

University of Tsukuba

筑波大学



INTERNATIONAL
GRADUATE PROGRAMS IN
**MEDICAL
SCIENCES**



Introduction

Many of the students currently enrolled in our Graduate Program in Medical Sciences have obtained their 4-year degree in the area outside medicine, including pharmacy, biology and chemistry. Such diversity has helped to create a unique academic environment for students to confront frontline research through discussion and cooperation amongst their peers. We expect to significantly increase the number of students from abroad to further diversify our program.

One of the special features of the Doctoral Program in Medical Sciences is the *Musha-shugyo* system of study (samurai errantry) already started in 2005. *Musha-shugyo* study is an active learning program in which the students propose assignments by themselves and complete these assignments through judicious collaboration with researchers from abroad and from industry.

The program originated from medical education reforms advocated by McMaster University in Canada and Harvard University in the United States. The program has also been adopted throughout Finland, a country noted for its innovative education system.

Previous trends in Japanese graduate school education reform have often overly focused on producing doctoral degree awardees meeting standards in substantiveness, comprehensiveness and reliability. One noted consequence of these prior reform experiments was the production of students who suffered from one or more of the following weaknesses.

- Generally acquainted with the field but were poor in applied skills
- Unable to design and manage a research program independently
- Lack of relevant knowledge of field
- Lack of communication skills – including language skills
- Lacking a well rounded academic mind

In an effort to combat the above trends we have decided to make *Musha-shugyo* active learning systems the primary focus of our research curriculum. Although we still endeavor to produce doctoral awardees meeting international

standards in substantiveness, comprehensiveness and reliability we consider active learning *Musha-shugyo* study as the best way to cultivate the quality of scientists who are truly worthy of the conferment of the doctoral degree.

In some respects, *Musha-shugyo* study may be seen as antithetical to substantiality – an educational philosophy that emphasizes learning of content set in concert with a grading policy known in advance.

In summary, we feel that *Musha-shugyo* is a superior strategy for training students wishing to become the researchers of tomorrow – and this is one of the stand out features of the University of Tsukuba Doctoral Program in Medical Sciences.



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Interview with Vice Provost Dr. Yasunori Kanaho

“We are trying to grow more and more.”

Thank you for speaking to us today, Dr. Kanaho. First, could you tell us about the thinking behind the Global 30 program?

The Global 30 program was started to accept students from abroad to educate in Japanese universities. We are aiming to cultivate students for future international leaders in the globalized world and to provide solutions to global-scale challenges through social action work. One of our roles is to gather and disseminate knowledge backed by high-level research. In the beginning, the plan was to give classes in English for the foreign students, while Japanese students could take classes in Japanese. But I thought that is not true internationalization. My criteria for internationalization is for even Japanese students to be able to easily understand English, so they can go abroad for study at any time. Active participation in class discussions in a cross-cultural environment integrates and stimulates one's ideas and thoughts. So we decided to give all classes in English and to give the students opportunities to show their abilities to accomplish their goals.





Full Name: Yasunori Kanaho
Nationality: Japanese
Position/Year: Professor, Vice Provost, Graduate School of Comprehensive Human Sciences, University of Tsukuba
Field of study/Major: Physiological Chemistry, Signal Transduction

Do you plan to enhance the program?

Oh, yes. Of course, many institutions are also trying to set up exchange programs with other countries all over the world. For example, we have already established programs between our university and two others in Vietnam, and we are trying to establish an exchange program with National Taiwan University, Edinburgh University, Bordeaux University and so on. If we have exchange programs all over the world, maybe students can utilize our university as a hub for exchange programs. For example, if a student from Vietnam came here to study, they could go on to other universities, such as Edinburgh.

How can the Global 30 program benefit research here?

All programs involved in the education of graduate students are based on research. So first we should establish collaboration between our university and other universities. If we can successfully establish collaboration with other universities, maybe graduate students will realize how good our university is. So in the near future, we can form a lot of connections between our university and private companies. For communication it's really important to know other countries' culture, not only science.

Is this a policy direction for the whole university?

In the world ranking of universities, if you want to get a good position, you need everything – of course excellent researchers, as well as quality education and communication with other countries, researchers and educators. Part of that aim is to attract students from foreign countries. One of the evaluations of your institution is how well you contribute to education all over the world.

How about the future of the program?

We are trying to grow more and more. We have established a very valuable program here for both research and education to support students from foreign countries. This means they can come to the University of Tsukuba and do research and study in a very comfortable environment, and that is very valuable, for both the university and the country.

Master's Programs in Medical Sciences

The Master's degree programs in medical sciences were established to provide opportunities for students who had received undergraduate education other than in medicine to obtain knowledge of medicine and medical sciences, and to develop the Skills necessary for its application. Graduates of this program are expected to contribute to the progress of research in the fields of basic medical sciences, clinical medicine and community medicine. It is also the aim of this program to train professionals who can serve as experts in various medicine-related fields, such as preventive medicine, occupational medicine, medical welfare, medical engineering and medical administration, and other related fields.

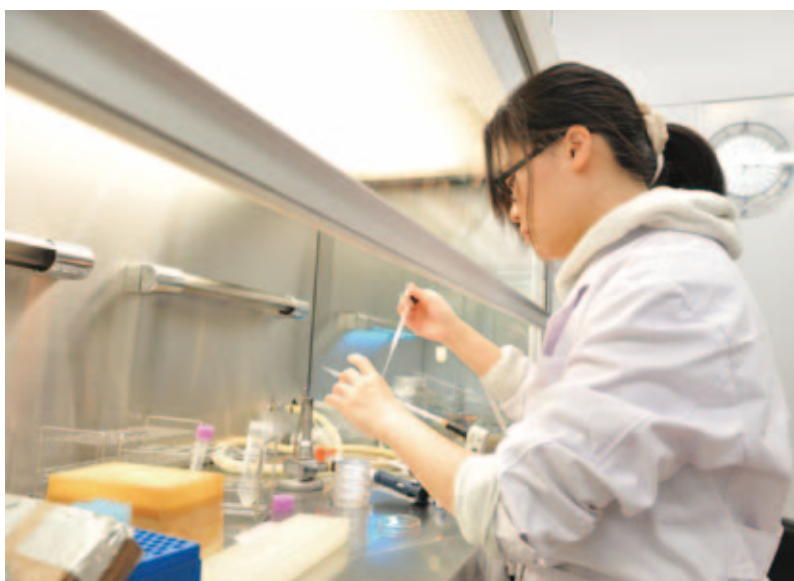
Global 30 Master of Public Health Program: There is a growing need for highly-trained public health professionals skilled in preventing illness and protecting health in the local, national, and international communities. This program is designed for professionals in various medicine-related fields who intend to incorporate public health skills into their current work and to change their careers. We aimed to equip the students with competence to become tomorrow's public health leaders, educators and researchers, namely, a new generation of public health professionals who help people to achieve healthier life around the world. Students can select either one of two programs, Accelerated Master of Public Health Program or Master of Public Health Program, according to their prior professional experiences, academic backgrounds, and future plans. *Accelerated Master of Public Health Program:* The curriculum with 30 credits is designed to develop abilities in key public health skills and to finish in one year. This program includes core coursework in public health such as Biostatistics, Epidemiology, Environmental Health, Public Health Management and Policy, Public Health Practice, and Social and Behavioral Sciences and aims to produce ethically, culturally, and scientifically competent, topnotch public health practitioners. Instead of a master's thesis, each student must conduct a special project, Advanced Exercise in Public Health, in the last term which covers overall cross-disciplinary fields of public health. The Advanced Exercise in Public Health offers the student the opportunity to synthesize both theoretical and practical coursework. Its outcome is assessed by a written report and a final oral presentation near the end of the program. *Master of Public Health Program:* This is a two-year, 30-credit program. The first year mainly involves core coursework in public health such as Biostatistics, Epidemiology, Environmental Health, Public Health Management and Policy, Public Health Practice, and Social and Behavioral Sciences, while the second year is devoted to research on public health. Students who wish to learn more about the methods and research of public health and pursue a PhD are encouraged to select this program. All students must prepare a master's thesis and make an oral presentation to show their competence in research activities.

Master's Program in Medical Sciences: This program is designed for student to enroll in the existing Master's programs offered in Japanese at the University of Tsukuba, Faculty of Medicine. Students in this program may also elect to take courses taught in English toward their degree. Japanese applicant living abroad may apply to this program.

Dual Master's Degree Program: The program gives students of the Master's Program in Medical Sciences, University of Tsukuba, and National University of Ho Chi Minh City and Ho Chi Minh City University of Medicine and Pharmacy an opportunity to study in the master's

program reciprocally, and the students are able to acquire degrees from both universities (dual degree) through academic studies and research activities in each institution. The learning period will be two years for students from Vietnam and a year for Japanese students. Students from Vietnam are expected to earn 10 credits out of 30 required credits in Vietnam, and with the remaining 20 credits in Japan. That, including a thesis, will fulfill the requirement for the degree (Medical Sciences). The students of the University of Tsukuba will acquire a master's degree either in Science or in Pharmacy in Vietnam. The curriculum instructed in English in the Master's Program in Medical Sciences, University of Tsukuba, is organized with a variety of courses which extend to clinical, basic and community medicine in the comprehensive fields of medical sciences. Thus students are able to select courses of their interest and future goals. Through basic research in life sciences and research leading to medical care, students of both countries are expected to devote themselves toward the betterment of society. With an international mind, they will practice as medical professionals such as researchers, educators or highly skilled specialists.

Curriculum: In order to meet the changing and growing demands of medical sciences, public health, health care and welfare, the curriculum has been structured to accommodate the diversity of student backgrounds. The requirements for students admitted to any of the above programs are generally the same. The curriculum is comprised of (1) fundamental subjects, including human anatomy, physiology, biochemistry, overview of clinical medicine, overview of social medicine and English in medical science, (2) electives and advanced subjects including all of the basic medical science disciplines, biotechnology, pathology, clinical medicines, sports and health, social medicine, medical welfare, medical information technology, experimental animal sciences, and (3) thesis for the Master's degree. Total required credit units for graduation are 30 units, most of which have to be finished in the first year. The thesis work should be carried out under the direction of an advisor.

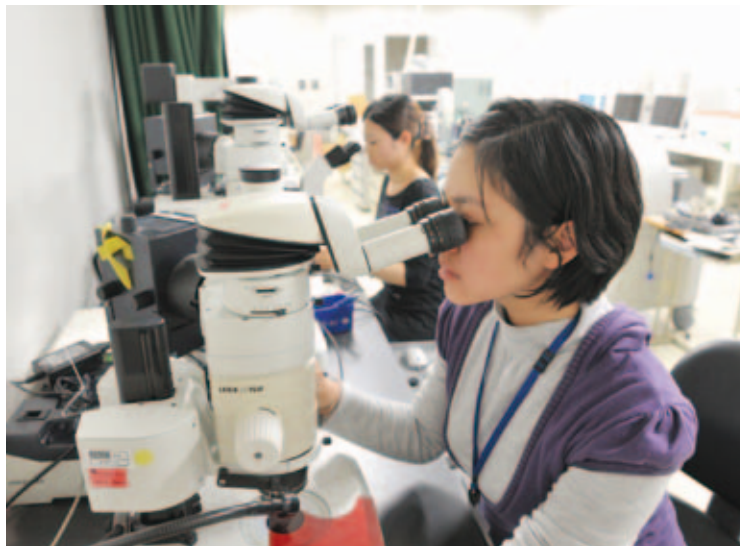
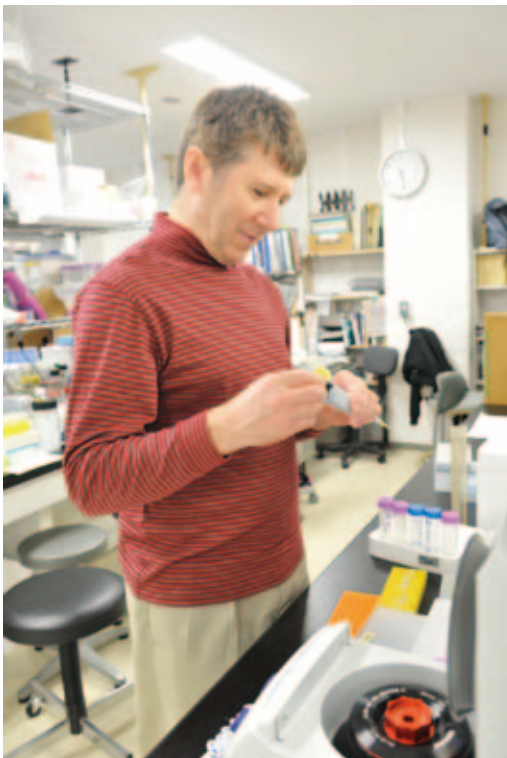


Doctoral Programs in Medical Sciences

The Doctoral Programs in Medical Sciences of the University of Tsukuba will cultivate in our scholars a spirit of creativity and cooperation so that they can become innovative and leading biomedical researchers and educators. Through the program, we will advance knowledge and problem solving skills through rigorous scientific debate conducted always in a spirit of mutual and abiding respect.

Research fields in our program cover basic experimental medicine as well as social and environmental medicine: Biochemistry, Molecular Biology, Cell Biology, Human Genetics, Physiology, Animal Models, Anatomy and Embryology, Pathology, Pharmacology, Oncology, Infection Biology, Immunology, Epidemiology, Environmental Medicine, Legal Medicine, and Public Health. Students can select their specialties from 18 different fields. The program is designed to have many faculty members so that students can learn each subject from the specialists in the field. More than 70 members participate in the program.

Another characteristic of our program is the emphasis on rigorous scientific debates. Students are expected to participate in rigorous discussion during the seminars and periodic meetings in order to sharpen their communication skills and creative thinking. They are expected to be able to judge and evaluate the objectives, methods, results and significance of research to understand the science and logistics behind the research work. Organization and preparation for publication and thesis is also important. While working toward their theses, students gain advice from their mentor as well as from faculty and students outside their own laboratory. The entire faculty is willing to support and contribute to the quality of theses.



Global 30 International Doctoral Program: The University of Tsukuba aims to cultivate human resources with a global view by promoting international exchange to improve academic standards. The University of Tsukuba was selected as a member of "Global 30 Project for Establishing Core Universities for Internationalization" in 2009 by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). This project aims to promote internationalization of Japanese universities. All courses are offered in English for students to obtain a Doctorate degree.

Doctoral Program in Biomedical and Clinical Sciences: The program is designed for students to enroll in the existing Doctoral programs offered in Japanese at the University of Tsukuba, Medical Branch. Students in this program may also elect to take English courses toward their degree. Japanese applicants living abroad may apply to this program. Please visit http://www.md.tsukuba.ac.jp/renais/e/home/about_r/about/about_prj.htm for more information.

Dual Doctoral Degree Program: This program is for students currently enrolled in a foreign graduate school affiliated with the University of Tsukuba to obtain a Master's or Doctoral degree from both institutions. Affiliated Universities are: The University of Medicine and Pharmacy at Ho Chi Minh City (Vietnam), University of Sciences at Ho Chi Minh City (Vietnam) and National Taiwan University (Taiwan).

Curriculum: The Doctoral degree programs include the satisfactory completion of at least 30 credit hours of formal course work, including required courses. Each student is required to take a preliminary examination during the 2nd year of enrollment, and defend their dissertation in English for their final examination. It is expected that doctorate students will publish two first author original articles in a professional journal written in English. Students must also demonstrate English proficiency by obtaining a score over 750 in TOEIC.



Student Life

Interview with Alexander Zaboronok,
Doctoral student in neurosurgery,
from Belarus.

“There are a lot of research opportunities at this university.”



First, could you tell us about your studies here?

I'm in the PhD course in the department of Neurosurgery. My research is devoted to the treatment of brain tumors using X-rays and gold nano-particles. Tumor cells can accumulate gold in the form of nano-particles, and when irradiated with X-rays of a certain energy range the gold

atoms can produce additional local radiation, enhancing the effect of radiotherapy. I believe these mechanisms can be used in the development of new drugs for combination therapy to cure cancer and extend the lives of patients.

Why did you come to Japan to study?

In my country I was doing research on brain tumor treatment using lasers and special drugs called photosensitizers. When I saw a poster on the Global 30 scholarship I decided that it would be a very good opportunity for me to realize my cancer treatment ideas doing research in Japan.

I applied and was really happy to come to Tsukuba. There are a lot of research opportunities at this university – at our research center and in other laboratories I can work with equipment that I only read about in books when I was a student.

What are your plans after you finish the degree program?

I devote all my time here to research and I am so interested in it that I would like to continue to study and do research on cancer treatments after I graduate.

How do you like it here?

People are very friendly in Japan and especially in Tsukuba, as there are many foreigners here. And there's no problem getting help and answers to almost any question if you are in trouble. The laboratory personnel are also very helpful. I practice karate in the medical student karate club and I met many friends there. I enjoyed travelling in Japan as I can visit so many beautiful places. I really love Japan.

Full Name: Alexander Zaboronok

Nationality: Belarus

Position/Year: Doctoral Program 3rd year

Field of study/Major: Neurooncology, Neurosurgery

Educational background: BM, Belarussian State Medical University
Clinical Residency in Neurosurgery, Minsk, Belarus

Interview with Farhana Ferdousi,
Doctoral student in epidemiology,
from Bangladesh.

“I know I'm happy to be here, very comfortable.”



Could you describe your studies?

I'm a 1st year doctoral student in the department of clinical trial and clinical epidemiology. In my master's program I studied visceral leishmaniasis, also known as kala-azar, one of the most neglected tropical diseases (NTDs) carried by sandflies.

I studied ways of using Neem oil to control the sand flies and therefore the disease that way. Now, in my doctoral program I'm studying childhood tuberculosis. When I finish my PhD, in four years, I plan to return to Bangladesh and work as a researcher.

Why did you choose the Global 30 program?

As the language of instruction in the Global 30 program is English, I found it convenient to study here.

What do you think of Tsukuba, and Japan?

It's great, very beautiful – I love the sakura and momiji, and it's so calm and quiet here. The people here are so kind and helpful – I don't speak Japanese well, but whenever I go out, I know I'm happy to be here, very comfortable.

On my time off there are parties, and we go outdoors, to Mt Tsukuba, Kasumigaura Lake, and shopping. I've also done some travelling, to Hiroshima, Osaka and Toyama.

Full Name: Farhana Ferdousi

Nationality: Bangladesh

Position/Year: Doctoral Program 1st year

Field of study/Major: Clinical Trial and Clinical Epidemiology

Educational background: MBBS, Mymensingh Medical College, Bangladesh
MPH, University of Tsukuba, Japan

Interview with Vo Nguyen Thanh Thao and Trinh Nhu Thuy, Doctoral students in Medical Sciences, from Vietnam.

“I hope to form tie-ups between Vietnam and Japan. -Thao.”

Please tell us about your studies and research here.

Thao: I just finished my master's degree, and have started working on my medical degree in the International Doctoral Program in Medical Sciences. I work in Kato-sensei's lab, where the research focus is on transforming growth factor β (TGF- β) signaling and how it regulates human diseases, especially cancer. In my group, we are trying to find out the role that this plays in the progression of the disease.

Thuy: I'm in the 1st year of the doctoral program in Medical Science as well, and I also took my master's degree here. I belong to the regenerative medicine and stem cell biology lab, where I'm interested in stem cells from adipose tissue. I hope to figure out some characteristics of adipose tissue-derived mesenchymal stem cells from diabetic patients. Then, I will try to improve their functions and use them to treat diabetes mellitus and its complications.

How do you like living here?

Thao: I love Tsukuba. It's a modern city, not so crowded, quiet, lots of open spaces and fresh air. Moreover, it's very convenient to get to Tokyo on a TX express train within 1 hour. So it's a very suitable place for studying and living. The International Student Center, which is located in the center of Tsukuba University, also gives a lot of support to overseas students. Here, it is very easy to make friends, join international events, and learn about the cultures of other nations.

Thuy: It's a very impressive place; the people are very positive and helpful. The students study very hard. In Tsukuba, there are many opportunities to learn about science. I have had opportunities to join many conferences and met a lot of famous scientists from Japan and other countries. Besides, it's very beautiful here. I love the seasons – my country only has sunny and rainy seasons. I enjoyed the snow in the winter, and all the beautiful flowers, especially the sakura (cherry blossoms) in the spring, as well as the momiji (maple leaves) in the autumn.

Have you done much traveling?

Thuy: Oh, yes, I go shopping in some places around Tsukuba every weekend. My friends and I often have gone on trips to Tokyo, Yokohama and Chiba. We also went to Hokkaido for the Snow Festival.



Vo Nguyen Thanh Thao (right) and
Trinh Nhu Thuy (left)

What are your plans for after graduation?

Thao: I want to become a scientist in the near future. After graduation in two or three years, I'll return to my country and set up my own lab. I am meeting lots of professors here, so in the future I hope to form tie-ups between Vietnam and Japan.

Thuy: I hope to become an independent researcher, as well as a lecturer. I would like to contribute to developing my field of study in Vietnam, and convey my knowledge to students in my country.

Full Name: Vo Nguyen Thanh Thao

Nationality: Vietnam

Position/Year: Doctoral Program 1st year

Field of study/Major: Experimental Pathology

Educational background: BS in Biology, University of Science, Ho Chi Minh City, Vietnam

Full Name: Trinh Nhu Thuy

Nationality: Vietnam

Position/Year: Doctoral Program 1st year

Field of study/Major: Regenerative Medicine and Stem Cell Biology

Educational background: BA, An Giang University, Vietnam
MS, University of Tsukuba, Japan

Recent Activities

Summer School at the University of Tsukuba: As a part of the Global 30, Graduate programs in Medical Sciences (Doctoral program in Life Systems and Master's program) at the University of Tsukuba held a summer school from July 25 to August 5, 2011. This year, twenty-one students from Vietnam and Taiwan, and nine students from the University of Tsukuba, participated in this program. Each student selected two courses from these subject areas instructed by faculty members of the University of Tsukuba: Human Pathology and Molecular Pathology; Molecular Biology and Developmental Engineering; Public Health; Bacteriology and Immunology; Bacteriology and Molecular Biology. A course completion certificate was awarded to participants.



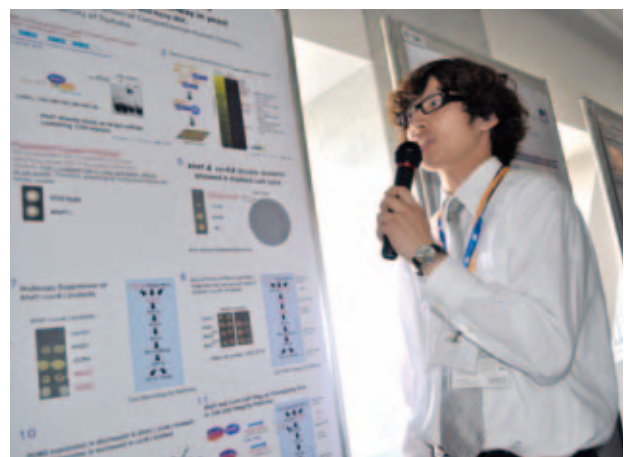
Musha-shugyo Program: The graduate students set a goal by themselves and make a research plan through negotiations with their supervisors, foreign graduate students and industry representatives. The plans include participation in the international conferences and training. In 2011, doctoral students attended conferences in Sweden, Portugal, the USA, Australia, and the UAE through this *Musha-shugyo* program.



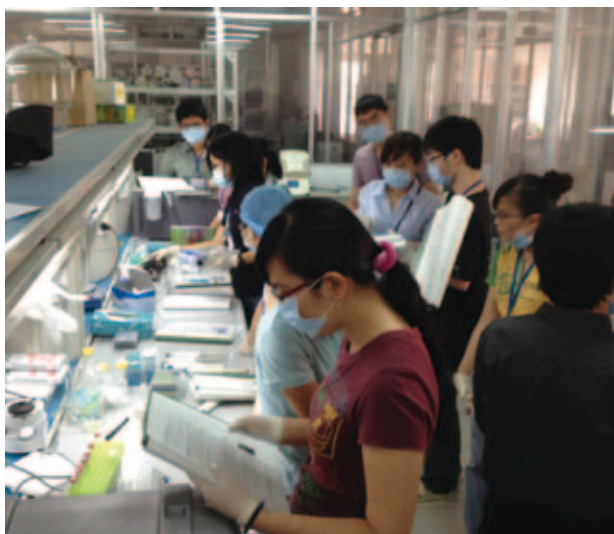
The Annual Leading Graduate Schools International Conference: This Conference aimed to bring together a diverse group of scientists tightly linked with our department in the field of medical sciences and life sciences. We intended to provide an opportunity to help strengthen the networks and promote the exchange of ideas and experiences among universities. Attendees have included delegations from the University of Edinburgh, Université Victor Segalen Bordeaux 2, Vietnam National University Ho Chi Minh City, National Taiwan University, and the University of Tsukuba. The inaugural Leading Graduate Schools International Conference in 2010 was divided into four sessions, Neuroscience, Development and Cell Biology, Gene Regulation and Clinical Research.



The second annual Leading Graduate Schools International Conference was held in November 2011. In addition to the above universities, University of Bonn, Hue College of Medicine and Pharmacy, Leiden University, University of Szeged joined this year's conference, with attendance of over 400 researchers and students, at Tsukuba International Congress Center. Topics focused on three areas: Gene Regulation and Cancer, Neuroscience and Development, Infection. Awards were given for oral and poster presentations. This year, Nicola Festuccia, Ph.D. student from Center for Regenerative Medicine (University of Edinburgh) received an outstanding speaker award.



Internship Program in Ho Chi Minh City, Vietnam: Students of the Ph.D. program in Life System Medical Sciences visited the Institute of Tropical Biology (ITB) to support a course in experimental molecular biology. This experimental course consisted of lectures, laboratory experiments and presentations. All parts of this experimental course were planned and conducted by doctoral students under the guidance of professors from the University of Tsukuba. The University of Tsukuba and ITB jointly recognized the work of program participants with a certificate of completion.



Short-term Visiting Program in Taiwan: Graduate students from the University of Tsukuba joined a visiting program at National Taiwan University. The students participated in lectures during the first week. The following week, they separated into six groups and spent four days at each laboratory, learning about the laboratories and conducting experiments. The entire course was in English and all the participants gave presentations of their learning outcome at the end of the program.



Long Distance Course Lecture with National Taiwan University: The aims are to promote international long-distance academic and research exchanges, to boost scientific communication and learning in English, and to explore biological sciences, in particular aspects relating to translational research. The Fall 2011 course in Cancer Cell Biology was conducted in collaboration between National Taiwan University, Kyoto University, and the University of Tsukuba.



Ph.D. Program in Human Biology: The University of Tsukuba offers a 5-year Ph.D. program in Human Biology starting 2012. This program adopts a multi-perspective methodological approach, integrating the disciplines of biological science, medicine, computational science, and materials science, to understand the mechanisms of human survival, adaptation, and inheritance. Students will be given training allowing them to develop the outstanding research skills and specialist knowledge required at this level of study. The aim is to nurture global leaders of the future, who are able to create a rich human society. For more information, please visit: <http://hbp.tsukuba.ac.jp/en/index.html>.

MEXT(Ministry of Education, Culture, Sports, Science and Technology) in Japan
Leading Graduate School Doctoral Program

PH.D. PROGRAM IN HUMAN BIOLOGY

**Nurturing of the Global Leaders
Steering of the Future Human Society**

The Human Biology Ph.D. Program adopts a multi-perspective methodological approach, integrating the disciplines of biological science, medicine, computational science, and materials science, to understand the mechanisms of human survival, adaptation, and inheritance. Students will be given training allowing them to develop the outstanding research skills and specialist knowledge required at this level of study. The aim is to nurture the global leaders of the future, able to create a rich human society.

Education
Cultivation of global leaders

- Globalization
- Global leaders able to lead the next generation of science & technology
- Global Health
- Human Evolution
- Judgment
- Biological Science
- Medicine
- Material Science
- Computational Science

Support for Students

- Financial support (JPY 2,100,000 ~ 2,800,000/year, including child expenses)
- Support for research activities (JPY 1,000,000 average)
- Overseas study/visiting research/academic exchange
- Professional training of government
- Special program (JPY 10,000/month)
- Risk, mental health and career support

Research
Interdisciplinary Human Biology

- Research in life sciences, medicine, and computational and material sciences
- Translational analysis of bioinformatics
- In silico data processing
- In vitro and in vivo experiments
- Identification of human health data
- Application to human health

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Research Groups

Basic Medicine



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Medical Genetics

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We are doing genome research aimed at understanding molecular genetics and pathophysiology of psychiatric disorders including schizophrenia and allergic diseases including bronchial asthma and pollinosis. To address these, genome-wide association studies, exome and whole genome sequencing, transcriptome and proteomics studies are employed. Our research is mainly based on human data, however, in vitro and animal studies are also carried out to explore the mechanisms of genotype-phenotype relations and better treatment and personalized medicine.

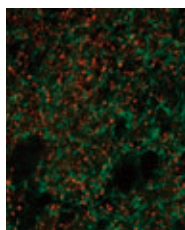


FUKAMIZU, Akiyoshi
Molecular Biology

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Biological homeostasis is regulated by a series of chemical reactions in response to external and environmental stimulus. A variety of signals through the plasma membrane are integrated into the nucleus, where histones and transcription factors are modified by phosphorylation, acetylation, ubiquitination, and methylation that are catalyzed by modification enzymes, thereby controlling gene expression. In my laboratory, we aim to understand the molecular mechanisms of lifestyle-related and pregnancy-associated diseases, or lifespan, how nutritional and stress conditions regulate epigenomic functions, by using genetic techniques with animal models such as mice and *Caenorhabditis elegans* (*C. elegans*).



HISANO, Setsuji
Laboratory of Neuroendocrinology

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Research interests of Prof Hisano's group relate to the morphology and physiology of vesicular glutamate transporter (VGLUT), which transports neurotransmitter glutamate into synaptic vesicles at neuronal terminals in the CNS. Our morphological studies leading the study of VGLUT have clarified the overall distribution of three different VGLUT types in the CNS. Recently, we found the expression of VGLUT in some hypothalamic peptidergic neurons, indicating that peptidergic neurons, in general, also release glutamate. What is the physiological significance of glutamate release in the peptidergic neurons? Besides this theme, we are studying the brain function related to Kansei in humans using near-infrared spectroscopy (NIRS), and the functional development of the hypothalamo-pituitary axis in rodents using molecular biological and morphological strategies.



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Our group studies transcription factors and chromatin structure to understand cellular differentiation and the roles of gene expression in this process. Utilizing the iPS cell induction and adipocyte differentiation systems, we analyze regulatory mechanisms of transcription factors and chromatin structure through biochemical, molecular biological and cell biological methods. We particularly focus on epigenetic mechanisms of coactivators and histone modifying enzymes that interact functionally with the transcription factors that are pivotal for maintaining pluripotency of iPS cells as well as inducing differentiation of adipocytes. These studies will provide an invaluable intellectual background necessary for medical application of these cells.



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Molecular Genetics

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Our lab is located in Riken Tsukuba campus of Tsukuba Science City. Via analysis of transcriptional regulators, we are studying the mechanisms of cancers, various diseases (neuronal, immunological, and metabolic), and developmental defects. Recently, we are investigating the possibility of "inheritance of stress-induced epigenome change", which can be connected with "inheritance of acquired characteristics". We are also working on the mechanism of reprogramming of somatic cells, which can lead to development of a new method of iPS cell generation.



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Post-transcriptional regulation of gene expression has a significant role in various cellular processes such as cell growth, cell differentiation, adaptation to stress, and cell death. Post-transcriptional regulation—including processing, transport, localization, degradation, and translation of mRNA—is coordinated by association of specific RNA-binding proteins to specific mRNA sequences usually found in the 5' or 3' untranslated region. In our laboratory, we are focusing on understanding the molecular mechanism and the physiological function of the post-transcriptional regulation by RNA-binding proteins using yeast and mammalian cells.



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Physiological Chemistry

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We have been investigating physiological and pathological functions of cellular signaling mediated by lipid-metabolizing enzymes and their activity-regulating small GTPase Arf6 at molecular, cellular and whole animal levels. We have recently found that deletion of Arf6 from vascular endothelial cells inhibited the tumor angiogenesis and tumor growth, demonstrating that Arf6 plays an important role in tumor angiogenesis and thereby in tumor growth. These results suggest that Arf6 is a potential target to develop an anti-cancer drug. We also found that the lipid-metabolizing enzyme phospholipase D plays a crucial role in suppression of tumor growth. Now we are analyzing its molecular mechanisms in my laboratory.

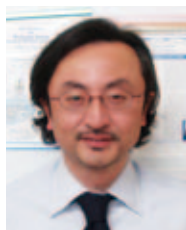


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We study the molecular mechanisms of how cancer related genes (TMEPAI, THG-1, MafK) work, which we originally identified from the study of transforming growth factor- β in cancer development. Through these works, we are aiming to establish novel methods to treat and prevent cancers. At the same time, we analyze the kinetics of cancer stem cells in the earliest carcinogenic lesions by combined research in molecular biology including the ageneration of genetically modified mice and 3 dimensional quantitative histopathology in which cell numbers and cellular growth kinetics are analyzed in 3 dimensional tissue units reconstructed in computers from serial sections to propose a novel theory of carcinogenesis.



KUMAGAI, Yoshito
Environmental Medicine

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There are numerous reactive chemicals in the environment; in particular, environmental electrophiles that covalently modify cellular proteins with reactive thiol groups (sensor proteins) to form protein adducts associated with loss of enzyme function and/or alteration in protein structure. Under these situations, however, current consensus is that there are a variety of protection systems against environmental electrophiles (detoxification and excretion into extracellular space, removal of the electrophiles from modified protein with cellular components, degradation of proteins bound to the electrophiles etc). With polycyclic aromatic hydrocarbon quinones in the atmosphere and methylmercury contamination in fish as the model for environmental electrophiles, we attempt to identify such protection systems in cells and then elucidate the mechanistic details.



MASU, Masayuki
Molecular Neurobiology

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Our main research focus is to study the molecular mechanisms that regulate neural circuit formation and higher brain functions. Our brain activities are totally based on the complex neuronal networks that are formed during development, but how they are formed remains unknown. Using integrative approaches including molecular biology, biochemistry, neuroanatomy, and developmental biology, we have been investigating how the complex brain network is formed in the developing brain and how the mature brain functions are acquired and regulated. We are particularly interested in the molecules that play a role in neural differentiation, cell migration, axon guidance, and synaptogenesis.



NAGASAKI, Yukio
Biomaterials Research Laboratory

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The field of biomaterials science is progressing steadily and spreading in versatile directions. Under these circumstances, we are focusing on creation of biocompatible surfaces, so called biointerfaces. Using this technique, we are studying biosensors, bioimaging, diagnostics and therapy. For example, we prepared a nanoparticle possessing antioxidant characteristics. Since this nanoparticle scavenges excessive generated reactive oxygen species effectively, it is applicable to cerebral, cardiovascular and renal ischemia-reperfusion injuries, cancer, gene delivery systems, Alzheimer's disease and ulcerative colitis. Combinations of nanoparticles and other treatments such as neutron capture, laser-photodynamic and hyperthermia therapies have been also investigated. We are collaborating extensively with medical doctors and pharmaceuticals scientists in order to open up the new interdisciplinary field of biomaterials science.



NAGATA, Kyosuke
Molecular Virology

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The research aim of this group is to understand the molecular mechanism of replication and pathogenicity of animal viruses such as influenza viruses, measles virus, adenovirus, etc. The structure and function of virus-encoded factors and host cell-derived factors involved in the above processes are being studied at the atomic, molecular, cellular, and body levels. Based on the obtained information, we are developing novel strategies for the control of virus diseases. In addition, we are particularly interested in clarifying the physiological function of host factors as well as their roles in infection. On this line, as a basis of regenerative medicine, we are studying the molecular mechanism of genetic reprogramming, since factors identified in our virus research have been found to be involved in this process.



NAGATA, Michio
Kidney and Vascular Pathology

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The kidney is a beautiful organ with rational structure-function relationships and thus renal pathological research is the best way to characterize the pathophysiology of kidney diseases. We investigate the pathogenesis and progression mechanism of kidney disease using specific disease models and in vitro systems. What we particularly focus on is glomerular podocyte damage and progression of focal segmental glomerulosclerosis. With a newly established transgenic mice model with podocyte specific injury, we recently identified the Notch signaling pathway as a promoter of glomerulosclerosis. In addition, we are also interested in the renal vascular system that involves chronic kidney disease particularly aging and metabolic syndrome.



NARIMATSU, Hisashi
Research Center for Medical Glycoscience (AIST)

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The Research Center for Medical Glycoscience (RCMG) at the National Institute of Advanced Industrial Science and Technology (AIST) focuses on coordination between two research fields, medical science and glyco-engineering. Under the concept of glycoproteomics, we work on the development of effective disease-related biomarkers such as tumor markers and further study basic glycoscience. Our research themes are: 1) development of glyco-biomarkers, 2) analysis of glycan functions using knock-out mice, 3) construction of a glycoscience database "JCGGDB", 4) development of new lectins recognizing specific glycans, 5) development of glycoproteomics technology, 6) development of novel technologies for glycan synthesis and glycan structure analysis, and 7) development of drug delivery system technology based on glycan function.



NOGUCHI, Masayuki
Diagnostic Pathology

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The Diagnostic Pathology Group is investigating the molecular mechanisms of human diseases, especially malignant tumors. Our research on malignant tumors has been focusing on the areas of "prevention", "diagnosis", and "therapy". We are interested in 1) the molecular mechanisms of cancer development, 2) the molecular mechanisms of tumor invasiveness, 3) the molecular background of tissues in which malignant tumors arise, and 4) the creation of new diagnostic criteria based on clinical prognosis. Recently, we have characterized stratifin (SFN), DDAH2, and OCIAD2 as critical biomarkers of lung adenocarcinogenesis and malignant progression, and have been analyzing their biological significance. Using these molecules, we are developing new diagnostic methods for early lung adenocarcinoma and strategies for the prevention and therapy of lung cancer.



OGAWA, Sonoko
Laboratory of Behavioral Neuroendocrinology

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Our main research focus is to study neuroendocrine bases of various behaviors, including emotional, socio-sexual, and affiliative behaviors. Using a number of active gene manipulation methods, we have been investigating how these behaviors are regulated by hormonal action in the central nervous system. We are interested in determining the roles of estrogen receptors in the regulation of behaviors and their underlying molecular and neural mechanisms. We have a strong research training program in behavioral, neuroanatomical and neuroendocrine studies as well as active ongoing collaborations with other research laboratories in medical and biological sciences both on and off-campus. We recruit students with a strong background in psychology, biology, and neuroscience, and provide professional training in behavioral neuroscience and behavioral neuroendocrinology.



OHNEDA, Osamu
Regenerative Medicine and Stem Cell Biology

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Our research group is focusing on developing useful therapy for cancers and intractable diseases using human stem cells. We isolate human stem cells and study their functional mechanisms in vitro and by using animal models of human diseases and gene knockout or knockdown mice. Especially we are studying the following 4 themes: 1) to analyze the differentiation mechanism of human embryonic stem cells, 2) to isolate and study functional human tissue stem cells, 3) to isolate and characterize primary cancer cells to develop useful stem cell therapy, and 4) to study how hypoxic stress affects stem cell proliferation and differentiation.



OKAMURA, Naomichi
Reproductive Biochemistry

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In the reproductive processes of mammals, precisely regulated mechanisms have been evolved for the maintenance of the germ line. In order to understand the mammalian reproductive system, we focus on the following two major subjects.

- 1) Molecular mechanisms involved in the acquisition of the fertilizing ability of sperm: identification of proteins expressed at the specific stages of spermatogenesis and analysis of signal transduction underlying functional sperm maturation especially in "capacitation".
- 2) Molecular mechanisms of mammogenesis and milkstasis: analysis of novel functions of monoamines produced in the mammary gland in the regulation of lactation.



SAKAE, Takeji
Medical Physics

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Medical physics is the scholarship of analyzing the physical and technical problems in clinical medicine, and develops various new technologies useful to medicine. Our group is performing basic research which is useful for clinical medicine. Moreover, the University of Tsukuba has a proton therapy institution (Proton Medical Research Center : PMRC), and we also perform the quality control for carrying out radiotherapy safely.

Some of our themes : Research to improve safety and high-precision in radiotherapy / Development of new radiotherapy techniques using an accelerator / Research on the new technology of radiation measurement (dosimetry) / New techniques for quality control in radiotherapy / Development of a new calculation method to estimate the patient dose distribution.



SHIBUYA, Akira
Immunology

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The immune system is crucial to human survival. In the absence of a working immune system, even minor infections can take hold and prove fatal. We are under constant threat from infectious diseases that are hard to cure. The immune system is also involved in the pathogenesis of autoimmune diseases, allergy, cancer, and transplantation. It is therefore important to understand and regulate the immune system.

In our laboratory, we identified for the first time in the world several novel immunoreceptors, which are involved in the development of allergy, cancer, infectious diseases or autoimmune diseases. Our goal is to develop therapies targeting novel molecules that we identified for these intractable diseases.



SHIDARA, Munetaka
Systems Neuroscience

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How is our brain working while we are consciously thinking, watching, planning, deciding, or speaking with others? We are studying brain functions and their mechanisms in motivation, reward expectancy, visual recognition, decision making, learning, and social interaction by recording neuronal activities in animal models and analyzing information processing mechanisms by statistical models and information theory analysis.

- Research themes:
- 1) Brain information processing mechanisms in motivation and reward expectancy
 - 2) Research on reinforcement learning and decision making mechanisms in the brain
 - 3) Research on visual recognition mechanisms under visual noise
 - 4) Brain mechanisms in emotional and social interaction



SHIGA, Takashi
Anatomy and Neurobiology

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<http://www.md.tsukuba.ac.jp/basic-med/anatomy/shiga-group/anatomy3rd.html>



We are examining the mechanisms underlying the formation of neural networks by multidisciplinary approaches from molecules to behavior, using mice and rats. Our research projects are as follows. 1) Runx family transcription factors are involved in acute myeloid leukemia and various cancers. We are examining roles of Runx1 and Runx3 in neuronal differentiation and the formation of neural connections using gene-knockout mice. 2) We are examining roles of monoamines (serotonin, noradrenalin and dopamine) in dendrite formation and synaptogenesis, using dissociation culture of the cerebral cortex of rat embryos. 3) We are examining effects of environmental factors (prenatal stress, postnatal tactile stimulation, maternal care etc) on behaviors (learning/memory, anxiety) and brain development, with special reference to the serotonergic system.

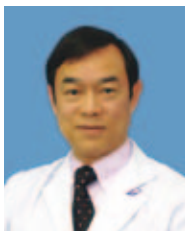


TAKAHASHI, Satoru
Anatomy and Embryology

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We are working on the functional analysis of transcription factors in the body by using transgenic and knockout mice. We are focusing on the following research themes: 1) Molecular mechanism of the development of organs: We are researching the molecular mechanisms of the development of organs by analyzing the function of transcription factors Large Mafs. 2) Developmental program of hematopoietic and vascular system: We try to elucidate the developmental program of the hematopoietic and vascular systems. We are also interested in ES cell pluripotency. 3) Molecular mechanism of autoimmune disease: We are interested in analyzing the function of transcription factors against disease sensitivity determination. 4) Study for generation mechanism of neural circuit: We are interested in the generation mechanism of neural circuits.



TSUBOI, Koji
Radiobiology

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<http://www.md.tsukuba.ac.jp/basic-med/radiation/>



The radiation biology research group is actively doing biological research on radiotherapy of malignant tumors, especially aimed at improving the safety and efficacy of proton beam radiotherapy. The following are the main research interests of our group; proton beam induced DNA damage and repair, radiation induced tumor immunological reactions, biological effects of x-ray micro beams and radiation protection.



TSUCHIYA, Naoyuki
Molecular and Genetic Epidemiology

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Human genome analysis provides a powerful approach to identify causally involved molecular pathways in complex diseases, where a highly complicated network of genetic and environmental factors plays a role. Our laboratory is interested in human genome diversity associated with systemic autoimmune diseases such as systemic lupus erythematosus, systemic sclerosis, rheumatoid arthritis and ANCA-associated vasculitis. Identification of disease-associated polymorphisms will provide us with insight into the pathogenesis of such intractable complex diseases, as well as valuable information eventually useful for drug discovery and personalized medicine. We are also interested in human genome diversity associated with the clinical course of malaria and Dengue fever, as well as development of statistical genetics approaches in the association study of complex diseases.



URUSHIHARA, Hideko
Genome Informatics

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We use cellular slime molds as research materials to study the basic mechanisms of development and cell differentiation. The standard strain of *Dictyostelium discoideum* is widely used as a model organism. It is also used for studies on infection mechanisms of pathogenic bacteria, drug discovery etc..

Our research projects include the followings:

Comparative genomics of the slime mold species with or without cell differentiation ability. (Genome sequencing and analyses are being done)

Studies on the molecular mechanisms of sexual cell interactions (Used as a prototype for the sexual reproduction system)

Analysis of signaling pathways during chemotaxis (A model system for leukocyte movement to the inflammation site)



YAGAMI, Ken-ichi
Laboratory Animal Science

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Laboratory animals are essential and important bio-resources for investigating bio-medical sciences. We develop animal models for human diseases with generation and evaluation of genetic engineered mice, genetic mapping of metabolic syndrome or agenesis of the corpus callosum (ACC) candidate genes and development of mouse embryonic stem (ES) cell lines from inbred mice and rats. We also investigate pathogenic mechanisms in viral infection of laboratory animals, especially in parvovirus and Norovirus infections, and develop diagnostic techniques for microbiologic monitoring in laboratory mice and rats.



YANAGISAWA, Masashi
Center for Behavioral Molecular Genetics

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We spend nearly one-third of our lives asleep. The mechanism and function of sleep, however, remains unclear. Many factors such as mental illnesses, food, drugs, and emotions, can affect sleep/wake regulation. Disorder of sleep is not only by itself a major problem in modern society, but also an established risk factor for metabolic syndrome and other lifestyle diseases.

We discovered the neuropeptide "orexin" that regulates sleep. Over 10 years of orexin research has convinced us that we have to take boldly new approaches to gain fundamental insights into the mechanism of sleep/wake regulation. Our approaches include real-time visualization and manipulation of the activity of multiple neurons within the sleep/wake regulatory circuits in freely behaving mice. We also carry out a large-scale forward genetic screen in mice, looking for new genes directly responsible for sleep/wake regulation.

Global 30 Faculty

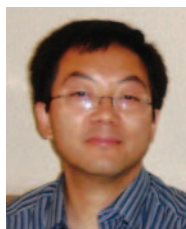


HO, Kiong
RNA Modification and Repair

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A primary research interest is to understand the gene expression in protozoan parasites responsible for major public health concerns, such as Malaria and sleeping sickness disease, with a goal in identifying parasite-specific processes that can be exploited as targets for novel therapeutic interventions. Analysis of mRNA cap formation in these parasites suggests that capping enzyme is an attractive target for anti-protozoan drug development because the mechanism of cap formation is completely different between the parasite and in the human host. A second research area aim to understand how damages in the RNAs are recognized and repaired in the cells. One of the few facts that has been established is that RNA ligase - an enzyme that joins the two ends of RNA together - is a key component of this repair process. Understanding of the function and mechanism behind cellular responses to RNA damage may also provide useful therapeutic targets, as breakages in the RNA accumulate in cancer cells and during stress condition.



MA, Enbo
Epidemiology

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Public health research for disease control and prevention is focusing on identifying and understanding lifestyle-related factors and other determinants. Recent major research is on disparities of risk factors of stroke and ischemic heart disease between Japan and China, aiming to obtain new evidence and strategies for risk control in different populations. Biostatistical methods and applications in medical research are also being explored. Clinical research activities in the CREIL Center are involved, particularly for trial data analysis.



SALAZAR, Georgina
Stem Cell Radiation Biology and Regenerative Medicine

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On March 11, 2011, following an earthquake and tsunami of unanticipated magnitude, the Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station experienced severe damage, generating a nuclear emergency. Radiation exposure levels increased, but in most cases so slightly that estimating associated risk may be impossible.

The aims of this project are: for the short term, to investigate previously unexamined effects of low doses of ionizing radiation on human adipose-derived stem cells; and for the long term, to integrate the expression profile of differentiating human stem cells with other radiation signatures to develop a biodosimeter for low dose, low dose-rate radiation exposure.

Clinical Medicine



AONUMA, Kazutaka
Cardiology

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Major clinical activities Pharmacological and non-pharmacological management of both atrial and ventricular tachyarrhythmia / Pharmacological and non-pharmacological therapy for management of heart failure / Catheter intervention for coronary, peripheral artery and structural heart disease / Echocardiographic evaluation to investigate the underlying cardiovascular physiology **Major Scientific Interests** Molecular biology in atrial fibrillation and ventricular tachycardia / Epidemiological research of Brugada syndrome and atrial fibrillation / Left ventricular remodeling in ischemic heart disease / Basic research in heart failure and myocarditis / Basic and Clinical research of 2D, 3D, 4D echocardiographic imaging **Projects for Regular Students in Doctoral or Master's Programs** Research on arrhythmia, pharmacological and non-pharmacological management including catheter ablation / Research on ischemic heart disease / Research on heart failure / Research on echocardiography



ASADA, Takashi
Neuropsychiatry

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The specialties of our group are: old age psychiatry including dementia and depression; child psychiatry such as pervasive development disorder, and mental health of university students. As to study of dementia, we have conducted a 10-year intervention study to prevent development of dementia in a community and examined the efficacy of the intervention. Using the technique of proteomics, we have also studied the biological background of the development of dementia. On the other hand, we have conducted a series of studies regarding child psychiatry in cooperation with the faculty of psychology and department of pediatrics. Finally we recently started a large study for the promotion of the mental health of university students.



BUKAWA, Hiroki
Oral and maxillofacial surgery

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In the field of oral and maxillofacial surgery, the subject of research is the disease in the oral region. Especially oral cancer and bone tissue engineering are our main researches. The examples are as follows.
 Development of diagnostic methods for oral cancer using micro RNA.
 Molecular Target therapy of oral cancer using anticancer chimera peptide.
 Functional analysis of bone differentiation from mesenchymal stem cells of human wisdom teeth.
 Analysis of oral diseases using various gene knockout mice.
 Development of oral cancer markers by using oxidative stress inducible protein.



CHIBA, Shigeru
Hematology

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Our research is focused on molecular pathogenesis of hematopoietic malignancies, such as leukemia and myelodysplastic syndrome (MDS), aiming for clues to developing new therapies. We are particularly interested in the regulation of epigenome, raising questions such as how impaired regulation of DNA demethylation leads to emergence of hematologic malignancies. On the other hand, abnormalities in the hematopoietic microenvironment are also postulated to be involved in the pathogenesis of MDS. In this context, we focus on the Notch signaling system in the microenvironment in the bone marrow. In both epigenome-oriented and microenvironment-oriented research projects, we are using cell-based and mouse-based techniques, as well as a number of clinical samples.



HARA, Akira
Otorhinolaryngology

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Otorhinolaryngology is a specialization for sensory organs. The main focus in our department is the auditory organ. There are a lot of causes which damage the auditory organ, for example, ischemia-reperfusion injury, ototoxic substances and acoustic overstimulation. Those factors mainly injure the hair cells of the organ of Corti and the spiral ganglion cells, and cause sensori-neural hearing loss. Most of the cases of sensori-neural hearing loss are difficult to cure. Translational research using various animal models is going forward to elucidate the mechanisms and to develop the therapeutic strategy for sensori-neural hearing loss.



HASHIMOTO, Koichi
Lifestyle-related diseases and management of technology

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Major activities of our group are, 1) Development of effective prevention treatments for lifestyle-related diseases, 2) Construction of a seamless platform for clinical translational research in Tsukuba Critical Path Research and Education Integrated Leading (CREIL) Center, 3) Education of experts in the integrative celerity research process for clinical translational research.
 Our major scientific interests are, 1) Effective and practical management of technology in the clinical trials field, 2) Effective prevention treatments for lifestyle-related diseases.
 The following are examples of projects for students in doctoral or master's programs. 1) Study of the amelioration of processes for reliable clinical translational research 2) Extraction of problematic points in specific clinical trials and propositions for solutions



HIZAWA, Nobuyuki
Pulmonary Medicine

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The division of Pulmonary Medicine provides comprehensive research to improve the understanding, diagnosis, and treatment of a wide range of respiratory diseases, including chronic obstructive pulmonary disease (COPD), bronchial asthma, respiratory infectious diseases, pulmonary fibrosis, and lung cancer. Our research focuses on tissue injury and its remodeling mechanism on the cellular basis to elucidate the pathophysiological processes of pulmonary diseases. This division will continue to conduct research projects which investigate the expression of mediating factors and their intertwined regulatory mechanisms using genetic, molecular biological, and biochemical techniques. Furthermore, in the design and delivery of our graduate training programs, we aim to produce worldwide academic leaders with outstanding careers in the field of pulmonary research.



HYODO, Ichinosuke
Gastroenterology

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Our research interests are development of novel molecular targeted therapeutics and diagnostic methods as follows.
 1) Using nude mouse models with peritoneal or subcutaneous xenograft of various gastrointestinal cancer cell lines, we investigate the effectiveness of small molecular targeted agents, oncolytic adenovirus and nucleic acid drugs.
 2) Moreover, we focus on the detection of cancer-specific proteins using clinical samples to develop novel tumor biomarkers and molecular targets for cancer therapy, including porphyrin transport mechanisms.
 3) We study gastrointestinal diseases other than cancer including inflammatory bowel disease on genetic polymorphisms and detection of inflammatory markers.



KAWAKAMI, Yasushi
Department of Laboratory Medicine

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Our major projects for regular students in master's programs are as follows.

- 1) Molecular and genetic analysis of human diseases and its application for diagnosis, especially endocrine tumors.
- 2) Molecular analysis of chromaffin cell proliferation.
- 3) Mechanism of adrenergic regulation on adiponectin production.



KOHDA, Yukinao
Pharmaceutical Sciences

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<http://www.md.tsukuba.ac.jp/clinical-med/pharmsci/>



Major Scientific Interests: Pharmacokinetic analysis for evaluating drug disposition / Pharmacogenetic study for assessing drug metabolizing enzymes and transporters / Drug interaction via drug metabolizing enzymes and drug transporters / Pharmacokinetic evaluation of Kampo medicine (herbal remedies)

Projects for Regular Students in Master's Programs: Therapeutic drug monitoring of anti-arrhythmic agents / flecainide and propafenone / Pharmacokinetic analysis of ribavirin to estimate ribavirin induced anemia Drug interaction of tizanidine and CYP1A2 inhibitors Effects of SLC29A1 activity on pharmacodynamics of nucleoside analogues



MAENO, Tetsuhiro
Primary Care and Medical Education

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- 1) Clinical research in primary care
- 2) Development of community-based medical systems.
- 3) Health promotion in the community
- 4) Clinical medical education



MASUMOTO, Kouji
Pediatric Surgery

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Pediatric surgery is a subspecialty of surgery for children and newborn babies with congenital and/or acquired abnormalities. A pediatric surgeon's responsibilities are to support a child's life by surgical intervention. In addition to general thoracic and abdominal procedures, pediatric surgeons participate in laparoscopic surgery and liver transplantation. We also address the treatment of solid malignant tumors. In our institute, we do two main areas of research, which include regenerative medicine related to lung development and oncology related to solid malignant tumors.

- 1) Regenerative Medicine i) Congenital Diaphragmatic Hernia: To investigate the progress of hypoplastic lungs, affected by umbilical stem cells / To investigate the regeneration of bioengineered diaphragms ii) Anorectal malformation: To investigate the regeneration of the bioengineered anal muscle complex
- 2) Pediatric Oncology: To investigate gene aberrations related to carcinogenesis and to track the progression of malignant solid tumors



MATSUMURA, Akira
Neurosurgery

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We are performing researches about the following themes.

- 1) Boron neutron captured therapy for malignant brain tumors
- 2) Angiogenesis and invasion in brain tumor cells
- 3) Vaccine therapy for malignant brain tumors
- 4) Drug Delivery Systems for brain diseases
- 5) Brain imaging using magnetic resonance spectroscopy
- 6) Brain Machine Interface including the clinical application of HAL



MINAMI, Manabu
Diagnostic Radiology and Interventional Radiology

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<http://www.md.tsukuba.ac.jp/clinical-med/radiology/>



Our group focuses research projects on investigations of 1) radiologic-pathologic correlation, 2) new imaging techniques, and 3) new interventional techniques. Research on radiologic pathologic correlation has been performed not only with two-dimensional images but also using three-dimensional images in the pathologies of the brain, lung tumors, liver and pancreas tumors, GI tract tumors and gynecologic tumors. New imaging techniques have been developed using CT and MRI, especially diffusion-weighted imaging in the abdomen and diffusion tensor imaging in the brain, peripheral nerves and muscles. Now new imaging methods are investigated in PET scanning as well. Novel IVR techniques are innovated in the field of RFA in liver tumors and new navigation methods are also produced using non-contrast vascular MR imaging.



MIZUTANI, Taro
Emergency and Critical Care Medicine

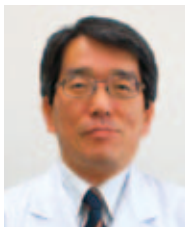
mizutani@md.tsukuba.ac.jp

Major Scientific Interests

1) septic (endotoxemic) shock, circulatory collapse, 2) acute respiratory distress syndrome (ARDS), multiple organ failure (MOF), 3) toxicology, 4) delirium

Projects for Regular Students in Doctoral or Master's Programs

1) Clinical and animal model research on predictors and markers for delirium, 2) Clinical and animal model research on treatments for septic shock, 3) Clinical and animal model research on resuscitation, 4) Clinical and animal model research on treatments for ARDS, 5) Clinical and animal model research on pathophysiology of extreme hypercapnia



NINOMIYA, Haruhiko
Hematology

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Megakaryocytes differentiate from hematopoietic stem cells under the control of a lineage-specific cytokine, thrombopoietin (TPO). Maturation of megakaryocytes is characterized by the expansion of cytoplasmic mass and polyploidization. Although platelets are produced from the ends of cytoplasmic processes called proplatelets in the final stage of megakaryopoiesis, molecular mechanisms of megakaryopoiesis including proplatelets are still not clearly defined. Therefore, effective treatments of thrombocytosis and thrombocytopenia are largely unknown. Our laboratories have analyzed molecular mechanisms of megakaryocyte differentiation and proplatelets by using knockout or transgenic mice of various genes. 2) Pathophysiological analysis of paroxysmal nocturnal haemoglobinuria.



NISHIYAMA, Hiroyuki
Urology

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<http://tsukuba-urology.com>



In our urologic tumor research group, the early stages of the carcinogenic process in genitourinary cancer are analyzed. We use cultured cells, animal carcinogenic models, and clinical specimens as a model for testicular tumors or urothelial carcinoma and perform a functional analysis of redox signals and small G-protein. In addition, the recurrence of urothelial cancer is still in the process of being elucidated using molecular techniques. Based on the findings, we are now developing novel immunotherapy with liposome containing a cell membrane of the BCG bacteria or peptide therapies that target cell cycles. In the future, we will conduct the clinical trials.



OHKOHCHI, Nobuhiro
Tumor Oncology and Organ Transplantation

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<http://www.md.tsukuba.ac.jp/clinical-med/ge-surg/>



The specific activities are as follows: 1) Characterization and new treatment for cancer; 2) differentiation and regeneration of stem cells and liver; 3) mechanism of rejection and induction of tolerance in organ transplantation; 4) surgical stress, metabolism and nutrition; 5) Control of tumor angiogenesis and metastasis. The focus of the section for studies on cancer lies in the development of early diagnosis of cancer, prognostication of patients, and cancer prevention and therapy. We analyze epigenetic alterations in natural antisense transcripts to find the molecular markers of human cancers and examine molecular mechanisms for understanding cancer development.

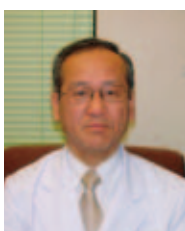


OSHIKA, Tetsuro
Ophthalmology

oshika@eye.ac <oshika@eye.ac>
<http://www.md.tsukuba.ac.jp/clinical-med/ophthalmology/>



1) Visual science
2) Visual optics
3) Minimally invasive ocular surgery
4) Vision-related quality of life



OTSUKA, Fujio
Dermatology

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<http://www.md.tsukuba.ac.jp/clinical-med/derma/>



Our laboratory has had an interest in studying the molecular mechanism of proliferation and differentiation of epidermal keratinocytes. The epidermis is constantly renewed by proliferation and differentiation of the epidermal stem cells. Our current research efforts are focused on the transcription factors which play an important role in the proliferation and the differentiation of epidermal keratinocytes using 2-dimension (2D) and 3-dimension (3D) cell culture. We are also interested in the role of the Nrf2-Keap1 pathway in UV irradiation of the skin.



SAKANE, Masataka
Orthopaedics Surgery

sakane-m@md.tsukuba.ac.jp
<http://tsukuba-seikei.jp/>



Major clinical activities: Clinical and basic research on peripheral nerve injuries / Clinical research on reconstructive surgery in upper extremity / Clinical and basic research on joint surgery / Clinical research in spinal disorders / Clinical and basic research in sport medicine

Major Scientific Interests: Nerve regeneration by gradual elongation / Cartilage regeneration / Stem cell therapy (tissue engineering) / Minimal invasive spine surgery: endoscopic surgery / Minimal invasive total hip arthroplasty / Biomaterials Projects for Regular Students in Doctoral or Master's Programs: Research on peripheral nerve regeneration / Research on treatment of osteonecrosis of the femoral head / Research on platelet rich growth factor for ligament healing / Research on photodynamic therapy for metastatic bone tumor / Research on rehabilitation / Development of new biomaterial for Orthopaedics / Clinical research on rehabilitation of physically disabled persons



SAKURAI, Hideyuki
Radiation Oncology

hsakurai@pmrc.tsukuba.ac.jp
<http://www3.pmrc.tsukuba.ac.jp/>



The department of radiation oncology makes a comprehensive study of cancer. We study a multidisciplinary approach to cancer patients to evaluate quality of life (QOL) and outcome of patients, and to maximize the probability of cure. The department of radiation oncology at the University of Tsukuba has an exceptionally comprehensive radiation treatment program. Special radiation technologies available include: 1) Intensity modulated radiation therapy (IMRT) 2) High dose rate brachytherapy 3) Proton therapy. So, we are able to conduct advanced research. We also can do translational research with radiation biology and medical physics.

Research Subject: 1) Evaluation of radiation sensitivity and radiosensitization for treatment resistant tumors 2) Development of radiation treatment planning using diagnostic imaging 3) Development of new cancer treatment using proton therapy



SATO, Yukio
General Thoracic Surgery

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<http://www.md.tsukuba.ac.jp/clinical-med/respiratory/index.html>



Lung cancer has become a major cause of death in most countries. Surgical resection is most effective for the treatment of lung cancer. Minimal invasive video assisted thoracic surgery (VATS) lobectomy appears to be a safe and effective procedure for treatment of lung cancer. We are making progress not only in reducing surgical stress but also in improving the quality of surgery by developing original devices and techniques. We are focusing also on the multimodal treatment of lung cancer, the mechanism of invasion of lung cancer, and the mechanism of acute lung injury.



SHIMANO, Hitoshi
Endocrinology and Metabolism

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<http://www.u-tsukuba-endocrinology.jp/>



The increasing prevalence of obesity, metabolic syndrome, and diseases such as diabetes, dyslipidemia, NAFLD, and atherosclerosis, heightens the requirement for new approaches for both the management and prevention of these diseases. In our research, we try to understand the molecular mechanisms of energy metabolism using the newest technologies, such as molecular and cellular biology, gene-engineered animals, genome informatics. We also extend our investigations to understand the molecular basis of metabolic disease, and try to develop new therapeutic approaches for preventing obesity, diabetes, and cardiovascular disease.



SHODA, Junichi
Molecular Sportology

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<http://www.taiiku.tsukuba.ac.jp/sportsmed/03shoda.html>



High calorie intake because of Westernized food habits and chronic lack of exercise have increased the number of obese subjects and the morbidity rate of obesity-related liver diseases in Japan. There are no therapies, other than diet and exercise, which have gained a consensus to prevent the onset and progression of the obesity-related liver diseases. In the laboratories of Molecular Sportology, we have conducted several research projects to seek scientific evidence of exercise for liver diseases, based on the long-standing outcome from the research projects of exercise programs for obese subjects and subjects with metabolic syndrome. For basic medicine research, in order to explore the usefulness of exercise, we have identified new molecules that are induced by exercise, generated gene-knockout mice or gene-transgenic mice of the newly identified molecules, and moreover, conducted experiments using specific drugs activating the molecules. In addition, we have applied the obtained research evidence in supporting patients with obesity-related diseases in the Sports & Health Clinics of the University of Tsukuba Hospital. We say, "Exercise is medicine." We look forward to your joining our team of Molecular Sportology.



SONE, Hirohito
Diabetes and Metabolism, University of Tsukuba Mito Medical Center

hsone@md.tsukuba.ac.jp
<http://square.umin.ac.jp/soneken/index.html>



Our lab specializes in clinical studies and clinical epidemiology in the fields of metabolic disorders such as diabetes, obesity, dyslipidemia and metabolic syndrome. Our aim is to establish scientific clinical evidence for these disorders that can be utilized in daily clinical settings. Our lab has published many papers in quality journals like Lancet, JAMA, etc. We welcome experts in various related fields like nutrition, sports medicine, clinical psychology, nursing, public health and statistics.



SUMAZAKI, Ryo
Pediatrics

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<http://www.md.tsukuba.ac.jp/clinical-med/pediatrics/>



Our research subject includes a variety of organ systems in the pediatric field such as metabolic syndrome, low dose radiation effect on child health, neonatal medicine, hematology, oncology, cardiology and gastroenterology. We often use ultrasonography to gather physiologic data especially in vascular, abdominal and thyroid research. We also do investigations using transgenic mice and human hormone analyses in the metabolic field. Therefore, we welcome you to join us if you want to contribute to the science of pediatrics by familiarizing yourself with such analytic methods. We also encourage you to obtain a higher level of technique in ultrasonography and molecular biology.



SUMIDA, Takayuki
Internal Medicine, Faculty of Medicine

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<http://www.md.tsukuba.ac.jp/clinical-med/rheumatology/>



We offer expert medical care for patients with various autoimmune diseases including rheumatoid arthritis, Sjogren's syndrome, and systemic lupus erythematosus. At the same time, we are committed to developing new therapeutics through elucidation of autoimmune disease at the molecular level. Our goal is to develop and practice 'science based medicine', and we are always moving forward towards this goal.



TAMAOKA, Akira
Neurology

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<http://www.md.tsukuba.ac.jp/clinical-med/neurology/>



1) Molecular pathophysiological research on Alzheimer's disease (AD), especially on the generation, aggregation and deposition of amyloid β protein, one of the common characteristics of AD neuropathology. 2) Molecular biological research on neurodegenerative diseases, especially on the pathogenesis of the mutated genes of familial disorders including familial amyotrophic lateral sclerosis and familial spinocerebellar degeneration. 3) Morphological and biochemical research on neuromuscular diseases, especially on progressive muscular dystrophies, mitochondrial encephalomyopathies and metabolic myopathies. 4) Neurophysiological research on neuromuscular diseases, especially on the neuro-ophthalmological characteristics of neurodegenerative disorders. 5) Clinical, epidemiological and radiological research on organoarsenic intoxication, especially on its pathogenesis in model animals.



YAMAGATA, Kunihiro
Nephrology

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<http://www.tsukuba-igaku-kidney.com/>



Wellcome to Department of Nephrology, University of Tsukuba. Our department provides expertise for clinical nephrology in a wide area including chronic kidney diseases, glomerular diseases, hypertension, renal failure, dialysis and transplantation. Moreover, our subjects of basic research include onset mechanism in IgA nephropathy, transcriptional regulation of glomerular diseases, vascular damage due to uremic toxin, and kidney regeneration using multipotent stem cells. We have prepared well-developed programs for fellowship, master's and doctor's courses. Please freely contact us and visit our lab.

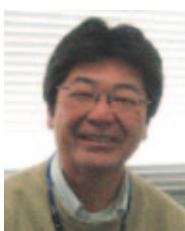


YOSHIKAWA, Hiroyuki
Obstetrics and Gynecology

hyoshi@md.tsukuba.ac.jp
<http://www.md.tsukuba.ac.jp/clinical-med/ob-gyn/>



At our laboratory, we are analyzing genetic aberrations and protein expression abnormalities of various oncogenes and tumor suppressor genes, i.e. PTEN, PIK3CA, AKT, p53, and p27 etc., in gynecologic malignancies including endometrial cancer, ovarian cancer, and cervical cancer. By comparing responses to treatment methods such as surgery, chemotherapy, and radiotherapy, and to various chemotherapeutic agents, we are aiming at personalizing therapies based on abnormalities in individual cancers. Recently numerous kinds of molecular therapeutics targeting the PI3K/PTEN/AKT signaling pathway are being actively developed. We are also conducting research on responses of gynecologic cancers to those molecular targeted agents according to genetic and protein abnormalities in individual cancers.



TANIGUCHI, Akiyoshi
Biomaterials and Tissue engineering

taniguchi.akiyoshi@nims.go.jp
http://samurai.nims.go.jp/TANIGUCHI_Akiyoshi-j.html



Nanotechnology is becoming increasingly important for products used in our daily lives, such as nanoparticles used in the pharmaceutical industry, for cosmetic products, or for pigments. Meanwhile, a serious lack of detailed information concerning the interaction between the nanomaterials and cells limits their biological and medical applications. In this group, we have attempted to investigate the interaction between nanoparticles and cells. We expect our work to advance the understanding of the interactions between bio-nanomaterials and mammalian cells to improve applications in biology and medicine.

Public Health



HONDA, Katsuya
Legal Medicine

k-honda@md.tsukuba.ac.jp
<http://www.md.tsukuba.ac.jp/community-med/legal-medicine/index.html>



In our laboratory, we are developing a technique to diagnose the cause of death in medico-legal autopsy cases. We are based on and make full use of the discrimination of identity (DNA analysis) of the unidentified body, a biochemistry diagnosis from body fluid, blood gases examination, drug-poison detection, the highest technique including harmful metal detection and promote medical study to contribute to crime-investigation from various aspects. From our laboratory, four post-graduated students found work in a crime laboratory institute. We take pride in having the world's best level in DNA analysis technology in particular. We welcome students who want to practice study that can contribute to the maintenance of social order.



MATSUZAKI, Ichiyo
Occupational Psychiatry / Space Medicine Longevity Medicine Endowed Chair

ZAW00312@nifty.com
<http://www.md.tsukuba.ac.jp/community-med/envhlth/>



Environmental and occupational prevention of work-related diseases.
Empirical and epidemiological study on risk factors for work-related diseases and prevention.
Projects for Regular Students in Doctoral or Master's Programs

- 1) Various mental disorder patients' treatment in occupational health. Training of psychiatric clinical ability demanded on site of industrial medicine.
- 2) Training in techniques for managing working people's mental/physical health issues as industrial physicians.
- 3) Research by epidemiology techniques.

Study Programs for Short Stay Students (one week ~ one trimester)

- 1) Health care for workers, mainly their mental health.
- 2) Clinical psychiatry (Major depressive disorder, Adjustment disorder etc.)
- 3) Return-to-work support



SATOH, Makoto
Sleep Medicine

mk-satoh@md.tsukuba.ac.jp <mk-satoh@md.tsukuba.ac.jp>

Sleep Medicine was established as a new division financially maintained by private donations in 2005. Sleep is one of the rhythm phenomena to be seen in the world of creatures widely. Homo sapiens was able to stand at the top of the world of creatures by developing a large cerebrum. The main role of sleep is to let the huge cerebrum take a rest effectively. In our division, we focus on fundamental research and clinical study. In fundamental research, we study the physiologic relationship between the maintenance of healthy life and the role of sleep. In clinical research, we are developing new therapeutic modalities for sleep disordered breathing.



WAGATSUMA, Yukiko
Clinical Epidemiology

ywagats@md.tsukuba.ac.jp
<http://www.md.tsukuba.ac.jp/epidemiology/index.html>



Clinical epidemiology has evolved in modern medicine, based on the two disciplines of clinical sciences and epidemiology. That helps to understand the conceptual gaps between the structured experience of basic science and the more complex, open-ended problems arising for the care of patients. Based on the principals of clinical trials and the use of clinical epidemiology, we try to provide evidence for improving the care of patients.



Human Care Science



ICHIKAWA, Masao
Global Public Health

masao@md.tsukuba.ac.jp

"The existing gross inequality in the health status of people, particularly between developed and developing countries as well as within countries, is politically, socially, and economically unacceptable and is, therefore, of common concern to all countries." (The Declaration of Alma-Ata, September 1978) With this statement in mind, we have conducted action-oriented researches into global public health problems among socially disadvantaged and vulnerable populations. Making change happen is difficult but we believe it is possible through scientifically sound research. Current topics of our research include injury prevention, post-migration refugee health, mobility and health in the aging society of Japan as well as in Asian region.



MATSUDA, Hitomi
Gerontological Nursing & Caring

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<https://www.hcs.tsukuba.ac.jp/~koureicare/>

Evaluation of the effect of nursing intervention for adjustment of circadian rhythm of the elderly: Sleep-awake disorder and insomnia lower the immune system and may provoke depression or dementia in the elderly. I manage fieldwork in the Kanto area, and major cities from Hokkaido to Okinawa, with active elder citizens on their circadian rhythm and the quality of sleep. I have found a strong relationship between tuning factors of sleep (light, exercise, eating, and communication) and contracting lifestyle related disease or dependence of favorite food, the correlation between taking daytime sleep (nap), or having conversation on a moderate pleasant topic and on initiating night-time sleep.



MORITA, Nobuaki
Social Psychiatry & Mental Health

nobuakim@nifty.com
http://www.md.tsukuba.ac.jp/community-med/mental_health/index.html

The Department of Social Psychiatry & Mental Health is looking into the causes and solutions of sociopathological phenomena such as crime, alcohol & drug abuse, child abuse and domestic violence, maladaptation, through forensic psychiatric evidence and field work. Main recent achievements are as follows. Assessment tools of problematic behaviors. Structured Interview of Disorder of Extreme Stress not Other Specified-Japanese version.; Sexual Behavior Checklist for ASD; Juvenile Sex Offender Assessment Protocol II-Japanese version, The Scale of Self-efficacy to cope with drug dependence; Stimulant Relapse Risk Scale. Development of programs of problematic behaviors Attachment based program for a child and care worker in child welfare facilities. Cognitive Behavior Therapy programs for drug abusers. Respectful Relation Program for DV abusers Concurrent program for mother and children exposed to DV



OKUBO, Ichiro
Health Care Policy and Management

iokubo@md.tsukuba.ac.jp
http://www.hcs.tsukuba.ac.jp/~health_policy/

Our department, Health Care Policy and Management, aims to develop effective policy based on evidence from analysis and evaluation of issues among the health system, health care management, and quality of health services with a multidisciplinary approach including public administration, economics, epidemiology, environmental sciences, and international health. Recent major research projects include health economic analysis of infectious diseases control and cancer care. Research techniques such as cost-effectiveness analysis and market analysis of health services are mainly employed. Research projects on international health and development of adaptation programmes for global warming based on health impact assessment are also being conducted.



TAMIYA, Nanako
Health Services Research

ntamiya@md.tsukuba.ac.jp
<http://www.md.tsukuba.ac.jp/hsr/>

Health services research is a multidisciplinary science that analyzes through empirical analysis, from a comprehensive and scientific perspective, the quality of medical care (including health care, nursing and welfare) from several points of view, including the structure (Policy, staffing, facility, budget, insurance, health system, etc.), process (Utilization, accessibility, referral under health system, etc.) and outcome (QOL, cost, satisfaction, ADL, well-being, survival, etc.). Our research group, not only studies the arrangement of the medical care field alone, but also the multidisciplinary points of view of policy, law, economics, sociology, anthropology and so on, incorporating effectively their fruits, in order to achieve better medical services for all people, and aiming to help transmit their success inside and outside the country, and with this, improving the quality of service "achieving medical care in harmony with life".



How to Apply

Medical Branch at the University of Tsukuba established research and study program for international students, leading to a degree in Doctor in Medical Sciences, Masters of Public Health and Masters in Medical Sciences. These programs are designed for students who have completed a Bachelor's degree or equivalent and wish to pursue in-depth study in the Medical Sciences and Public Health.

GLOBAL 30 Program: The University of Tsukuba aims to cultivate human resources with a global view by promoting international exchange to improve academic standards. The University of Tsukuba was selected in 2009 as one of the Global 30 Project for Establishing Core Universities for Internationalization by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT). This project aims to promote internationalization of Japanese universities. All courses are offered in English for students to obtain Master's or Doctoral degrees. Entrance requirements are listed on the electronic application form available at <http://www.md.tsukuba.ac.jp/G30/application.html>.

Doctoral Program in Biomedical and Clinical Sciences, and Master's Program in Medical Sciences: The program is designed for student to enroll in the existing Master's or Doctoral programs offered in Japanese at the University of Tsukuba, Medical Branch. Students in this program may also elect to take English courses toward their degree. Japanese applicant living abroad may apply to this program. For more information, please visit the website of Masters Program in Medical Sciences: <http://www.md.tsukuba.ac.jp/FrontierSite/> and Doctoral Program in Biomedical and Clinical Sciences: http://www.md.tsukuba.ac.jp/chs/index_e.htm. Electronic application form is available at <http://www.md.tsukuba.ac.jp/G30/application.html>.

Dual Master's and Doctoral Degree Program: The program is for students currently enrolled in foreign graduate school affiliated with University of Tsukuba to obtain Master's or Doctoral degree from both institutes. Affiliated Universities are: The University of Medicine and Pharmacy at Ho Chi Minh City (Vietnam), University of Sciences at Ho Chi Minh City (Vietnam) and National Taiwan University (Taiwan). Entrance requirements are listed on the electronic application form available at <http://www.md.tsukuba.ac.jp/G30/application.html>.

Ph.D. Program in Human Biology: The students in the Human Biology Program will be trained in multidisciplinary courses that cover medical, biological, computational and physical sciences, to understand how human being can adapt, inherit and sustain their life. For admission requirements and application form, please visit: <http://hbp.tsukuba.ac.jp/en/index.html>.



For further information on the International Graduate Programs in Medical Sciences, please contact us at the following address or e-mail.

International Office Medical Faculty and Sciences
University of Tsukuba
1-1-1 Tennodai, Tsukuba, JAPAN 305-8575
Email: med.office@md.tsukuba.ac.jp

Additional Information:

International Graduate Programs in Medical Sciences

<http://www.md.tsukuba.ac.jp/G30/index.html>

International Office

<http://www.md.tsukuba.ac.jp/duo/international/en/>

Global 30

<http://www.global.tsukuba.ac.jp/>

Human Biology Program

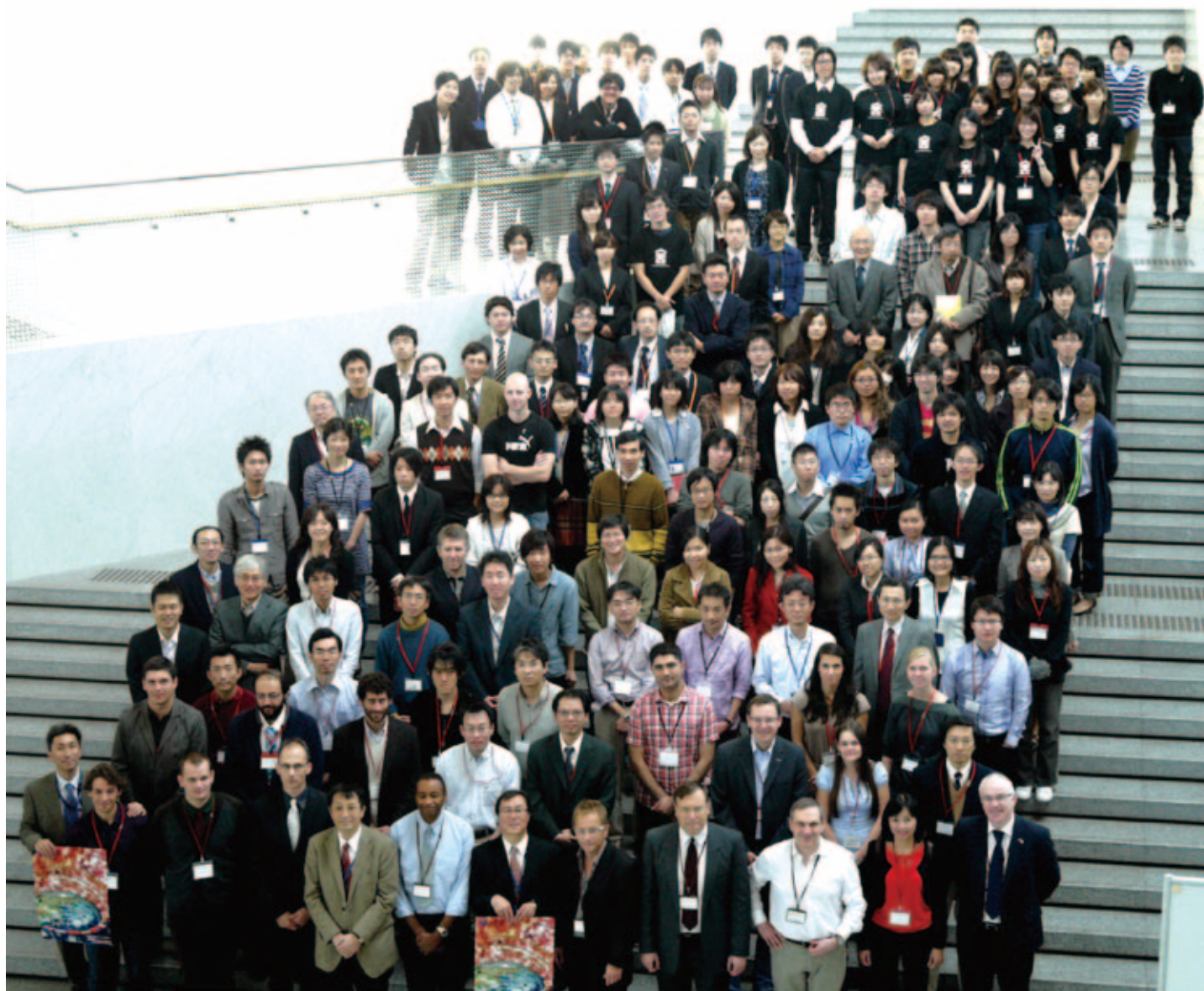
<http://hbp.tsukuba.ac.jp/en/index.html>

Faculty of Medicine

<http://www.md.tsukuba.ac.jp/E-index.html>

University of Tsukuba

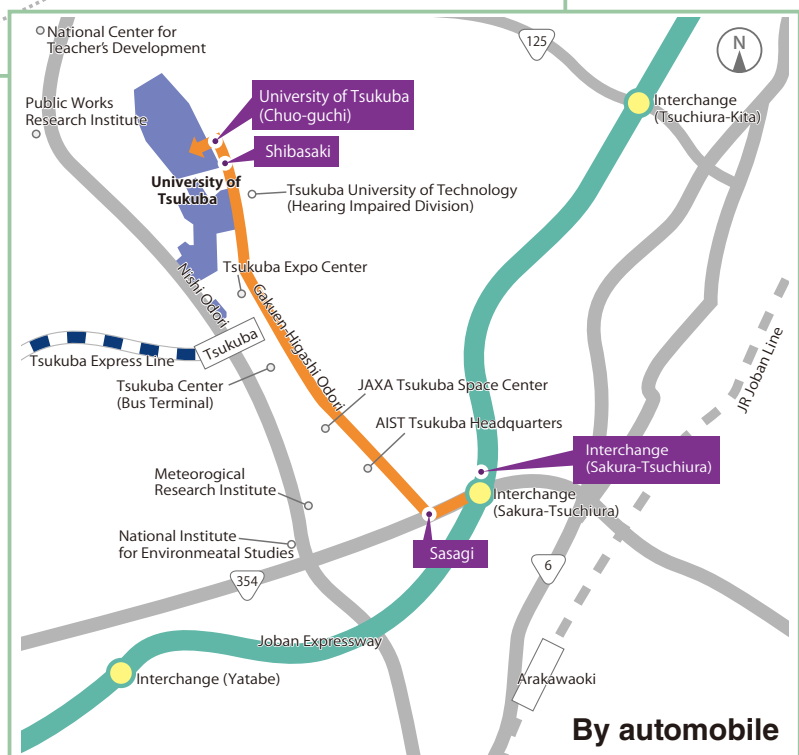
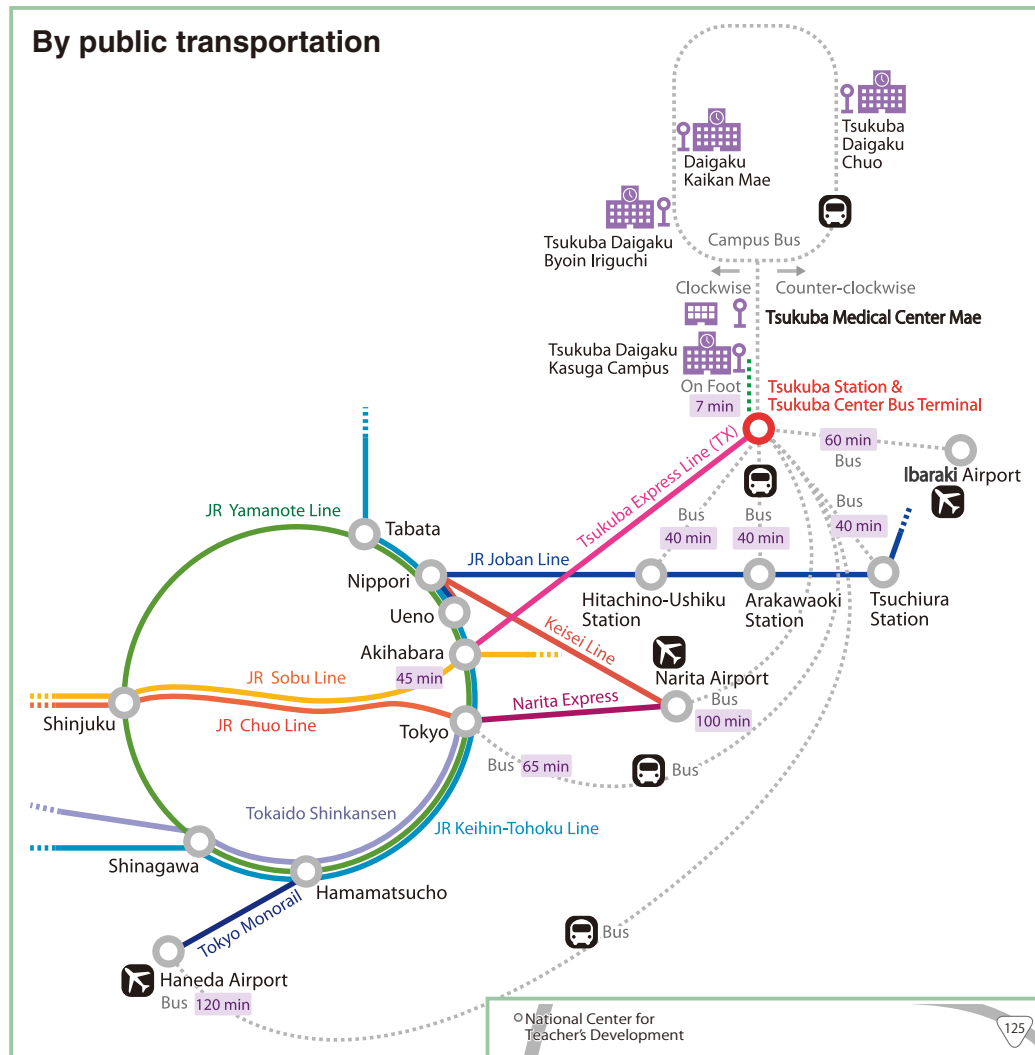
<http://www.tsukuba.ac.jp/english/>



The Second Leading Graduate Schools International Conference & The Sixth Tsukuba Medical Science Research Meeting

Map and Directions

By public transportation



By automobile



UNIVERSITY OF TSUKUBA FACULTY OF MEDICINE

1-1-1 TENNODAI, TSUKUBA, 305-8575 JAPAN

University of Tsukuba

<http://www.tsukuba.ac.jp/english/index.html>

International Graduate Programs in Medical Sciences

<http://www.md.tsukuba.ac.jp/G30/>

International Office Medical Faculty and Students

e-mail: med.office@md.tsukuba.ac.jp