the strongest research areas that will transform the way healthcare is delivered.

Workshops were structured to provide hands-on learning and acquisition of basic skills with health data analytics. Professor Hidenobu Shigemitsu from TMDU chaired the conference, working with specialists from Massachusetts Institute of Technology, Harvard Medical School, National University of Singapore, Australian New Zealand Intensive Care Society, University of Philippines and across Japan who joined as speakers and facilitators. After the director of the Research Promotion Bureau from the Ministry of Education, Culture, Sports, Science and Technology of Japan gave a welcome message, 150 participants from all around the world engaged in lively discussions during this event, which was a tremendous success.

The datathon program

TMU and TMDU Joint Symposium 2018

TMDU hosted the fourth TMU-TMDU Joint Symposium on March 24th, 2018. The symposium, which has been held regularly since 2013, provides TMU and TMDU with a vital opportunity to deepen their relationship and exchange cutting-edge information and experience regarding medical and dental research.

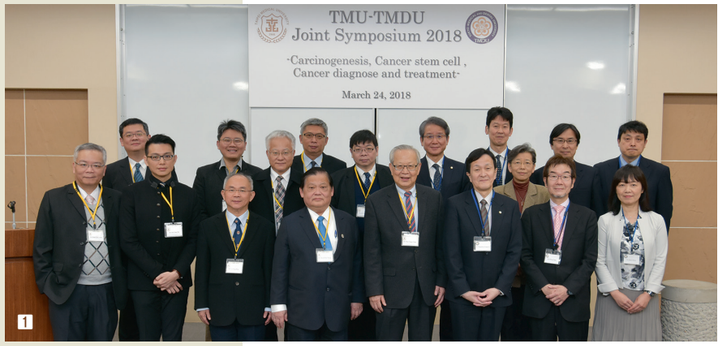
The fourth symposium in 2018 featured research themes of carcinogenesis, cancer stem cells, and cancer diagnosis and treatment. There were twelve TMU and TMDU guest speakers from various cancer research fields, as well as two speakers from each university. Each of the lectures proved to be very interesting, and listeners actively participated in the discussions during the Q&A periods.

1st TMDU-UCSD-USC Joint Symposium

On September 5, 2018, TMDU hosted the 1st TMDU-UCSD-USC Joint Symposium. This symposium was jointly hosted by three universities: TMDU, University of California San Diego (UCSD) and University of Southern California (USC). The first symposium featured the research theme "Frontiers in Liver Research and Global Medicine."

There were nine guest speakers, all well-known researchers in their respective liver research fields. The following professors were invited from the aforementioned universities: Vice Chancellor David Brenner, Health Sciences, UCSD; Assistant Vice Chancellor Mounir Soliman, Health Sciences, UCSD; Associate Prof. Tatiana Kisseleva, Department of Surgery, UCSD; Prof. Hidekazu Tsukamoto, Department of Pathology, USC; Associate Prof. Kinji Asahina, Department of Pathology, USC; and Associate Prof. Keigo Machida, Department of Molecular Microbiology and Immunology, USC. The following professors from TMDU also gave lectures: Prof. Hiroshi Nishina, Department of Developmental and Regenerative Biology, Prof. Shinji Tanaka, Department of Molecular Oncology and Associate Prof. Sei Kakinuma, Department of Liver Disease Control. There were 100 participants altogether, including the speakers from each university. The symposium concluded with closing remarks by Vice Chancellor David Brenner from Health Sciences, UCSD.

1 Guests from TMU and TMDU
2 A lecture by USC Prof. Hidekazu Tsukamoto



Signing Ceremony between TMDU and UCSD

On September 6, 2018, a signing ceremony was conducted at TMDU formalizing an international collaboration between TMDU and UCSD.

During the signing ceremony, President Yasuyuki Yoshizawa, TMDU, and Vice Chancellor David Brenner, Health Sciences, UCSD, signed a memorandum of understanding between the two universities for academic exchange.

We look forward to continuing active exchange between UCSD and TMDU in the future.

3 Signing ceremony between Tokyo Medical and Dental University and University of California San Diego
4 The unveiling ceremony of the memorial sundial

Chinese International Students and Alumni visited TMDU for the 9th TMDU Homecoming Day

On Sunday, October 14, 2018, Chinese international students and alumni attended TMDU's Homecoming Day to commemorate the 90th anniversary of the university's founding.

During its 90-year-long history, numerous students from all over the world have studied medicine and dentistry at TMDU. They have been active in various fields with careers in Japan and around the globe. Since the 1980s, China, the most popular among all the countries, has sent around 770 people to study at TMDU.

Chinese international students and alumni started their own initiative during 2018 on the occasion of the 90th anniversary, and invited about 100 alumni from locations including China, Japan, and the United States to participate in Homecoming Day.

TMDU's President, elective director and supervisors were also previously invited to the reception, and they enjoyed reuniting and reflecting on their memories of past decades. Through substantial donations to the Tokyo Medical and Dental University Fund, a sundial was presented as a memento of the celebration of the 90th anniversary.

A sundial tells the time using the direction of the sun's shadow as it reflects on the surface of the dial. The memorial sundial was placed in TMDU Garden, known as "知と癒しの庭 (*chi to iyashi no* niwa)" in Japanese, as it provides the best exposure to sunlight. There is an inscription on the surface of the sundial plate-words inspiring students to become highly skilled doctors with compassion. The meaning of the inscription closely matches TMDU's mission. "Cultivating Professionals with Knowledge and Humanity." We sincerely hope for everyone's continued success and look forward to seeing everyone again in the near future.

TMDU graduates are active at the forefront of their fields in countries worldwide. Studying abroad helped them deepen their knowledge as healthcare professionals, benefiting both their field and patients around the globe.

Letters from TMDU Overseas Alumni

Letter 01

TMDU and I: A Decade of Experience, Lifelong Lessons

Haslina Rani
Assistant Dean (Teaching & Citra), Centre for Family Oral Health
Faculty of Dentistry, Universiti Kebangsaan Malaysia

MY FIRST ENCOUNTER with TMDU was through Professor Kazuhiro Eto who came to the University of Malaya, Kuala Lumpur, where I was doing my Japanese Universities Preparatory Programme under the Malaysian Look East Policy, to interview students interested in pursuing medicine or dentistry in Japan. My preparatory programme was sponsored by the Malaysian Public Service Department, but the Japanese Ministry of Education, Culture, Sports, Science and Technology sponsored my bachelor's degree. That was more than 20 years ago when I was still a teenager. As if it were yesterday, I remember registering and meeting my classmates, all of whom were Japanese except for a Malaysian boy. It was an intimidating experience.

Before flying to Japan, I thought my Japanese was good as I came first or second in all the Japanese examinations at the University of Malaya. But I learned the hard way. I failed several subjects in my first year at TMDU as I could not understand what was being taught. The Japanese I had learned was not the same as the one being spoken!

But I had many caring friends who helped me pull through dental school. They spent their valuable time teaching me after class, making sure I understood the lessons. Their kindness did not stop there. They always made sure I never felt lonely living so far from home. We had much fun together. We had sleepovers, outings to lots of interesting places and experienced exciting things. They did not care that I looked and dressed differently. They respected my lifestyle and my rather limited choice of food. They stood by me through the six years of dental school and thanks to them, not only did I improve my Japanese and graduate from dental school, but I also passed the Japanese Dental Board License examination. All my lecturers were great too. I was so impressed by their helpfulness and modesty.

These good memories of TMDU, coupled with TMDU's reputation as a leading higher learning institution in dentistry, prompted me to return to do my PhD in Oral Health Promotion under the tutelage of Professor Yoko Kawaguchi, eight years after graduating from dental school. My experiences in graduate school at TMDU were just as important as those gained previously. This time, I was sponsored by the National University of Malaysia (UKM) and the Malaysian Public Service Department.

With the Dean and the head dental therapist of the Faculty of Dentistry, UKM, at one of our community dental projects where we provide consultations and simple treatment to the public for free.

In the Oral Health Promotion Department (OHP), Professor Kawaguchi stressed the importance of doing things together as if we were one big family. We usually had lunch together and discussed everything from clinical matters and research to sharing funny stories. Like any family, not everything was sunshine and rainbows. But all these positive and not so positive experiences help build one's character. They are life lessons money can't buy. Now, back in Malaysia, I appreciate the experience and everything Professor Kawaguchi and OHP taught me. I also wish to extend my sincere appreciation to every beautiful soul who helped me at TMDU. Space constraints mean I can't mention all your names, but please know that I am deeply touched by your kind hospitality.

Three years have passed since I finished my graduate studies. I am a senior lecturer and dental public health specialist at the Centre for Family Oral Health, Faculty of Dentistry, UKM, Kuala Lumpur. I was also appointed the Assistant Dean for Teaching & Citra (Liberal Education) of the Faculty, effective January 2018. At UKM, I'm trying to adopt the good things I learned during my 10 years at TMDU.

I have spent a quarter of my life at TMDU, which will always be my second home after Malaysia. May TMDU continue to flourish and cultivate professionals with knowledge and humanity, thereby contributing to people's wellbeing, not just in Japan but throughout the world.

Letter 02

A Leadership Journey in Public Health: Inspiring Experience at TMDU

Md. Mosiur Rahman
JSPS Post doc fellow
Department of Global Health Entrepreneurship

IN 2005, I earned my Master of Science in Population Science and Human Resource Development from the University of Rajshahi, Bangladesh. I joined the same department in the year 2006 as a lecturer where my main task was to carry out research and teaching. Since Population Science is one of the core methodological disciplines under the umbrella of Public Health research, and being a demographer and academician, I decided to go overseas to seek more advanced education in public health in order to contribute to the health and wellbeing of the Bangladeshi people.

In 2009, I received an offer from the University of Tokyo to study for a Master of Health Science in Community and Global Health for two years under ADB-JSP scholarship. During my study at Tokyo University, I heard about the Public Health Leadership Course, a specially crafted PhD program at TMDU in the Division of Public Health. The flexibility of the program at such a respected institution was a perfect match, and I considered myself privileged to have enrolled, graduating with a PhD in Medical Science. After completing the master's degree, I was accepted as a PhD student in the Department of Global Health Entrepreneurship, TMDU, where I studied from October 2011 to September 2015.

I had an incredible time at TMDU during my 4-year program. The university gave me the opportunity to explore and develop both as an academic and as a person. Even more, the university provided me with the essential skills and knowledge to conduct my own research and gave me opportunities to work and meet with peers from all over the world. During my PhD study, I was shown great support by both faculty and administrative staff working in Global Health Entrepreneurship. It was also enjoyable to participate in and learn from the frequent scientific talks and presentations organized by the department, as well as from visiting scientists from other Japanese and international universities.

While studying at TMDU, I published several research articles in various renowned international journals. I also received the "Bangladesh University Grant Commission Award" from the honorable President of Bangladesh for doing excellent research work. I was lucky enough to be a student of Professor Keiko Nakamura, from whose expertise and critical thinking I learned so much. Her support and the encouragement of my lab colleagues made it possible for me to accomplish this journey.

Upon returning to Bangladesh in 2015, I was promoted as Associate Professor

Receiving UGC gold medal from the honorable president of Bangladesh

in the Department of Population Science and Human Resource Development, University of Rajshahi, Bangladesh. Apart from my main duties at the university, I and several colleagues established a non-profit organization (Bridge of Community Development Foundation) to conduct public health research and related training for capacity development and service activities in Bangladesh.

My relationship with TMDU continues and in 2017 I joined the Department of Global Health Entrepreneurship as a JSPS Postdoc Fellow. Recognizing the impact of socio-economic inequality on uncontrolled diabetes, we are currently conducting a cohort study to identify the perceived barriers in explaining socioeconomic differences in adherence to poor glycemic control in Bangladesh.

To conclude, living in Japan and especially studying at TMDU gave me incredible opportunities to gain knowledge and experience, to network with other students and faculty, who always encouraged me to keep learning about everything. Moreover, the Japanese culture of discipline, spirit and respect greatly shaped my professional and personal habits. I hope all future students at TMDU will awaken to their unlimited potential, as I did.

International students from Asia, Africa, the Middle East, North America, Latin America and just about everywhere else in the world are studying at TMDU. What are they studying? What are their aspirations? International students currently at TMDU report on their life here.

Reports by TMDU Overseas Students

Report 01

A Kaleidoscopic Adventure

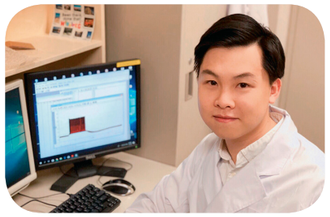
Nguyen Minh Tuan Viet
3rd year graduate student
Department of Systems Neurophysiology(from Vietnam)

AS WELL AS being one of the world's most popular tourist destinations, Japan is an incredible place for scientists and researchers to work. So far, my time in Japan has been a most rewarding and memorable experience for me.

More than 3 years ago, I participated in TMDU's International Summer Program 2015 (ISP 2015) as an undergraduate student. I concluded that TMDU would be an excellent university at which to pursue doctoral research since many researchers are engaged in top-level projects at TMDU in various fields of the medical, dental and related sciences. Moreover, TMDU strongly supports international students and global research. During ISP 2015, I visited TMDU's Systems Neurophysiology Department where Professor Izumi Sugihara, the head of the department, showed me around, introduced laboratory activities and explained the department's main research themes. I became greatly interested in the research at TMDU and decided to join as a PhD student after graduating as a medical doctor from the University of Medicine and Pharmacy (UMP) in Ho Chi Minh City, Vietnam, in 2016.

Afternoon tea with members of the Systems Neurophysiology Department

"The mysteries of the three pounds of matter between our ears," as we fondly refer to the brain, inspired me. To understand the underlying mechanisms of different molecular expressions in the brain, especially the cerebellum, is what fascinates me. By applying that exciting information concerning various molecular expression patterns, I want to investigate and clarify the cerebellum's algorithms that contribute to learning and memory. The experience of doing research has greatly exceeded my expectations because I have had the chance to perform sophisticated electrophysiology in patch clamp experiments,



Viet T. Nguyen-Minh, 3rd year graduate student of Systems Neurophysiology Department at TMDU

gather recorded results, analyze data and discover new findings. I enjoyed every moment spent in the lab with Professor Sugihara, who has been my supervisor, and other extremely helpful and inspiring professors, seniors and colleagues. During the past two years my career has progressed in exciting ways. I have published my first original research in the Frontiers in Cellular Neuroscience journal and presented my research at neuroscience and physiology conferences. In particular, at the 75th Fujihara Seminar, held at TMDU toward the end of 2018, I had an opportunity to listen to, meet and discuss with leading Japanese and foreign cerebellar researchers. This symposium was highly informative and a source of inspiration and new ideas for my current research project.

TMDU is creating a collaborative working environment as well as providing necessary support for international students living in Japan. I was fortunate to join TMDU's intensive Japanese language program. In addition to giving me the opportunity to learn a new language, the course offered insights into Japanese culture, history, and traditions. On the Japanese class's study trip to Hakone, I saw many beautiful sights that I will never forget. Besides time spent at the university, I love exploring Japan and Tokyo, going around the beautiful city, visit charming hidden places and distinctive modern buildings, taking fantastic photos, and tasting delicious Japanese cuisine.

Studying in Japan is an absolutely kaleidoscopic adventure. I have had a wonderful time both academically and in terms of the non-academic aspects. It will surely give me a solid foundation for my subsequent career as a neuroscientist. I would like to express my deepest gratitude to my supervisor for giving me this wonderful opportunity to study for a PhD. at TMDU. I would also like to thank all the people who have supported me, including my seniors and friends, for giving me this special experience.

Report 02

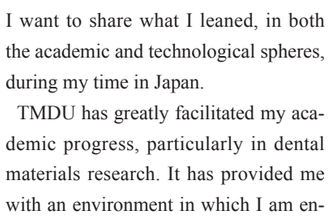
Studying at TMDU through My Eyes

Patcharanun Chaiamornsup
3rd year graduate student
Department of Advanced Biomaterials(from Thailand)

HAVING GRADUATED FROM Naresuan University with a doctor of dental surgery degree, I then specialized in prosthodontics at Chulalongkorn University. During these formative years, I was trained by leading experts in the dental field in Thailand. Coincidentally, most of the dentists who trained me received their doctorates from TMDU. Learning from them inspired me to pursue further studies in dental health at TMDU with a view to eventually improving dental education in Thailand. They explained what it was like to study at TMDU, which is regarded as one of the finest dental universities in the world. I had also noted that most dental materials are manufactured by Japanese companies. Hence, I felt that studying in Japan would be a great opportunity to deepen my knowledge of dental materials and technology. The training, knowledge, and skills gained at TMDU would be beneficial not just for me but also to others interested in the field of dental materials. Further, given the relative proximity of Thailand to Japan, it was practical and ideal to study at TMDU since family members and friends could easily visit me to alleviate any homesickness I might experience.

I am currently studying in the Department of Advanced Biomaterials while also undergoing training in the Department of Oral Biomaterials Development Engineering. In these two departments, I am studying the effects of build condition and angle acuteness on edge reproducibility of dental casting patterns fabricated using digital light production (DLP), which is a type of 3D printing technology. DLP, which is commonly used in the engineering field, has entered widespread use in the dental field too, particularly for developing dental prostheses. Furthermore, as part of my research, I have opportunities to visit several Japanese dental laboratories and manufacturers of dental materials and 3D printers. I regularly attend undergraduate classes together with dental technicians. Moreover, I have given oral and poster presentations on my research results at academic and scientific conferences.

Aside from my dental studies at TMDU, attending Japanese language class has been one of my most memorable experiences. I am grateful to TMDU for offering this opportunity for international students to make their lives in Japan easier. I also have chances to meet and become friends not only with Japanese students but also with students from various other countries, which stimulates the sharing and exchange of cultural experiences. Besides guiding me academically, my professors have been father figures to me during my stay at TMDU.



Poster presentation of research results for the Japanese Society for Dental Materials and Devices

After receiving my doctorate from TMDU, I will return to teaching at Naresuan University where I intend to impart my knowledge of dental materials and prosthodontics in the training of excellent dentists capable of improving the oral health situation in Thailand. Moreover, I will continue my research on dental materials so as to contribute to progress in the field of dental research in my country. I will also seek to forge and enrich collaborative research and training between Naresuan University and leading dental universities overseas, especially TMDU. Furthermore, by pursuing an active role in the Dental Association of Thailand as well as the Thai Prosthodontics Association, I want to share what I leaned, in both the academic and technological spheres, during my time in Japan.

TMDU has greatly facilitated my academic progress, particularly in dental materials research. It has provided me with an environment in which I am encouraged to embrace challenges, excel, and address adversity, supported by the guidance of Japanese dental experts. I will forever be grateful to TMDU for enabling me to hone my expertise for my subsequent career in dental science.

There are a wide variety of exchange programs for young people at different levels. TMDU students and young researchers improve their skills by participating in training programs abroad.

Reports of TMDU Students in the World

Report 01

The Most Fruitful Two Months of My Life

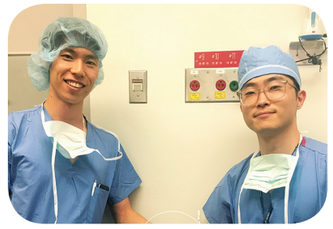
Ryo Higashide
6th year student, School of Medicine
Clinical Training in the U.S.

IN APRIL AND May, 2018, I was given the opportunity to participate in a clinical clerkship program as an elective at Harvard Medical School affiliate hospitals. I rotated in the Urology department at Massachusetts General Hospital (MGH) in April, and the Otolaryngology department at Boston Children's Hospital (BCH) in May. It was the most fruitful experience of my life.

Both at MGH and BCH, I was able to scrub in to many cases, experience consultations and participate in out-patient clinics. I was astonished by the scale of the surgical department at MGH– had more than 80 operation rooms, which were fully operated every day. There were many concurrent cases each day and I was able to see various diseases as well as operations and procedures performed by many doctors. The clerkship was sometimes tough and there were moments when I almost lost my motivation, but life at Harvard was stimulating every day and that helped me to easily get over my anxiety. Scrubbing in to cases and actually helping surgery was one of the most valuable experiences during my two months and it gave me a clear feeling of what it is like to be a surgeon in the United States.

With TMDU electives at Harvard Medical School

One thing I found different from Japan was that all medical staff were equally respected, including the students. Each occupation had different roles and every team member admired each other. The nurse, nurse practitioner, physician's assistant, medical student, intern, resident, fellow and attending had the equal right to remark on what was happening with the patient and how to provide better care from their own perspective. This meant that each staff member had complete responsibility in their role, which made me feel great responsibility towards the patient as well.



With Intern at MGH Operation Room

What I felt most during my two months at Harvard was that medical students were far more competitive and hardworking compared to those in Japan. Medical students in the United States were judged and evaluated by their daily activities, which directly lead to their future posts. Though Japan might not be that competitive during medical school, we should at least be hardworking to catch up with those who are competing hard across the ocean.

It was a great honor to experience life as a medical student at one of the most prestigious medical schools in the world. I would like to express my gratitude to all the people who were involved in this program. It is always said, "seeing is believing." Nothing will start without making a move yourself. I hope TMDU continues to provide opportunities to students who are willing to study abroad, and that more students from all departments challenge themselves by studying abroad.

Report 02

Invaluable Experience in Ghana

Ryota Ishida
4th year student, School of Medicine
Project Semester in Ghana

FOR ABOUT TWO months, I participated in research activities at the Noguchi Memorial Institute for Medical Research in Ghana. This consisted of two main activities: experiments in the laboratory and fieldwork.

First, I participated in research activities for six weeks. I researched malaria, leishmaniasis and trypanosomiasis. I conducted each research project for two weeks. I had some background in studying malaria in Japan, but I didn't have any experience with leishmaniasis or trypanosomiasis. Although there were a lot of things that I didn't know, Ghanaian research assistants taught me how to do experiments from the basics. One of the most impressive experiments which I experienced was a drug test on Trypanosoma. The drug used in this experiment was an extract from Morinda Lucida, a medicinal plant which can be collected in Ghana. This drug showed an ability to distort the shape of Trypanosoma and kill it. I was satisfied with the good result and acquired new skills in conducting experiments.

With Ghanaian research assistants

Following this, I conducted fieldwork with a principle investigator and some research assistants. We went to a rural area in Ghana, Mole National Park. The purpose of this fieldwork was to collect mosquitoes and larvae, and check water tanks in houses. This fieldwork was the most memorable event of my project semester. When I collected mosquitoes and larvae in Mole National Park, I was almost always surrounded by wild boars and baboons. I was afraid that they would attack me at first, but surprisingly, they seemed to be scared of humans because they escaped quickly when I approached them. In addition, during collection, I encountered wild elephants by chance. They were very large and trampled down vegetation, so my mild image of elephants was overturned.

Wearing Ghanaian traditional dress

I also witnessed the real circumstances of a poor area of a developing country while checking water tanks in houses in the rural area. Many water tanks contained larvae, but people still used this water for living. According to the principle investigator, a lot of larvae in water tanks near houses grow into mosquitoes carrying malaria and dengue fever. This is one of the reasons why malaria and dengue fever spreads in developing countries. I realized the importance of improving sanitary conditions.

Besides research, I also enjoyed Ghanaian culture through this program. One of the best things that I enjoyed in Ghana was Ghanaian food. Overall, Ghanaian food is very spicy. It matched my taste, so I tried many different kinds. My favorite is *fufu*, a food that resembles rice cake, served with spicy soup. In conclusion, I had an invaluable experience in Ghana, and I would like to make use of this experience in my academic life and my future career as a doctor.

Report 03

Our Short-term Study in Indonesia

Kousuke Abe
4th year student, School of Dentistry
Study Program in Indonesia

WE VISITED INDONESIA for eight days from March 4, 2018, for student-exchange activities between the University of Indonesia (UI) and TMDU. I applied for this program as I had never been to Southeast Asia and wanted to see a dental school in a foreign country to expand my knowledge. We learned lots of things about dentistry and experienced Indonesia's culture during this overseas study.

At UI, we participated in a Prosthodontics and Oral Surgery Skills Lab, special lectures on microbiology and dental materials and problem-based learning (PBL) for prosthodontics. UI students take lectures on clinical dentistry from their first year. Unlike Japanese universities, they do not seem to learn basic medicine. Therefore, although our grades were different, they had already learned what we had only learned recently or have not yet learned from lectures and practical training at TMDU, and so I was a bit confused.

Skills lab in oral surgery

However, I was able to make use of those lectures as preparation for clinical subjects in TMDU.

Especially during PBL, I thought that the extent of their research and study was extraordinary. Each student had a lot of information and participated in discussions. I realized that the time they spend studying is overwhelmingly different from Japanese university students. We treated clinical content as the subject of PBL, and I realized that basic medicine was still very important when studying clinical material. In fact, knowledge of immunology, pathology and histology were very important.

At a theme park in Jakarta

Also, some people say that English education in Southeast Asia is not so advanced, but it is superior to Japan. It was difficult to discuss the same topics in English, so I realized we have to be exposed to English on a daily basis.

It was a great opportunity, and I was able to compare the strengths and weaknesses of education at our university with the University of Indonesia. After graduating and acquiring our licenses, we can compare ourselves again. That will be a wonderful stimulus for studying hard, so I would like to try my best before comparing again.

We also gave presentations introducing life at TMDU and Japanese culture. UI students gave presentations about UI and the culture of Indonesia in fluent English.

In addition, UI students guided us to a mosque, MONAS (National Monument) and Pari Island, where we enjoyed cycling and snorkeling. We returned with a lot of precious memories.

This study program in Indonesia was a very good opportunity for me and I realized that I must study hard about medicine moving forward.

Report 04

A Precious Experience in Seattle

Yuka Handa
3rd year student, School of Health Care Sciences
Study Program in the U.S.

OVER MY SUMMER vacation, I participated in a study program in Seattle. Through this program, I visited many facilities and learned about the differences in Japanese and American healthcare systems.

First, I learned about nursing education in the US when we visited the nursing department of the University of Washington (UW). I studied the nursing education system at the university and gained insight into the actual work done by nursing students. I felt that the American education system is more practical compared to the nursing education of Japanese universities. In the training room, what surprised me most was that there was a human model which could talk, breathe and display vital signs. I thought we could also do more practical training which are close to actual clinical situations in Japan using these human models.

With volunteer staff

From there, I had the opportunity to visit some medical facilities during this program: Harborview Medical Center, UW Medical Center and Seattle Science Foundation (SSF), which impressed me a lot. SSF is a place where doctors conduct clinical anatomy. In the United States, there are more opportunities for dissection compared to Japan. There was also a big difference in ethics surrounding anatomy in the US. For example, I was most surprised to know that some scenes of dissection can be viewed through social media by many people.

Next, we volunteered at two geriatric facilities. Speaking in English was difficult for me and it made communication with the residents a bit had. Many people had difficulty understanding me and took a long time to respond. In this tough situation, I learned the importance of non-verbal communication including eye contact and physical touch. One old woman talked to me about her severe childhood during the war. Through this experience of communicating with a resident, I was able to understand the cultural background of a Japanese-American.

At the Seattle Science Foundation

Finally, we visited an elementary school and a high school and learned about healthcare in American schools. The high school had a school-based health center in which a nursing practitioner, doctor and counselor were dispatched from a hospital and students could receive treatment and prescriptions for free. There were counseling rooms which students could use every day and school nurses protected their privacy carefully by not telling their parents without their permission. Mental health is important for adolescent students in

Japan too, so I felt this kind of center is also needed for Japanese high schools.

I stayed with a host family during the study program. I was full of anxiety in the beginning, but they greeted me very warmly and I was able to have a good time with them.

I was able to have a very fulfilling experience in this program thanks to many people. I would like to share my appreciation to everyone who supported our program.

Report 05

My Experience in Taiwan, the Newest Study Tour of the School of Health Care Sciences

Wu Shixing
4th year student, School of Health Care Sciences
Study program in Taiwan

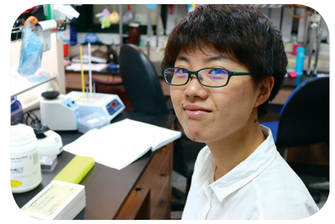
I WENT TO Taiwan for ten days during my summer vacation for an intensive study tour held by the School of Health Care Sciences. While the school already had short-term study tours for several other countries, the program in Taiwan began this year. Because there was no precedent, I was excited during my preparations imagining what the study tour would be like.

As soon as I arrived at the airport, two faculty members of Taipei Medical University (TMU) kindly picked me up and accompanied me to the campus. In an introduction to TMU, some graduate students gave presentations about their research and also gave me a handmade map of breakfast and bubble tea shops based on their recommendations. Soon I felt relaxed with the TMU students and faculty members. At night, some undergraduate students took me to a night market, and I got along with them very well. We still have a great relationship even now.

Visiting the training center for clinical skills

One interesting characteristic of Taiwan is that the laboratory at TMU hospital is open from 7 AM to 10 PM. Most laboratories in Japanese hospitals aren't open so long, so I was surprised and wondered why it stayed open so late. One TMU student told me the reason. It is really common for hospitals and clinics to stay open until 8 or 9 PM because Taiwanese people finish work very late, and therefore clinics have to adjust business hours for them. However, the main reason for large hospitals like the one at TMU is that there are too many patients. Thanks to Taiwanese national health insurance, medical care is quite affordable. This is an obvious advantage for patients, but it may be a huge burden on national finances.

Another Taiwanese characteristic I'd like to mention is tuition. TMDU's annual tuition fee is approximately 500,000 Japanese yen. On the other hand, TMU, which is a private university, has a tuition of approximately 300,000 Japanese yen. I was amazed to hear that it was much cheaper than a Japanese public university. A student told me that the Taiwanese government subsidizes educational costs. I think this enables Taiwanese people to obtain higher education much more easily from a financial viewpoint compared to Japan.



In the laboratory at Taipei Medical University

I think the most interesting aspect of Taiwanese culture in laboratories is the Taiwanese character "乖 (*guai*)" printed on red paper attached to analytical machines all over laboratories. The character means "good boy/girl" and Taiwanese people use these papers to pray for good data from the machines.

My intensive study tour of the School of Health Care Sciences ended successfully. I had a very productive time in Taiwan and hope this study tour continues the following year. I would like to express my gratitude to everyone who helped me through this program.

Report 06

A Valuable Experience in Thailand

Haruna Ozawa
3rd year student, School of Oral Health Care Sciences
Study Program in Thailand

I VISITED THAILAND for dental training last summer. I enjoyed it very much and I would like to return there again. I went to many facilities during this training, including the Golden Jubilee Dental Hospital, a community health center, a school for dental nurses, the faculty of dentistry at Mahidol Univer-

Mates at the college

sity and a private clinic. I would like to introduce two things that impressed me during this training.

First, dental nurses (DNs) in Thailand were similar to dental hygienists (DH) in Japan. In Thailand, most dentists work in urban areas, and DNs work in suburban areas, as there are not as many dentists there. I heard a DN's story at the community health center, and I thought that she was doing wonderful activities for the community's health. These included some of the same things that DH do, including preventive dental treatment and health education for children, elderly people and pregnant women. She also actively visited other locations such as schools and homes. Additionally, she made great connections with professional staff and volunteers, working hard with them to promote community health. As a DNs, she can do what DH can't. Also, DNs have the skills and ideas for promoting community health through their connections. I think it is important to support the health of all the people in a given

Clinical training with 5th year dental students at a primary school

community.

Second, regarding dental care activities in Thailand, there are systems, designs and practices that Japan does not have, like the idea of high level standard precautions for patients. I would like to adapt this to Japan to improve patients' health and also protect Japanese dental care workers. Comparing Thailand and Japan, the dental treatment is almost the same. The differences are in the culture, available resources and environment. I think that's why the systems and rules are different. If we don't know about foreign culture, we may think that Japanese ideas are correct. By understanding the background of each country, we can discover a lot of good points and problems in both places. I felt that both Thailand and Japan are working hard to provide the best dental care to meet patients' needs according to their cultures, resources and environments.

Before this training, I was enthusiastic to learn about Thai dental treatment, culture and values. After finishing this training, I realized it was also an important opportunity for me to think about my own values. It was a valuable experience to study in a country far from Japan. I was glad to make good friends, too. I was influenced by them, especially their attitudes towards studying, their English skills and positivity. They helped me notice that I have to continue learning and acquire knowledge from my classes. I will stay in touch with them forever. These experiences made me strong and I would like to utilize them in my future and practical training. Thank you for giving me this valuable opportunity.

Report 07

A Rewarding Experience in Korea

Rina Watanabe
4th year student, School of Oral Health Care Sciences
Study Program in Korea

DURING THREE WEEKS from September 9-29, 2018, I received training at Dankook University in Korea. Dankook University is a private university founded in 1947, and has two campus locations: Jukjeon Campus and Cheonan Campus. The Department of Dental Hygiene belongs to the Faculty of Health Sciences at Cheonan Campus.

Practical training in preventive dentistry

Dental hygienists in Korea work in a similar environment to Japan. However, in Korea, the difference is that dental hygienists can take dental radiographs. Like Japan, there are three-year colleges and four-year universities as educational institutions. So, there were some students who had already graduated from a three-year college.

During this training, I took classes with students in their second, third and fourth years. With the second-year students, I attended dental radiology training and dental hygiene practical training (fundamental practical training). As I mentioned above, Korean

Wearing the *chima chogori*

dental hygienists can take dental radiographs, so there were lectures and practical training in dental radiography.

With the third-year students, I attended classes in orthodontics, prosthodontics, pedagogy, pediatric dentistry and clinical practice. Almost all the classes were taught by teachers using textbooks, but for prosthodontics, it was interesting for me to see the students in charge of making presentations, and teachers giving them feedback. I thought it was not only the input of information, but also creating opportunities for output that deepened students' understanding. The fourth year classes were in nutrition, pharmacology, infection management, medical communication, medical insurance and clinical training.

As for trainings there was basic training, third-year practical training at hospitals and fourth-year mutual and clinical training. During practical training at the hospital, I mainly practiced preventive dentistry. I felt that one characteristic of Korean facilities was that they treated a small number of patients with great care, as the treatment was not covered by insurance.

Clinical practical training is similar to practical training; however, in clinical practical training the students invite patients to participate. What impressed me most was the detailed assessment. Using a phase contrast microscope, they showed the bacteria in dental plaque to patients. Furthermore, each patient's risk management was managed by conducting highly detailed tests such as saliva volume measurement, saliva pH measurement and breath tests. I was also surprised that the rolling method was recommended during TBI because in Japan, the scraping method is standard.

During my time in Korea, I was also able to try on a Korean folk costume called *chima chogori* with my fourth-year classmates. They said they had also worn it for the first time, so it was a valuable experience.

Many Korean students said they liked Japan because of Japanese food, animation, TV dramas and more. During my stay, I had a truly rewarding experience and was blessed with an environment in which many students supported me and helped me in many situations. I appreciated it all. Thank you so much.

Report 08

The Wonderful Experience in Taiwan

Noe Takata
3rd year student, School of Oral Health Engineering
Study Program in Taiwan

I VISITED TAIWAN for three weeks to study dental technology. There are four educational institutions for dental technology in Taiwan: Taipei Medical University (TMU) in Taipei, Central Taiwan University of Sciences and Technology (CTUST) in Taichung, Min Hue College of Medicine and Management in Gaoxiong and Shu Zen College of Medicine and Management (SZCMM) in Gaoxiong. I had the opportunity to visit three of those institutions and studying the differences in dental technology at each place.

There are three reasons why I chose Taiwan. First, I wanted to study in an Asian country with a high standard of licensing for dental technicians. I found the dental technology of Taiwan to be quite high. Second, I had visited TMU

With friends ofTMU students

once before, so I felt confident that I could study there. Although I wanted to learn a lot about dental technology in other countries, I thought that Taiwan was a good option because if I went somewhere unfamliar to study, I would feel anxious and be unable to study. Lastly, I love Taiwan. When I was a sophomore student, I visited Taiwan and felt drawn to Taiwanese culture, people and food. I also wanted to seek employment in Taiwan in the future.

At TMU, I participated in the second- and fourth-year classes. I attended more lectures than training sessions, there being no laboratory work. Compared to lectures at TMDU, there were significant differences in what was emphasized from place to place, which was interesting.

I also toured CTUST, SZCMM and Chung Shan Medical University (CSMU). CTUST is the oldest dental technology school in Taiwan and I felt a traditional atmosphere there. SZCMM is a 5-year vocational school for students graduating from junior high school. Its students are encouraged to study at a professional level by utilizing facilities

Dinner with members of the Shu Zen College of Medicine and Management

at SZCMM and other medical institutions. The students take specialized classes from the first year after enrollment. I think it was a very good environment.

CSMU does not have a school for dental technology, so my visit was focused on the dental hospital. The interior of the dental hospital is older than TMDU dental hospital. Just the other day, I had practical studies at TMDU dental hospital so I was again reminded of the difference between the two. For example, both are the same in that they're divided according to type of dental treatment, but CSMU had dedicated units for each dentist and an examination room that was easy to use for the dentist. It was a comfortable environment to work in.

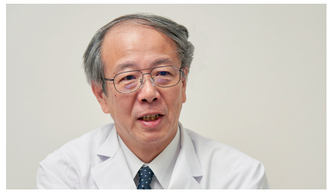
During my stay, I did some sightseeing. Taiwan has many famous tourist destinations, all of which were wonderful. Also, I liked the food and very much enjoyed my time there. I am grateful for having been given this opportunity to study and I have learned so much that has changed my mindset.

Professor
Head, Department of Neurosurgery, TMDU Medical Hospital

Taketoshi Maehara

Practicing neurosurgeon Professor Taketoshi Maehara using a microscope. As a specialist in epilepsy, his skills are regularly tested in the operating theater.

"Mental as well as manual dexterity required for surgery"



"ON THE DAYS I operate, I can focus totally when in theater because I have already envisaged the surgery on the way to work. The operating theater is the place where I can focus best."

The speaker is neurosurgeon Professor Taketoshi Maehara. Within TMDU's Department of Neurosurgery, his area of expertise is surgical intervention for cerebrovascular conditions such as brain tumors and aneurysms. He has built his career as a surgeon specializing in epilepsy.

"As a student, my interest in the functions of the brain and spine led me to venture into neurosurgery. The image of this field is that it requires physical endurance, and, as an assistant surgeon, I have taken part in operations that lasted up to 30 hours. Surgery has become more advanced since then, however, and these days the technology allows us to conduct shorter operations. We can operate on epileptic patients to eliminate or reduce the incidence of seizures in cases where drug therapies have not controlled the condition. Many new therapies for epilepsy have been developed. This includes seizure detection using electrodes embedded in the brain, with treatment through electrostimulation."

Skills needed as physician acquired on the soccer field

In his early years as a neurosurgeon, the youthful Professor Maehara did not have access to the training aids available today such as artificial blood vessels and simulation technology. Instead, he would often do suture training in the operating theater at night while using a microscope to look at gauze on the bottom of a milk bottle.

"Surgery requires more than just manual dexterity. It is vital to cultivate the mental dexterity needed to decide surgical tactics based on your own ability and to recover any situation."

Teamwork is also cited as a critical factor in surgery. Professor Maehara played soccer from his junior high school days through university, and he still acts as an advisor to TMDU's soccer team today. He says that soccer taught him about playing on a team.

"I was not such a conscientious student at university, but on the soccer field I learnt things that are indispensable for a physician, such as the importance of teamwork, and the way one's role and function within the team varies from match to match."

Focus on clinical research to elucidate brain functions

Besides the teamwork between Professor Maehara's Department of Neurosurgery and other hospital departments, there are many cooperative links with fields such as neurology, psychiatry, and pediatrics. There is also extensive collaboration between his department and other researchers and physicians outside TMDU, including specialized centers for treating epilepsy around Japan. Improving the quality of medical care for epilepsy patients is the common goal.

As well as being in surgery most weeks, Professor Maehara is also active as a researcher. Recently, developing the next generation has been a major challenge.

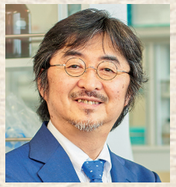
"We want students who are interested in how the brain functions to be clinical physicians who can also undertake research. I continue to do research because my goal is to elucidate how the brain works. I want to apply the findings from our research to clinical practice so that we can actively develop cutting-edge therapies."

Taketoshi Maehara
Graduated from TMDU in 1985. Received medical PhD in 1995. Worked as a neurosurgeon at Tokyo Metropolitan Neurological Hospital. After serving as an assistant surgeon and lecturer, Department of Neurosurgery at TMDU Medical Hospital, became Professor in 2012. Concurrently serves as Professor, Department of Neurosurgery, TMDU Certified by The Japan Neurosurgical Society, the Japan Stroke Society and the Japan Epilepsy Society. Specialist in surgical treatments for epilepsy.

Maehara the soccer-playing student (front row, third from right).
He still applies clinically what he learnt about the importance of teamwork and individual roles.

【1】

Increased Calcium Sensitivity of Cardiomyocyte Contractions Results in Cardiomyopathy and Arrhythmia



Akinori Kimura
M.D., Ph..D., Professor/
Executive Vice President
Department of
Molecular Pathogenesis,
Medical Research
Institute, TMDU

HYPERTROPHIC CARDIOMYOPATHY (HCM) is characterized by cardiac ventricular hypertrophy with diastolic dysfunction. More than half of HCM patients have a family history of HCM and/or sudden cardiac death consistent with autosomal dominant inheritance. Because the prevalence of this disease in the general population is 1 in 500, HCM is one of the most prevalent hereditary diseases.

HCM is a major cause of sudden death in young and progressive heart failure as well as arrhythmia in adults. In such cases, cardiac transplantation may be required for severe cases. Pathologically, cardiomyocyte hypertrophy and myofibrillar disarray are found in the heart. Recent studies have revealed that mutations in genes encoding the components of sarcomere cause HCM, which is often associated with the increased Ca^{2+} sensitivity of muscle contractions. However, it is not known whether abnormal Ca^{2+} sensitivity would directly result in clinical and pathological phenotypes of HCM.

A sarcomere is a fundamental unit of muscle structure, composed of actin-based thin filaments and myosin-based thick filaments. Muscle contractions are regulated by intracellular Ca^{2+}. The Ca^{2+} sensitivity of cardiac muscle contractions is regulated by two different mechanisms: (1) regulation by troponin complex acting on the thin filament and (2) regulation by myosin light chain acting on the thick filament.

We have previously shown that a heart-specific myosin light chain phosphatase small subunit, HS-M_{21}, increases the Ca^{2+}-sensitivity of cardiac muscle contraction. In this study, we investigated the function of HS-M_{21} *in vivo* and the causative role of abnormal Ca^{2+} sensitivity in HCM. We generated transgenic (Tg) mice, in which human HS-M_{21} was specifically expressed in the mouse's heart. Three different Tg (one low-expression line and two high-expression lines) were generated. Increased Ca^{2+} sensitivity of cardiac muscle contraction was confirmed in the two high-expression lines. Although Tg mice with the low-expression line did not show any phenotypes, Tg mice in both high-expression lines developed severe systolic dysfunction with myocardial fibrosis, which resembles the progressive phase of HCM phenotypes. Most notably, the contractile dysfunction and cardiac fibrosis were improved by treatment with the Rho-kinase inhibitor, Fasudil.

Gene expression analysis of Tg mice hearts revealed that so-called cardiac remodeling genes were highly induced even in the low-expression line-, showing no cardiac phenotype and that several key modulators were induced only in the high-expression lines before manifesting with cardiac hypertrophy. In addition, sinus bradycardia and atrioventricular conduction defects were observed in Tg mice with high-expression lines. Our findings showed that increased Ca^{2+} sensitivity of cardiac muscle contractions could directly result in the HCM phenotype, which can be prevented by modulating Rho-kinase activity. These Tg mice may be useful for developing novel therapeutics for HCM.

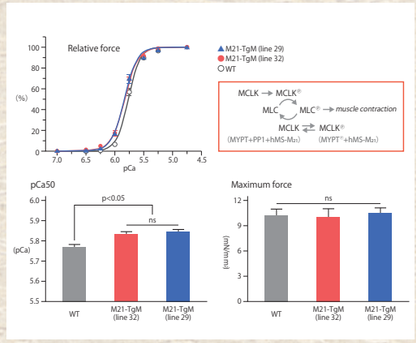


Fig.1: **Calcium sensitivity of cardiac muscle contraction increased in M_{21}-TgM**
a) Calcium tension curve of heart muscles from transgenic mice. Relative tension against full tension (%) and calcium concentration (pCa) was plotted for heart muscle fibers from wild type (WT) and high-expression M_{21}-Tg lines 29 and 32.
b) Half maximum pCa for heart muscle fibers.
c) Maximum tension for heart muscle fibers.
d) Schematic representation of cascade for phosphorylation of myosin light chain (MLC). Myosin light chain kinase (MLCK); myosin light chain phosphatase (MLCP); myosin phosphatase target sequence (MYPT).

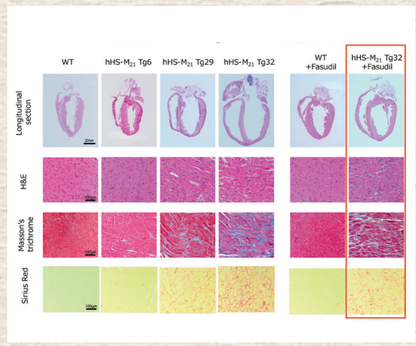


Fig.2: **Rho kinase inhibitor Fasudil prevented heart failure and cardiac fibrosis in M_{21}-TgM**
Pathological findings from the hearts of 8-month-old mice. Macroscopic data of longitudinal section (the most upper field) are shown with microscopic data; hematoxylin eosin (H&E) staining, Manson's trichrome staining and Sirius Red Staining. Wild type mice (WY) and low-expression line (hHS-M_{21} Tg6), high-expression lines (hHS-M_{21} Tg29 and hHS-M_{21} Tg32) were investigated. Data for treatment with a Rho-kinase inhibitor, Fasudil, are shown for wild type mice (WT) and high-expression Tg mice (hHS-M_{21} Tg32).

Systemic Administration of Toll-like Receptor 7 (TLR7) Agonist Enhances the Efficacy of Immune Checkpoint Inhibitors

Miyuki Azuma
DDS, Ph.D., Professor
Department of Molecular Immunology, Graduate School of Medical and Dental Sciences, TMDU

RESEARCHERS LED BY TMDU proposed a new combination immunotherapy using a TLR7 agonist to improve treatment efficacy of immune checkpoint inhibitors (ICIs).

The release of negative regulators in immune activation (immune checkpoints) that interferes with beneficial antitumor immune responses brings a benefit to cancer patients. CTLA-4 and PD-1 are such immune checkpoint molecules that negatively regulate T-cell activation. Treatment with humanized antibodies against CTLA-4 and PD-1 (ICIs) have shown to a great achievement in patients with a variety of cancers. Now, immunotherapy has been accepted as the fourth pillar of cancer therapy, following surgery, radiotherapy and chemotherapy. However, patients who receive such benefits of ICIs are limited and differ by their clinical grade and tumor tissue type.

To improve the efficacy of ICI treatment and to reduce economic toxicity by the use of ICIs, the research group has invented a new way to use the synthetic compound of toll-like receptor 7 (TLR7) agonist (resiquimod) as a companion drug of ICIs. TLR7 is a member of the TLR family that recognizes the molecular patterns of various microbes. TLR7-mediated signals lead to the activation of dendritic cells that trigger innate immune responses and subsequently enhances the ability of killer T cells, resulting in the elimination of virally infected cells and tumor cells. Despite such promising effects of resiquimod, its clinical application has been limited in the usage of topical/local application to avoid cytokine storms.

The research group examined the antitumor effects of the systemic application of low-dose resiquimod in two PD-L1 blockade-resistant tumors that exhibited different profiles of tumor-infiltrating lymphocytes (TILs). Resiquimod monotherapy markedly inhibited tumor growth in a squamous cell carcinoma model with abundant infiltration of regulatory T cells (Treg) in the tumor microenvironment. The combinational treatment with PD-L1 blockade further reduced the tumor's growth. Resiquimod monotherapy and combined treatment markedly increased the ratio of CD8 T cell/Treg in the tumor. They found that systemic low-dose resiquimod administration induced earlier activation of two types of dendritic cells (plasmacytoid and conventional), resulting in the reduced recruitment of regulatory T cells and increased recruitment of effector killer T cells in the tumor microenvironment. They further demonstrated that limited doses of resiquimod or decreased frequency of the PD-L1 inhibitor could efficiently regress tumor growth. Their results suggest that limited doses of systemic resiquimod administration enable resistance to PD-1/PD-L1 blockades to be overcome, allowing for the decreased usage of PD-1/PD-L1 inhibitors.

The article, "Systemic administration of a TLR7 agonist attenuates regulatory T cells by dendritic cell modification and overcomes resistance to PD-L1 blockade therapy" was published in Oncotarget (2018, 9:13301, Nishi N et al. at DOI: org/10.18632/oncotarget.24327)

Summary: TMDU researchers developed a new use for TLR7 agonists in cancer immunotherapy. Systemic administration of low-dose resiquimod is useful as a companion drug with PD-1/PD-L1 blockade therapy. This may have great potential to eradicate tumors, especially in immunosuppressive tumors with abundant regulatory T cell infiltration.

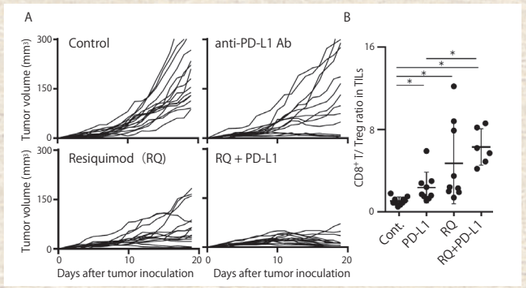


Fig.1: **The effects of treatments with resiquimod and/or PD-L1 blockade in a SCCVII tumor model**
A. Change of tumor volume. Treatments were started on day seven.
B. The ratio of CD8+ T cells/regulatory T cells (Treg) in tumor-infiltrating lymphocytes (TILs) on day 19.

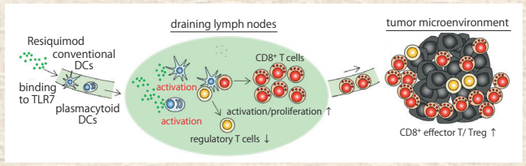
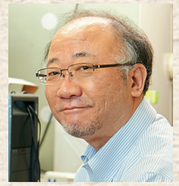


Fig.2: **PPossible mechanism of resiquimod action for enhancing anti-tumor effect**
Systemic administration of low-dose resiquimod induces a transient and rapid activation of plasmacytoid and conventional dendritic cells, resulting in enhanced priming of T cells in draining lymph nodes. Tumor-recruiting CD8⁺ effector T cells increased while regulatory T cells decreased in the tumor microenvironment.

The Intellectual Disability Gene PQBP1 Rescues Alzheimer's Disease Pathology



Hitoshi Okazawa
MD, PhD, Professor
Department of Neuropathology, Medical Research Institute, TMDU

TOKYO, JAPAN-ALZHEIMER'S disease (AD) is the most common form of dementia, involving memory loss and a reduction in cognitive abilities. AD is pathologically defined by extracellular beta amyloid (Aβ) aggregates, so therapeutic drugs are being developed with the aim of removing extracellular Aβ aggregates. However, despite the successful decrease in Aβ aggregation, these trials mostly have failed to improve memory or cognitive function in AD patients. This discrepancy highlights the significance of preclinical or prodromal stages of AD.

Now, a Japanese research team led by TMDU has investigated the level of SRRM2 phosphorylation in the AD mouse model and found it to be increased before Aβ aggregation. This ultimately prevented SRRM2 nuclear transport and reduced the level of PQBP1 associated with neurodevelopment and intellectual disorders. The results of the study were reported to Molecular Psychiatry.

In previous work, the research team found that the phosphorylation state of certain proteins changes before the formation of Aβ aggregates in the extracellular space (Tagawa et al., Hum Mol Genet. 2015). Two of the three proteins identified are MARCKS and the homolog MARCKS-like. The third protein was serine / arginine repeat matrix 2 (SRRM 2), thought to be involved in one form of gene regulation, but its precise function has not been elucidated.

"We showed that the increased phosphorylation of SRRM2 prevented it from interacting with another protein which aids protein folding," says first author Hikari Tanaka. "In the absence of this interaction, SRRM2 remained unfolded so it was not transported to the nucleus and was degraded in the cytoplasm." Furthermore, SRRM2 deficiency in neurons destabilized polyglutamine binding protein 1 (PQBP1), a causative gene for intellectual disability (ID), greatly affecting the splicing patterns of synapse-related genes. Actually, the team next measured levels of SRRM2 and PQBP1 protein in the cerebral cortex of early-phase AD mice and human end-stage AD patients as well as in human AD iPS cells. Both proteins were greatly reduced compared with corresponding amounts in healthy controls.

"To find out what effect a reduction in PQBP1 would have *in vivo*, we generated knockout mice in which the PQBP1 gene was disrupted," explains corresponding author Hitoshi Okazawa. "We observed cognitive decline and changes in the morphology of their synapses, which are junctions between neurons that allow electrical and chemical communication. These changes were caused by disrupted patterns of synapse gene splicing."

Restoration of PQBP1 by an adeno-associated virus (AAV) vector was used to recover the synapse protein expression in these mice. Not only did this restore PQBP1 expression, but it also recovered the abnormal phenotypes. This suggests possibilities for gene therapies by virus vectors.

Finally, they identified ERK1/2 (MAPK3/1) as the kinases responsible for the phosphorylation. These results revealed a new aspect of AD pathology: phosphorylation signals that influence RNA splicing and synapse integrity precede extracellular Aβ aggregates and may progress in parallel with tau phosphorylation.

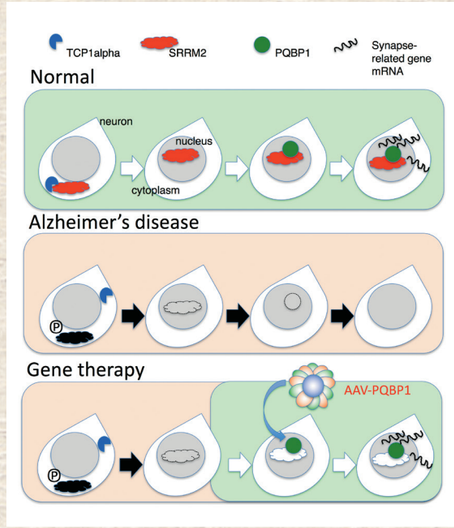
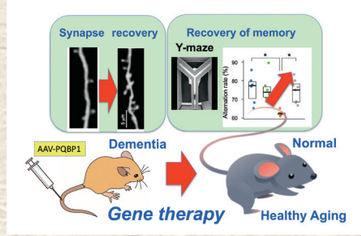


Fig.1: **Theory of Gene Therapy by AAV-PQBP1**
In Alzheimer's state, nuclear scaffold protein SRRM2 and synapse-gene regulator PQBP1 are decreased. By expression of PQBP1 in neurons, expression of synapse genes is recovered, and cognitive defects are rescued in Alzheimer's patients.

Fig.2: **AAV-PQBP1 mediated gene therapy**
By using PQBP1 gene therapy (AAV-PQBP1) in two types of Alzheimer's disease model mice, neural circuit transmission was improved, and memory was recovered even after onset. This suggests a possibility for the same treatment in human patients.

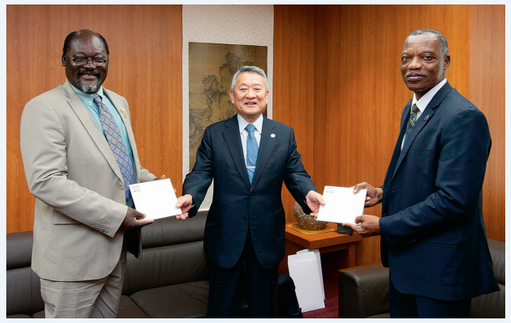


Prof. Anang and Prof. Ayeh-Kumi from the University of Ghana Visit TMDU

PROF. ABRAHAM KWABENA Anang, Director of the Noguchi Memorial Institute for Medical Research (NMIMR), and Prof. Patrick Ferdinand K. Ayeh-Kumi, Foundation Dean of the School of Biomedical and Allied Health Sciences of the University of Ghana visited TMDU on June 6th, 2018. President Yasuyuki Yoshizawa, Prof. Tetsuya Taga (Director of the Institute of Global Affairs), Prof. Shiro Iwanaga, Specially Appointed Associate Prof. Mitsuko Ohashi and Specially Appointed Prof. Masahiko Tanaka (Senior Office Manager of the Administrative Division of the Institute of Global Affairs) were pleased to welcome them.

The Ghana-TMDU Research Collaboration Center was established at the NMIMR in 2008. Student exchange, researcher invitations, and other collaborative efforts between the two universities are ongoing.

From front left: Prof. Abraham Kwabena Anang, President Yasuyuki Yoshizawa, Prof. Patrick Ferdinand K. Ayeh-Kumi.
From back left: Specially Appointed Associate Prof. Mitsuko Ohashi, Prof. Shiro Iwanaga, Executive Senior Vice President Prof. Tetsuya Taga, Specially Appointed Prof. Masahiko Tanaka.



President Yoshizawa hands TMDU mementos to Prof. Abraham Kwabena Anang and Prof. Patrick Ferdinand K. Ayeh-Kumi.

The Summer Festival

A SUMMER FESTIVAL was held for both International and Japanese students of Tokyo Medical and Dental University and Juntendo University. The Summer Festival was held in the evening of July 20, 2018 at the TMDU Garden. After greetings by Tetsuya Taga, Director, Institute of Global Affairs at TMDU and Yuichiro Yamashiro, Emeritus Professor at Juntendo University during the opening ceremony, a TMDU student gave a background explanation of the Summer Festival.

At traditional Japanese summer festivals there are rows of food stalls called “Demise” as well as other fun activities that festivalgoers can enjoy. The TMDU Summer festival showcased the same kind of food and activities, such as yo-yo fishing games and superball scooping and halal yakisoba, and even wearing traditional Japanese summerwear called yukata. The highlight of the festival was undoubtedly the watermelon splitting game, called “Suika-wari”, in which blindfolded participants called out to one another to find a watermelon and split it open with a wooden stick. All in all, international students found plenty of opportunities to enjoy traditional Japanese culture.

Watermelon splitting game

Yo-yo fishing games

Cover of this issue
Yushima Campus of Tokyo Medical and Dental University. The 26-story M&D Tower (left) opened in 2009 has given added impetus to the fusion of research and clinical practice, collaboration in the medical and dental fields, and industry-academia collaboration in education and research through use of open labs, and moreover it has come to symbolize the quality of TMDU’s work and our aspirations. On the right in the foreground is the Taiseiden of Yushima Seido temple.

EDITORIAL SUMMARY

WE ARE PLEASED to send you Vol. 11 of the TMDU Annual News, with highlights of TMDU’s international activities and campus events for the 2018-2019 academic year.

In this issue, we have featured the Organ and Tissue Neogenesis Consortium and the Open Innovation Institute. We have also reported about Campus information, and provided Reports on Study Abroad Programs from TMDU students and Letters from our graduates.

We will introduce the latest topics of Tokyo Medical and Dental University (TMDU) in the future. We hope you enjoy “TMDU ANNUAL NEWS.”

THE EDITORIAL OFFICE expresses many thanks to those who took special effort in preparing articles for this issue. If you have any suggestions or news to be included in the future issues of the TMDU Annual News, please feel free to contact the Public Relations Division by e-mail (kouhou.adm@tmd.ac.jp).

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