International students from all over the world
Sendai is the largest city with a million people and the center of the arts, culture, business, and politics in the Tohoku region. Sendai has been an academic city for over a century. Both domestic and international students are learning together and carrying out their research in the numerous advanced research institutions in Sendai. Sendai is also known as a city of music. Sendai hosts many international events including Sendai International Music Competition attracting maestros from around the world. In addition, Sendai offers you many place to go and events to see. Near Sendai, there are various tourist sites such as Matsushima, one of the “Three Views of Japan,” or Mt. Zao, which is famous for the O-kama (rice cooker), a crater lake. Sendai makes you enjoy many events, for example, the Sendai Aoba Festival (Spring), the Sendai Tanabata Festival (Summer), the Jozenji Streetjazz Festival (Autumn), and the Sendai Pageant of Starlight (Winter) all year around. Here, you can find a lot of attractions about Sendai and Japan.

Three Principals

Tohoku University has been committed to the “Research First” principle since its foundation. Tohoku University was able to attract of young and brilliant researchers who had trained around the world to serve on its faculty, calling upon scholars to not only pursue highly productive research but to also put their findings to work in the teaching of their students.

Tohoku University also displayed to the world an unwavering commitment to an “Open Door” policy. Tohoku University accepted graduates from technical schools and higher normal schools, and despite opposition from the government at that time, became Japan’s First University to admit female students in 1913.

Tohoku University has nurtured a tradition of “Practical Mind,” in which the results of cutting edge research are being put to use for the good of society and the improvement of living standards. Evidence of our pioneering practice includes the establishment of local venture businesses which have contributed to regional industry, and our status as the nation’s center for research on family law; the domestic branch of law which is closely associated with our daily lives.
Message from Dean

Tooru
SHIMOSEGAWA
Dean, Graduate School of Medicine

Welcome to the Frontline of Medical Education and Research

To train the international and interdisciplinary medical researchers to contribute to the development of Japan and global medicine.

MISSION

Tohoku University has been committed to the “Research First”, “Open Door”, and “Practical Mind” as principles, and aims to improve the quality of research through the exchange of excellent human resources and to return its results to the society. We respect this spirit of the University; human resources are recruited from a wide variety of fields and promoting the creative and advanced research to contribute to the development of medical science. In addition, we have trained excellent medical researchers who can be internationally active and medical professionals who have advanced medical knowledge and skills with rich humanity. It is our mission to contribute to the advancement of health and medical care both domestically and internationally.

EDUCATION and RESEARCH

The Graduate School of Medicine aims to nurture human resources exploring mind and sense of purpose towards the medical science and capable of raising a question and resolving it independently. We are also striving to nurture medical researchers of world standard to challenge unknown subjects and medical professionals with latest expertise. In the Graduate School of Medicine, we have gathered diverse faculty that covers most of the medical research area and many excellent research staff. We are accepting more than 200 students every year combining doctoral program and master’s program. Furthermore, we provide practical education in a wide range of fields by collaboration with Institute of Development, Aging and Cancer and Graduate School of Biomedical Engineering in the graduate school, or with Tohoku University Hospital in the School of Medicine.

INTERNATIONALITY

In accordance with the spirit of “Open Door” of the University, our graduate school accepts large number of students from abroad. We are actively promoting academic exchange agreements with departments of overseas universities and international exchanges with partner universities, with support by International Exchange Office in which a full time staff is stationed. We are also promoting international exchange through scholarships and acceptance for international students, or overseas deployment program for researchers and students in our school. In May 2013, the Graduate School of Medicine and National Institutes of Health (NIH) concluded an exchange agreement and held “NIH-Tohoku University-JSPS Symposium” as a joint symposium in Sendai, Japan, resulted from the research cooperation of Tohoku University from NIH at the time of the Great East Japan Earthquake. Furthermore, a second round of joint symposium “NIH-Japan-JSPS Symposium 2014” was held on a larger scale at NIH in Bethesda, United States. Third joint symposium will be held in 2016. We are going to keep deepening the ties to overseas research institutes such as NIH in order to form a foundation for internationalization.

RECONSTRUCTION and FUTURE

Tohoku region including Miyagi Prefecture suffered an extensive damage by the Great East Japan Earthquake on March 11, 2011. Tohoku University was also severely damaged by the earthquake but graduate students, young researchers, doctors, specialized medical staff—everyone from the Tohoku University Hospital played an active role in many fields of health and medical support for the affected areas. Even now, we are taking part in planning reconstruction project and we are working with strong commitment in restoration and reconstruction of Tohoku area. In addition, as a part of Project for the Reconstruction of Community Health Care, Comprehensive Education Center for Community Medicine and Tohoku Medical Megabank Organization have been established. The Graduate School of Medicine, based on the strong co-operation with University hospital and Tohoku Medical Megabank Organization, will have further development in the future. We have been working vigorously in the state-of-the-art research internationally and we are seeking the participation of students and young researchers with a strong will to carve out the future of medicine, medical care and welfare. Regardless of domestic or international origin, by bringing together the young energy we are striving to become the driving force that opens up the future.
Modernization of medicine and globalization produced an ambivalent situation. Modern medicine improved people’s health by discovery and development of useful drugs including various antibiotics, while this also caused drug-resistant bacteria such as methicillin-resistant *Staphylococcus aureus* and multi-drug resistant tuberculosis. Rapid progress of globalization, on the other hand, shortened time required for transportation of people and goods. It could increase the risk of cross-border transmission of infectious diseases, which may result in outbreak on a global scale.

Prof. Hitoshi Oshitani was a regional advisor for Communicable Disease Surveillance and Response at the World Health Organization (WHO) Western Pacific Regional Office between 1999 and 2005. He led a regional response to severe acute respiratory syndrome (SARS) and avian influenza H5N1. Prof. Oshitani’s group mainly focuses on the evolution and pathogenesis of viral infectious diseases from public health and global perspectives. Therefore most of their researches are being conducted in the fields in various countries including Philippines. Recently, they have reported the antigenic and receptor binding properties of Enterovirus 68 (EV68) for the first time in the world. EV68 has attracted a global attention due to increased detection in many parts of the world. In the study, the antigenicity and the host receptor binding properties of the virus were investigated. Recent EV68 strains were found evidently different antigenic properties from the original reference strain, and the current EV68 contained multiple antigenically distinct strains. Overall, the study indicates that the recent worldwide spread of EV68 is likely to be due to the emergence of new antigenically distinct viruses strains. The study findings contribute to achieve a better understanding of the transmission dynamics and pathogenesis of EV68. As described above, Prof. Oshitani and his co-workers aim to contribute for controlling the infectious disease across the globe.

Antigenicity and receptor binding properties of Enterovirus 68, a potential virus causing severe respiratory illness in recent times

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**Antigenicity and receptor binding properties of Enterovirus 68.**


With the advent of the ageing society, number of people with the symptoms of dementia is increasing and has become a social problem. Prof. Etsuro Mori’s Group of behavioral neurology is working in the research of various types of dementia and development of diagnostic methods in order to comprehensively understand dementia. Idiopathic normal pressure hydrocephalus, an ailment that causes dementia, gait disturbance, urinary incontinence in the elderly people is improved by a surgery called cerebrospinal fluid shunt. In 2012, Clinical Guidelines of idiopathic normal pressure hydrocephalus was revised by the Committee, in which Prof. Mori was served as the Chairman and by using MRI easy and highly accurate non-invasive diagnosis was possible. In addition, Prof. Mori’s Group developed a new diagnosis method using the phenomenon called Pareidolia, which is seen on human face and animals like the stains on walls and cloud shapes and it is possible to distinguish with high accuracy, the dementia with Lewy bodies from Alzheimer’s disease.

Recently, Prof. Mori’s Group successfully discovered the factors predicting development of cognitive impairment in Parkinson’s disease. Parkinson’s disease is a disease whose main symptoms is motor symptoms such as Bradykinesia (slow movement) and trembling of limbs and in approximately 80% of the patients it is known to become dementia in long-term course. Prof. Mori carried out a longitudinal study of Parkinson’s disease patients without dementia about motor function, cognitive function (memory, visual illusion, and executive function), Regional Cerebral Metabolic rate of Glucose measured by FDG-PET and clarified that there is a possibility of rapid progress of cognitive function and motor impairment in Parkinson’s disease patients with memory and visual illusion impairment. As described above, Prof. Mori is carrying out research intensively in order to clarify complex mechanism of cognitive and behavioral impairments and dementia.


Nursing and palliative care have two different but complementary face, that is, art and science. For artistic face, doctors, nurses, and medical workers should have delicate senses and feelings on patient’s conditions in nursing and palliative care. For scientific face, on the other hand, they must have a clear measurable standard to determine evaluate the patient’s conditions. Measurement is one of the fundamental and indispensable ways to develop new clinical intervention, to survey current patient status, and to audit clinical practice scientifically. Recently, Prof. Miyashita validated three Japanese measurement tools for palliative care patients: Care Evaluation Scale (CES) to evaluate structure and process of care, Comprehensive Quality of Life Outcome inventory (CoQoLo) to evaluate outcome of care, and EORTC-QLQ-C15 PAL to evaluate quality of life of palliative care patients.

Physical, mental, social and spiritual aspects of individuals should be measured by the standardized methods in the palliative care because it is a care to the whole person. While the EORTC-QLQ-C15PAL or usual quality of life scales depend on physical status of patients, the CES and CoQoLo measures quality of care and comprehensive quality of life, which are independent on physical status. The CES and CoQoLo are more favorable than the EORTC-QLQ-C15PAL, when the aim of palliative care is to maintain patients in a satisfied and comfortable condition as possible, against deteriorating physical status toward death. In addition, Prof. Miyashita and his co-workers have developed 20 or more measurement tools regarding palliative care and cancer nursing.

Measuring Palliative Care

Nursing and palliative care have two different but complementary face, that is, art and science. For artistic face, doctors, nurses, and medical workers should have delicate senses and feelings on patient’s conditions in nursing and palliative care. For scientific face, on the other hand, they must have a clear measurable standard to determine evaluate the patient’s conditions. Measurement is one of the fundamental and indispensable ways to develop new clinical intervention, to survey current patient status, and to audit clinical practice scientifically. Recently, Prof. Miyashita validated three Japanese measurement tools for palliative care patients: Care Evaluation Scale (CES) to evaluate structure and process of care, Comprehensive Quality of Life Outcome inventory (CoQoLo) to evaluate outcome of care, and EORTC-QLQ-C15 PAL to evaluate quality of life of palliative care patients.

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Prof. Miyashita is one of a leader of specialist of measurement and evaluation of palliative care in Japan. He has led many surveys such as following national interdisciplinary collaborative projects; developing regional palliative care system; bereavement surveys; exploring a concept of good death in Japan; quality of life of cancer patients; nursing education for palliative care; palliative care in geroontology. Prof. Miyashita is certainly one of the energetic researchers of palliative care and cancer nursing in Japan, and has published 127 English and 53 Japanese peer reviewed papers to date.

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Human being receives various physical and chemical stimuli from its internal and external environments. It is essential to respond to the stimuli appropriately for health maintenance and disease prevention. Especially, it is quite important to physiologically regulate reactive oxygen species (ROS), such as superoxide and nitric oxide (NO). These reactive species are produced in energy generation process, but may cause oxidative damage of biological molecules, if they are generated in excess, leading senescence and aging. Prof. Takaaki Akaike is a pioneer in the research connecting environmental health sciences and molecular toxicology. His research covers a wide range of field from the signal transduction against oxidative stress to the host defense response against bacteria infection.

Recently, Prof. Akaike and co-workers revealed the novel cellular system to produce reactive cysteine persulfide that have superior antioxidant activity and unique signaling function. Current common knowledge suggests that the enzymes metabolizing sulfur-containing amino acids, cystathionine β-synthase (CBS) and cystathionine γ-lyase (CSE), may produce hydrogen sulfide (H₂S) and that H₂S acts as a signaling molecule in mammalian cells. Recently, Prof. Akaike’s group developed a method for detecting not only H₂S but also its related reactive persulfide and polysulfide derivatives by LC-MS/MS and explored the enzymatic production, cellular levels, and its reactivity. Their work clarified that H₂S may simply be a biomarker of persulfides formation and that reactive cysteine persulfide itself may have a primary role in cellular signaling and regulation of the pathogenesis of oxidative stress-related diseases.

In the other aspect, they revealed that *Helicobacter cinaedi*, the most common enterohpatic Helicobacter species that causes bacteremia in humans, significantly enhanced atherosclerosis in hyperlipidaemic mice. Aortic root lesions in *H. cinaedi* infected mice showed increased accumulation of neutrophils and macrophage-derived foam cells, which was due to bacteria-mediated increased expression of proinflammatory genes. Furthermore, they found that *H. cinaedi* infection altered expression of cholesterol receptors and transporters in cultured macrophages and caused foam cell formation. This work provides the first evidence of a pathogenic role of *H. cinaedi* in atherosclerosis in experimental models, thereby justifying additional investigations of the possible role of enterohpatic *Helicobacter* spp. in atherosclerosis and cardiovascular disease.

Prof. Akaike, thus, aims to develop novel diagnostic methods, clinical therapeutics, and preventive medicine for oxidative stress-related diseases, e.g., atherosclerosis, chronic inflammation and infection, and cancer.

Hydrogen sulfide anion regulates redox signaling via electrophile sulfhydration.

Reactive cysteine persulfides and S-polythiolation regulate oxidative stress and redox signaling.

Promotion of atherosclerosis by Helicobacter cinaedi infection that involves macrophage-driven proinflammatory responses.
Khan S, Rahman HN, Okamoto T, Matsunaga T, Fujii S, Takeya M, Akaike T.
Distinguished Honoree

Sadayoshi ITO
Professor
Department of Nephrology, Endocrinology and Vascular Medicine

Arthur C. Corcoran Memorial Lecture Award
Measuring the Health of the Brain Based On the Functioning of the Kidney

The Arthur C. Corcoran Memorial Lecturer Award of the American Heart Association has a history of more than 40 years. Prof. Sadayoshi Ito is the third Japanese researcher who has received the award. The award was given to him in recognition of his work in developing the technique that allows the regulation mechanism of the filtration function of the kidney to be studied directly and laying the foundation for the understanding of renal hemodynamics.

The kidney detects changes in the salt level in the body and regulates the blood pressure. By adjusting the secretion amounts of the hormones that control the blood pressure as well as the renal filtration function, the kidney regulates not only the blood pressure but also the body fluid volume. It was unknown for a long time, however, which part of the kidney detects the salt level.

Prof. Ito identified the part by creating two types of specimen - one consisting of only afferent arterioles having rennin productive cells and the other consisting of afferent arterioles with the macula densa attached to them - and comparing the renin secretion of these two specimens. As a result, substantial differences in renin secretion were observed between the specimens with the macula densa and the one without it. This was the first research in the world that proved the macula densa mechanism.

In addition to regulating renin secretion, the macula densa was considered to have a function to regulate the vascular resistance of afferent arterioles that deliver blood to the glomeruli. This function keeps the glomerular filtration rate of the kidney constant. The glomerular filtrate filtered through the glomerulus passes through the macula densa adjacent to afferent arterioles from the proximal tubule via Henle’s loop. It was considered that the macula densa monitored the salt level and controlled the degree of constriction of afferent arterioles to keep the filtration pressure in the glomerulus constant. This phenomenon is called tubuloglomerular feedback. As a matter of fact, it had been observed that, when a thin glass pipette was inserted into the proximal tubule from the surface of the kidney and the pressure inside the tubule, which is thought to reflect the filtration pressure in the glomerulus, was measured, the pressure kept fluctuating minutely about twice a minute. But the average pressure is kept stably constant. Such stability was considered possible because the macula densa regulated the degree of contraction of afferent arterioles very elaborately.

Prof. Ito took out afferent arterioles and the macula densa together and perfused them at the same time. He built an experimental system for observing directly under a microscope whether afferent arterioles would contract or relax when the salt level of the perfusion liquid of the macula densa was changed. As a result, He proved that an increase in the salt level of the macula densa causes afferent arterioles to contract.

Chronic kidney disease is a term that collectively refers to abnormal conditions of the kidney such as a very slight amount of protein excreted into the urine. Epidemiological studies have shown that patients with chronic kidney disease are likely to develop stroke or myocardial infarction. The biggest mystery of chronic kidney disease is that, even when the glomerulus filtration rate is normal, a person is prone to develop stroke or myocardial infarction if a very tiny amount of albumin in the final urine is minuscule, because albumin leaked out from only a small number of glomeruli is diluted by a large volume of albumin-free urine coming from normal glomeruli. No matter how little the amount of albumin in the urine, however, it means strain vessel damage. Because the brain has strain vessels, exactly the same structure as the kidney does, we can understand why the presence of small amount of albumin in the urine is closely associated with stroke. Thus, he made it clear why detection of albumin in the urine led to a prediction of a stroke and myocardial infarction.

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Honoree

Distinguished

SHIMOKAWA

Hiroaki

On the Winning of the William Harvey Lecture Award

Department of Cardiovascular Medicine

Professor

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in which a coronary atherosclerotic lesion was
similar to that seen in humans using miniature pigs,
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cular smooth muscle and the relaxant response of the
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vascular endothelial dysfunction or the vascular smooth muscle-hypercontraction? The animal model
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selective Rho-kinase inhibitor for various indications.

Angina pectoris and myocardial infarction are isch-
emic heart diseases in which the blood flow to
cardiac muscle is reduced due to obstruction and/or
spasm of the coronary arteries. Prof. Shimokawa
worked on the research about elucidation and
improvement of coronary artery spasm for more than
30 years.

His first research topic was to develop an animal
model for reproducing coronary spasm. Doing these
researches, he came to realize that the spasm is never
experienced by normal blood vessels but occurs only
to blood vessels hardened by one type of arterioscle-
rosis or another. Finally, in 1983, he succeeded in
developing an animal model of the coronary spasm similar to that seen in humans using miniature pigs,
in which a coronary atherosclerotic lesion was
induced. Using the coronary spasm model, then, he
examined coronary artery in detail histologically. He
found that early coronary atherosclerotic lesions not
visualized by coronary arteriography had formed in
some parts but that coronary spasm had occurred in
those parts with high levels of reproducibility. Prof.
Shimokawa thus demonstrated experimentally that
coronary spasms occur in parts of a coronary artery
with early coronary atherosclerotic lesions using an
animal model.

Coronary spasm occurs when the vascular smooth
muscle contracts abnormally. It had been considered
that the spasm is caused by the disruption of the
balance between the contractile response of the vas-
cular smooth muscle and the relaxant response of the
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wide range of cardiovascular diseases. Today, a
d number of domestic and foreign pharmaceutical
companies are in fierce competition to develop a
selective Rho-kinase inhibitor for various indications.

Prof. Shimokawa then started to study the vascular
endothelium as his second research theme. The vas-
cular endothelium produces and releases relaxing
factors called the endothelium-derived relaxing factor (EDRF) in order to keep blood vessels relaxed.
There are three types of EDRF; PGI2 (prostacyclin)
identified in 1976, nitric oxide (NO) reported in
1980, and the endothelium-derived hyperpolarizing
factor (EDHF) reported in 1988, which identity
remained unknown for a long time. While research-
cers around the world were trying to identify the
EDHF, Prof. Shimokawa discovered ahead of them
in 2000 that the identity of the EDHF is hydrogen
peroxide (H2O2) that the vascular endothelium pro-
duces and releases at the physiological concentration.
Since his first report, many papers have been pub-
ished confirming his EDHF/H2O2 theory in both
animals and humans. His concept has opened the
important research filed on the physiological and
medical importance of reactive oxygen species to
maintain the homeostasis of our body.

Prof. Shimokawa is still working on the researches
of coronary spasm and the EDHF. The William Harvey
Lecture Award was given to him for his achieve-
ments in these two basic researches.

William Harvey Lecture Award

On the Winning of the William Harvey Lecture Award

The William Harvey Lecture Award of the European Society of Cardiology is an honorable prize associ-
ated with William Harvey (1578 – 1657), an English
physiologist and physician, who discovered the
circulation of the blood. The award is given to the
distinguished scientists as leading experts in the
fields of knowledge through their contributions and
qualified investigation. Professor Hiroaki Shimo-
In 1979, Prof. Shimokawa obtained his M.D. degree
at Kyushu University and in 1985, his Ph.D. degree
at Kyushu University. He took a full-time position as
a Lecturer at Tohoku University in 1981. Later, he
became a Professor in 1991. Prof. Shimokawa is
still working on the researches of coronary spasm
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was given to him for his achieve-
ments in these two basic researches.

Professor Hiroaki Shimokawa

Department of Cardiovascular Medicine

Tohoku University

Education
1979 M.D. (Kyushu University School of Medicine, Japan)
1985 Ph.D. (Kyushu University Graduate School of Medicine, Japan)

Academic Appointment
1991 - 1992 Adjunct Assistant Professor, Kyushu University
1992 - 1995 Assistant Professor, Kyushu University
1995 - 2005 Associate Professor, Kyushu University
2005 - Professor, Tohoku University Graduate School of Medicine

Hospital Appointment
1991 - 1995 Assistant Professor, Kyushu University Hospital
1995 - 2005 Associate Professor, Kyushu University Hospital
2005 - Chairman, Department of Cardiovascular Medicine, Tohoku University Hospital
2012 - President, Tohoku University Medical Association
2012 - Director, Cardiovascular Center, Tohoku University Hospital
2013 - Director, Clinical Research, Innovation and Education (CRIETO), Tohoku University Hospital
Masayuki YAMAMOTO

Professor
Department of Medical Biochemistry

Education
1979 M.D. (Tohoku University School of Medicine, Japan)
1983 Ph.D. (Tohoku University Graduate School of Medicine, Japan)

Academic Appointment
2007– Professor, Tohoku University Graduate School of Medicine
2008–2011 Vice president, Tohoku University
2008–2012 Dean, Tohoku University Graduate School of Medicine
2012– Executive Director, Tohoku Medical Megabank Organization

The Japan Academy Prize
Keap Away from Oxidative Stress

The Japan Academy Prize is the most authoritative prize among Japanese academic prizes. The award is given to persons for their notable research landmarks, outstanding achievements, and particularly excellent academic papers or books. Prof. Masayuki Yamamoto received the award in 2014 for his research on the molecular mechanism of response to environmental stress in living organisms.

We are surrounded by various stresses that cause bad effects to our body. Especially, whereas “Oxygen” enables us to acquire energy efficiently through a mechanism called breathing, biological molecules in turn are being exposed to the risk of oxidative damage. Nevertheless, human being can enjoy a healthy life, because our body can respond to the environment stresses including various oxidations, and has the ability to adapt.

Prof. Masayuki Yamamoto has made a great achievement in understanding how the cells sense the oxidative stresses and environment toxins, how it responds and adapts to them and molecular mechanisms underlying the responses. Particularly, Prof. Yamamoto discovered Keap1 which is a sensor of environmental carcinogen (electronic substances) and oxidative stress and transcription factor Nrf2 that responds to its commands. It is clear now that Keap1-Nrf2 control system plays a vital role in biological defense, which has received international acclaim. Further, Prof. Yamamoto found that the dysfunction of Keap1-Nrf2 control system forms the molecular basis of various diseases and proved that Nrf2 activity control is effective in the prevention and treatment of diseases. In response to this achievement, currently, one Nrf2 activator has been approved in many countries for the treatment of multiple sclerosis and similarly treatment of diabetic nephropathy is nearing to practical application. Prof. Yamamoto has found that derepression from the suppression due to the constant degradation of Nrf2 by Keap1 is the actual condition of environmental stress response. And, Prof. Yamamoto had clarified that the reactive cysteine residues of Keap1 sharply sense these environmental stresses. Thus, molecule basis of stress sensor is “Cysteine code” (Regulation of gene expression by Cysteine residue modification).

Thus, the study of Prof. Yamamoto is to provide an important discovery in the biological response mechanism research area to environmental stress and its result has been attracting greater attention from various fields of medicine and life sciences.
Greeting
Medical Sciences
(Master’s Course)

Foster Global Talents

Master’s Course of Medical Sciences is committed to the goal of training researchers and professionals who play an active role in the forefront of medicine and medical care in Japan and the world. We also foster excellent human resources who have the power to show leadership on-site. We provide coursework and practical training of medical sciences hosted by top-ranked academics in Japan. The most characteristic change over the last few years is the increasing number of students including foreign students taking an infectious diseases, virology, healthcare administration and genomic epidemiology as specialized fields. Students struggles experiments or field works very hard, with the result that some students publish their thesis works in international journals every year.

The Graduate School of Medicine has been accepted international students for many years under the “Open Door” policy of Tohoku University. Now, 83 students from 19 countries in Asia, the Middle East, Africa, North America and Europe are enrolled (Nov. 2014). In 2012, we started double degree program, and we have accepted 11 students from international partner institutions.

Half of the graduated students continue to stay in Japan and go on to doctoral program or work for public or private research institutions and companies. Among the other half, some go to other countries to continue study at universities, the others take their expertise learnt in Tohoku University back to their country. We are looking forward to spending time with students who are enthusiastic and open-minded, and to playing an important role as citizens of the world with foreign students.

Quick Facts

114 Departments
104 Professors
30 Students (Fixed Number)
Pursue Your Potential

In the Medical Sciences of Tohoku University Graduate School of Medicine, we are aiming to foster human resources to challenge the problem to be solved in medical sciences. It is important for the aim not only to acquire the cutting-edge specialized knowledge and understanding the world-class research but also to nurture a strong willingness to challenge the unknown, unexplored subjects.

In the Doctoral Program of Medical Sciences, we aim to systematically train the personnel with variety of talents in the medical field by adoption of “Multiple Mentor System” and “Retreat of the Graduate School” and built multi-dimensional teaching (guidance) and an environment for the students to actively execute research. In addition, system that supports research such as common equipment room has been established and it is possible to perform research that use cutting-edge research equipment. On the other hand, Video lessons ISTU (Internet School of Tohoku University) using internet are actively used and it is possible to attend many lectures from off-campus (outside the University) in Tohoku University. The ISTU allows many of the working people to obtain a degree while continuing their work.

We will provide you with both an excitement in the profound research “Seeking the Mechanism of Life” and actual feeling helpful to the society in the research to “Cure the Disease.” Here is a place for you to pursue each individual’s potential to one’s heart’s content by using the cutting-edge technology.
Greeting

Disability Sciences
(Master’s Course / Doctoral Course)

Overcome Disability with Science

Disability Sciences are the courses of the Functional Medical Science as one of the divisions of Graduate School of Medicine. Functional Medical Science indicates research area of normal and abnormal function of human body and mind and developing novel methodology to overcome dysfunction. This organization was first established in Tohoku University and the most creative structure not only in Japan but also in the world.

The courses aim to pursue in investigating medicine, disability and rehabilitation and to develop ability to perform scientific research, clinical practice, and/or education/occupation with high grade. The courses also aim to cultivate internationally useful individuals. Actually we successfully educated graduates of multidisciplinary areas; school/faculty of medicine, nursing, pharmacy, nutrition, physiotherapy, occupational therapy, speech therapy, biology, agriculture, technology, psychology, education, economy, music, sports sciences, and the others. We offer enriched curriculum and made human resources who can contribute to international activities as investigators, professors, administrators of government, professional business personnel, and others.

For the rehabilitation professionals, they will become educators/professors to be responsible for graduate education of medicine/health fields and/or leaders of professional physicians or therapists.

The mission of the organization is; “Disability can be overcome by science.”

Quick Facts

- **8 Departments**
- **8 Professors**
- **28 Students**
- **11 Students**

Shin FUKUDO
Professor, Department of Behavioral Medicine
In accordance with advances and specialization of medicine and medical care, even in the health science area, educators, researchers and advanced professionals who have excellent knowledge and skills are sought. The Course of Health Sciences was established in April 2008 with an aim to promote the training of educators, researchers, and advanced professionals in Health Sciences. Three courses including Nursing, Radiological technology, and Medical technology courses are provided and we are conducting educational and research guidance.

For admission qualification, national qualification of either of Japanese Nurse, Medical radiology technician or Clinical laboratory technician is not required. In either of doctoral programs (first or second semester), curriculum of Nursing course confers a degree of Master’s degree or Ph.D. in Nursing and curriculum of Radiological technology or Medical technology courses confers a degree of Master’s degree or Ph.D. in Health Sciences.

We introduce multiple faculty system in research guidance and students can choose research guidance (Advisor teaching guidance) by faculty other than affiliated laboratory, enabling to develop research from various points of view. In Japan, which becomes low birth rate and aging society, you can learn the research that contributes to health, medical care and welfare with cutting-edge Health Sciences.

Greeting
Health Sciences
(Master’s Course / Doctoral Course)
Amid declining population and aging, health problems that modern society is facing are more diverse and complicated. On the other hand, the rapid advances of clinical research and genome science has a major impact in Public Health. Therefore, Researchers of Public Health System with high degree specialization of international level and high degree specialized jobs are in demand.

In order to meet its needs, upon a common foundation called as “Accomplishments of Public Health”, we are further working as a mission to train human resources with a high degree specialization and high degree professional ethics of international standards. The school of Public Health is the most new course that was setup in April 2015 and those who complete the master’s program will be awarded Master of Public Health (MPH).

The MPH is internationally recognized in public health administration, international health, clinical research, and other related fields. Our School’s aim is to develop new aspects of public health capable of responding to the needs of the times. We look forward to many highly motivated students taking our new course.

High Expertise and Work Ethics

Quick Facts

- 11 Departments
- 10 Professors
- 10 Students (Fixed Number)
Natthewan
CHAIMONGKOL
Thailand
Doctoral Course Student, Course of Medical Sciences
Education

2007 B.A. (Chiang Mai University, Thailand) 2010 M.A. (Chiang Mai University, Thailand)

It is well-known that universities in Japan are the famous institutions where have a good educational system including school facilities. Therefore, I decided to continue my Ph.D. study here in Japan. Among a number of different areas of research, I am personally interested in infectious diseases, and, fortunately, this research field is available in a laboratory of Department of Virology, Tohoku University Graduate School of Medicine.

Regarding to our laboratory, we have been conducting the research in Japan and the Philippines through the collaboration with the Research Institute of Tropical Medicine (RITM). Within two years of my study, I have gained valuable experiences in the two main areas of emerging infectious diseases, such as acute respiratory diseases (caused by influenza virus, respiratory syncytial virus and enterovirus D68) and acute gastroenteritis (caused by rotavirus, norovirus and other enteric viruses). Therefore, it is a really good chance to me to experience in the field trip abroad, to learn how to develop a connection, and to work as a team with new colleagues. All of these are truly strengthen and fulfill my research background.

Before I came to Japan, I had a bit worry about a language burden because the Japanese language was quite difficult for me. However, I apparently got helps from university organizations cooperating among foreign students and also got the endless kindness from my faculty members and colleagues. The supports eased my worries since the first year and I began having fun with the student life. Accordingly, I spend most of my free times travelling and trying some new activities. Moreover, there are several clubs available in the university and students can also join with a variety of activities as they like. Since, Sendai city is not so crowded, I usually walked or ride the bicycle to the campus and other places. Therefore, I literally feel fascinated in the environment, cultures, architectures and the Japanese’s life style. The more people have a simply life, the less stress they feel, and this sounds like a gift for my mental health.

Over the past two years, I have been learning on creative thinking and have been practicing several laboratory skills from Tohoku University. I believe that study in Japan will develop my maturity which will be very useful for my future. Thank you very much for such a great opportunity.

Runnnapa
MALASAO
Thailand
Doctoral Course Student, Course of Medical Sciences
Education

2003 B.A. (Chiang Mai University, Thailand) 2007 M.A. (Chiang Mai University, Thailand)

My research project is molecular characterization of human respiratory syncytial virus (HRSV). It is mainly cause of acute lower respiratory tract infection (ALRI) which is the global disease burden in infant and young children. We performed molecular analysis of HRSV among infants and children hospitalized with severe pneumonia in four study sites in the Philippines, including Biliran, Leyte, Palawan, and Metro Manila. Nasopharyngeal swabs were collected and screened for HRSV from 2012-2013 revealed that 24.7% were positive for HRSV. Based on the G gene sequence, HRSV is classified into two subgroups (HRSV-A and HRSV-B). HRSV-A can be further divided into 3 genotypes including GA1-GA7, SA1, NA1, NA2, and novel ON1 genotype which had 72 nucleotide duplication in the 2nd hypervariable region of G gene while HRSV-B can be divided into 9 genotypes including GB1-GB4, SAB1-
In the year 2010, I did an exchange program overseas study in Tohoku University School of Medicine as a special auditing student. And then, I completed master’s course of Disability Sciences at Tohoku University Graduate School of Medicine and currently enrolled in the doctoral program.

Now I am doing research in “Application and effectiveness verification of Kohzuki Exercise Program (KEP) among the elderly people of local residents”. In Japan and South Korea, health problems of elderly people such as elderly diseases and life style disease, Quality of Life (QoL) has become serious. I have designed an exercise program suitable for physical functions of the elderly and the objective is to verify if the effect of this exercise program varies depending on the age by comparing Japan and South Korea. By clarifying the importance of exercise for physical and mental functions of the elderly people, this research is expected to result in the establishment and continuing the research against the elderly in the department. Based on the knowledge learnt in Japan, I aim to building a model of both purpose of life and health promotion in elderly people. In the future, I would like to make the best use of the things that I have learned here in my own country.

I love Sendai. Sendai was my first overseas training place when I was an undergraduate student in Korea. People were very kind and the environment was very comfortable to me, even I cannot speak Japanese at that time. Therefore, I thought I was able to study abroad if I could live in Sendai. My Sendai life is in the 6th year. Even now, I am enjoying comfortable life in Sendai.

In the course of Disability Sciences, furthermore, medical researches are conducted not only for the elderly people but also for people with disabilities, as a unique research course in Japan. Among them, many rehabilitation medical staff of various occupations was enrolled in the Department of Internal Medicine and Rehabilitation Science, to which I belong. It is a unique department for rehabilitation performing medical care and research to prevention and rehabilitation for internal functions disabilities such as heart disease, respiratory and kidney dysfunction, brain and metabolic disorder. By doing research here, we get taught by wonderful teachers, and I am also learning the attitude as a researcher specialized for elderly people care. In addition, I would like to learn by expanding the field of vision furthermore against physical and mental health of the elderly people by continuing the research against the elderly in the department. Based on the knowledge learnt in Japan, I aim to building a model of both purpose of life and health promotion in elderly people. In the future, I would like to make the best use of the things that I have learned here in my own country.

I am Sarina Bao. I am a蒙古族 from Inner Mongolia Autonomous Region in the People’s Republic of China. I graduated the Master’s Program in Health Science at the Tohoku University Graduate School of Medicine in 2014, and then I am enrolled in a doctoral program in the same field. During the past few years, I have learned systematically the theory of physiology and got the basic manipulative skills about the relevant medical experiment method under the direction of Prof. Ryoko Maruyama. The research theme in my master’s course study was to investigate the relationships between birth weight and hypertension risks. We focused on autonomic nerve system and low-grade inflammation in healthy Mongolian young adults. Low birth weight is a major public health problem not only in developing countries even in developed countries including Japan. Previous studies have suggested that people who had low birth weight tended to have higher prevalence of hypertension. In China, the Mongolian ethnic minority people mostly live in Inner Mongolia, and they have a higher prevalence of hypertension than other ethnic people. We recruited 20 Mongolian young adults living in Japan to measured blood pressure, electrocardiogram and inflammation biomarkers. We got some interesting world’s first knowledge by this study. Currently, I am preparing for paper submission to academic journals. I am continuing this study in doctoral program in order to do further research to determine the mechanisms. Furthermore, I plan to compare and discuss our research findings in several ethnic groups including Chinese Han and Japanese, to clarify the ethnic differences. I believe that our study can contribute to the future of disease prevention and health promotion.

I think it is a good opportunity and challenge for me to study in Tohoku University Graduate School of Medicine. Everyone in our laboratory is really kind and taught me lots about Japanese language and culture. Prof. Maruyama always gave me encouragements and supports to challenge for some new things and new research perspective. It is important to me because it is the best way to learn new knowledge and be good for broadening my horizons. I want to full advantage the opportunity to studying in Tohoku University Graduate School of Medicine.
International Exchange Office

The International Exchange Office responds to inquiries from students overseas about studying at the Graduate School of Medicine and provides support for international students. The office has been designed as a bright, comfortable space where international students can casually drop in for guidance.

http://www.intexchange.med.tohoku.ac.jp

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