

PH.D. PROGRAM IN HUMAN BIOLOGY

To understand human beings in the contexts of the natural and social environments and thereby contribute to the happiness of a sustainable earth





PH.D. PROGRAM IN HUMAN BIOLOGY

Nurturing future leaders who will
create a rich human society

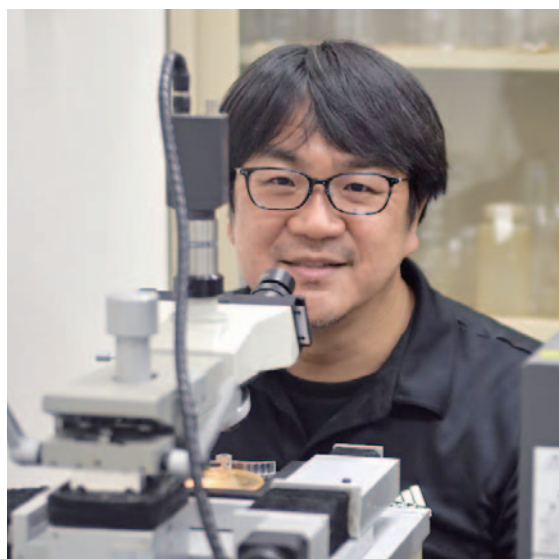
Human biology is the area of study to understand the maintenance mechanism of the homeostasis.

When carrying out research on human beings, ethical boundaries dictate which experimental methods are acceptable, and thus collaboration and integration with computational science are required to apply biological findings to human beings.

The HBP offers a program of individualized, global overseas training, as exemplified by the Appropriate Technology course. (1) Students experience the cutting-edge, global-standard education and research of a scientifically-advanced country based on their own research proposal plan. (2) Through their participation in the creative process of planning research projects in developing countries, students develop the abilities of decision-making, making breakthroughs in research, and bringing a research project to completion. To develop the spirit of challenge and organizational and strategic planning needed for entrepreneurship, students can also do coursework at overseas partner universities or in collaboration with industry.



Welcome to the Ph.D. PROGRAM IN HUMAN BIOLOGY



IRIE Kenji
Program Leader Professor



Nurturing global leaders towards future human society

The University of Tsukuba's PhD Program in Human Biology (HBP) was chosen as one of the Leading Graduate School Doctoral Programs supported by the Japanese Ministry of Education, Culture, Sports, Science, and Technology (MEXT), and has started in 2011. In the 21st Century, humanity faces numerous global crises: environmental problems, dwindling natural resources, disasters, disease, and poverty. To solve these problems we have to transcend disciplinary and national borders, and work together towards a brighter future. We share the same destiny and are all passengers in the same boat: our planet Earth.

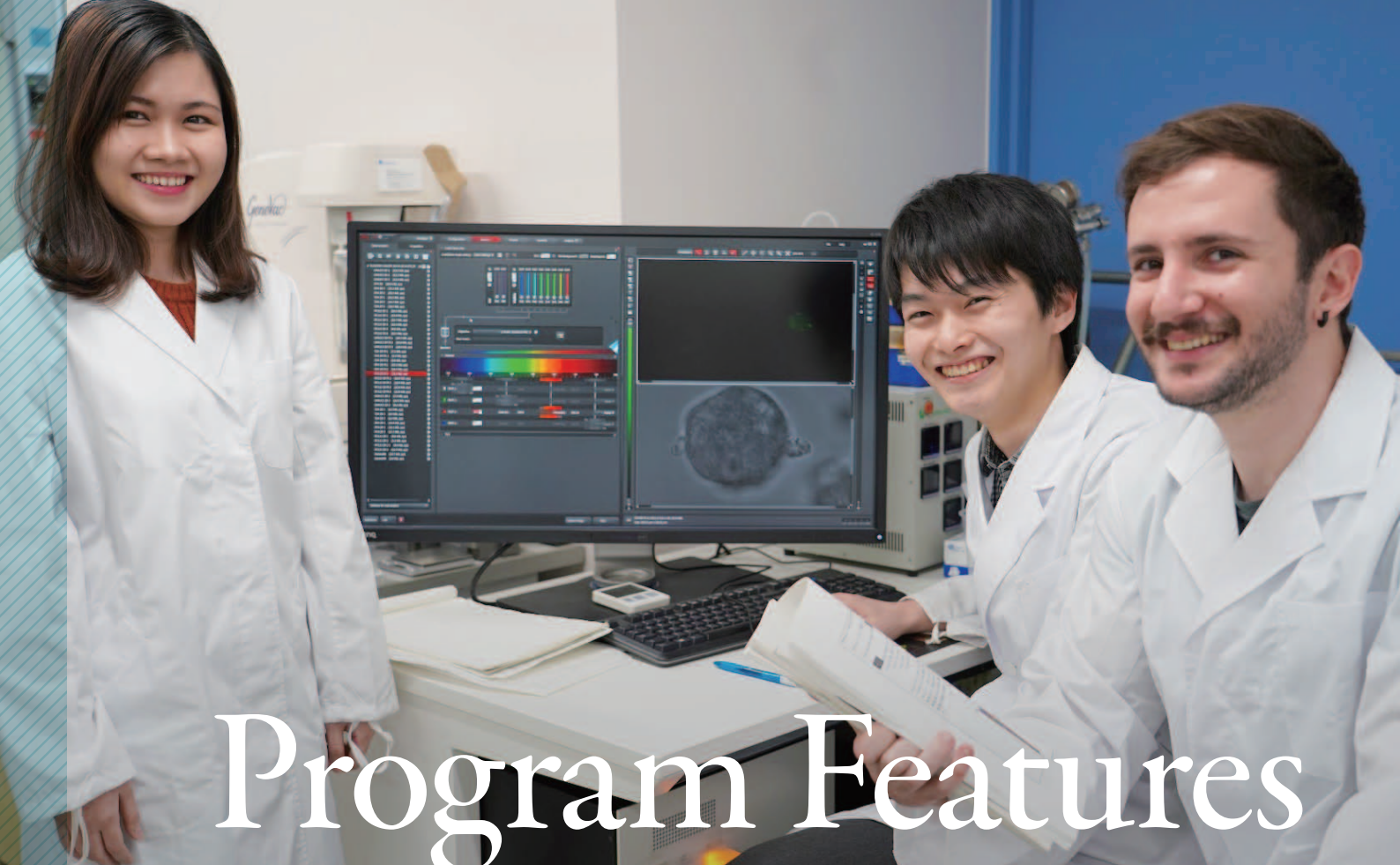
In the HBP, we aim to nurture leaders of the future, who will bring together expertise in various fields relating to human biology, to identify and work towards overcoming global issues. We call this the Shipmaster Program. An excellent captain has strong leadership skills and takes the responsibility of directing the ship's crew, making good use of various technologies and resources, to navigate the ship through the roughest of seas towards the final destination. To nurture such leaders, we have brought together world-class academics from many research areas, not only biology, but also medicine, computational sciences, and materials sciences, to be faculty members of the HBP.

A competent captain needs more than just technical ability, and so we also aim to foster professional skills in our students, what we refer to as the ABC of Human Power, namely the power of accomplishment (A: Accomplishment), the power of breakthrough (B: Breakthrough), and the power of judgment (C: Cognoscente). In the HBP, we prepare various programs to cultivate these abilities. For example, students have the chance to actively study in other countries through three innovative courses: Appropriate Technology in Developing Countries, International Research Rotation, and Internship in Overseas Companies.

HBP has been accepting students since 2012 school year and has produced many graduates so far. The HBP graduates who have acquired strong human ability in addition to a wide range of research abilities are actively working in domestic and overseas companies, various research institutes, and academia. In the final evaluation of the Leading Graduate School Doctoral Programs, HBP obtained the highest S evaluation (it can be evaluated that the purpose of this project was sufficiently achieved because the efforts beyond the plan were performed and the excellent results were obtained). We have realized that students are growing through the HBP educational program.

Although support from the Leading Graduate School Doctoral Programs was terminated in 2017, it will be restarted with a new system from 2018, and students of this course will continue to receive financial assistance for 5 years.

Please enroll in HBP and experience your growth in an environment where you can grow up and work hard with your friends. We welcome young people with big dreams and high ambitions.



Program Features

Human Biology - The biology of the human being

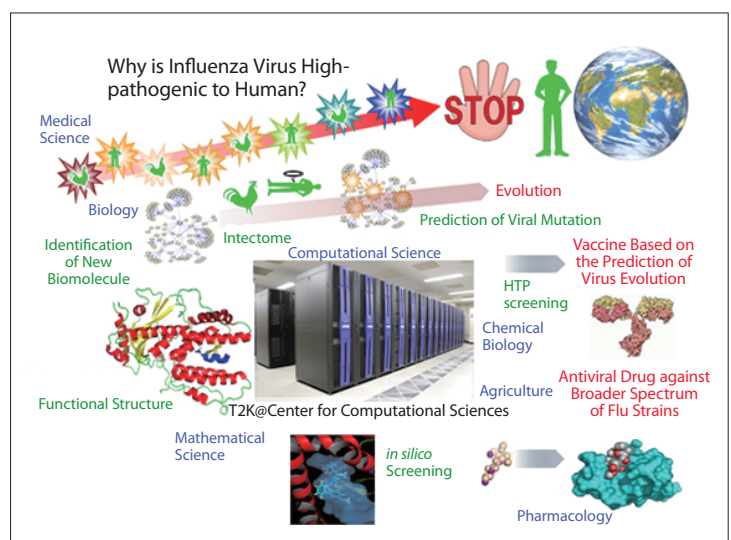
Human biology looks at the human being as a single unit of life on earth and in space. It seeks to understand the homeostasis and mechanisms of the human body in its place on the temporal axes of the global environment and biological evolution.

In the Ph.D. Program in Human Biology, students can

1. Figure out problems and frameworks of possible solutions to global issues with broad perspective and deep insight.
2. Possess knowledge, skills, intellect and creativity for planning research or activities to solve problems.
3. Have enthusiasm, administrative ability on cooperative negotiation, leadership and integrated humanity, meeting the needs of the society on a global mass scale.

The nature host of influenza virus is migratory waterfowl. The avian influenza viruses are transmitted from waterfowl reservoirs to human communities by adaptation to mammals, causing pandemics. However, the adaptation process remains unknown and is difficult to reproduce in non-primate animal models (e.g., mouse models). Thus, it is necessary to understand the molecular basis of viral pathogenicity and the adaptive evolution in humans by using computational models of host responses against viral infection, including immune responses and changes in physiological functions.

Based on these, we will be able to predict the viruses that will be emerged in the future for vaccine development. It is also possible to design antiviral drugs by in silico technique that are less likely to cause the emergence of drug-resistant strains.



Our Vision for Human Biology Research

Develop and create interdisciplinary degree programs

As humankind made scientific and technological discoveries, it unwittingly exposed its health and wellbeing to many kinds of threats. Today, our global environment is deteriorating as the delicate balance of its water and atmospheric systems becomes disturbed by pollution. Within this increasingly precarious environment are chemical substances, such as endocrine-disrupting chemicals, which are the byproduct of the technological inventions of humankind.

Elsewhere, the spread of new and reemerging infectious diseases is a result of the high speed at which people and goods travel the world today. To control this kind of global threat, we cannot rely on medicine alone, the primary aim of which is to prevent and to heal disease. Rather, we must combine multiple related disciplines, starting with the field of biology.

When carrying out research on human beings, ethical boundaries dictate which experimental methods are acceptable, and thus collaboration and integration with computational science are required to apply biological findings to human beings.



Global overseas training

The HBP offers a program of individualized, global overseas training, as exemplified by the Appropriate Technology course. (1) Students experience the cutting-edge, global-standard education and research of a scientifically-advanced country based on their own research proposal plan. (2) Through their participation in the creative process of planning research projects in developing countries, students develop the abilities of decision-making, making breakthroughs in research, and bringing a research project to completion. To develop the spirit of challenge and organizational and strategic planning needed for entrepreneurship, students can also do coursework at overseas partner universities or in collaboration with industry.

The perfect study environment created through international collaboration between academia, government, and industry

The PhD Program in Human Biology is proud of its multi-tiered teaching system that brings together international and domestic faculty members from a wide range of interdisciplinary fields - experts from academia, government, and industry. Through interaction with such a diverse and experienced faculty team, students receive invaluable insights and advice to steer them in their future career paths. Our program further encourages students to engage in coursework at overseas partner universities or in collaboration with industry.

The University of Tsukuba

Medicine, Biological Science, Computational Science and Medical Science

Companies

Shimadzu Corporation, Kao Corporation, Mizuho Information & Research Institute, Inc. etc.

Overseas Universities

University of Edinburgh, National Taiwan University, Uppsala University, etc.



5 years in HBP

The desired students and the image of Ph.D. students to be trained

This degree program seeks individuals who have the ability to understand the mechanisms of maintenance, adaptation, and inheritance of human life, and who have the qualities to become global leaders in a wide range of industry, academia, and government.

We do not question the amount of knowledge that the applicant currently possesses, but rather evaluate the applicant's capabilities, specifically whether they can reason logically using the given environment and their current knowledge and skills, whether they can explain things to others in an easy-to-understand manner, whether they can understand other.

Curriculum Policy

Understand the concept of human biology, acquire the expertise of epigenetic biomolecules science and its control technology that cannot be handled by conventional central dogmas centered on DNA analysis, and apply these findings to the field of society. The educational course for cultivating connoisseurs, breakthroughs, and completeness to be utilized to solve problems will be organized as follows.

Through Graduate General Education Courses

Students will acquire

- (1) a strong desire to play an active role in the world,
- (2) a sincere spirit, a sense of ethics, the ability to negotiate internationally, and the fundamentals of leadership and entrepreneurship, and
- (3) the ability to adapt to the environment and the practical ability to learn to navigate the globe, extracting problems to be solved from complex realities.

In Foundation Subjects for Major I

Students will acquire

- (1) knowledge of human biology at a level equivalent to that of Japanese
- (2) specialized knowledge of chemical substances and their research methods, and
- (3) exercises in computer-aided biological research. In this course, students will acquire computer-aided complex research methods for research on human subjects, where experimental research is limited.

In Foundation Subjects for Major II

Students will systematically learn about the latest achievements in human biology and research methods in the life sciences.

Ability to acquire in specialized subjects

With the aim of improving each student's expertise through Major Subjects, students will deepen their specialized knowledge and skills in their chosen field, develop their research skills, and learn how to extrapolate the results of animal experiments to humans by introducing computational science.

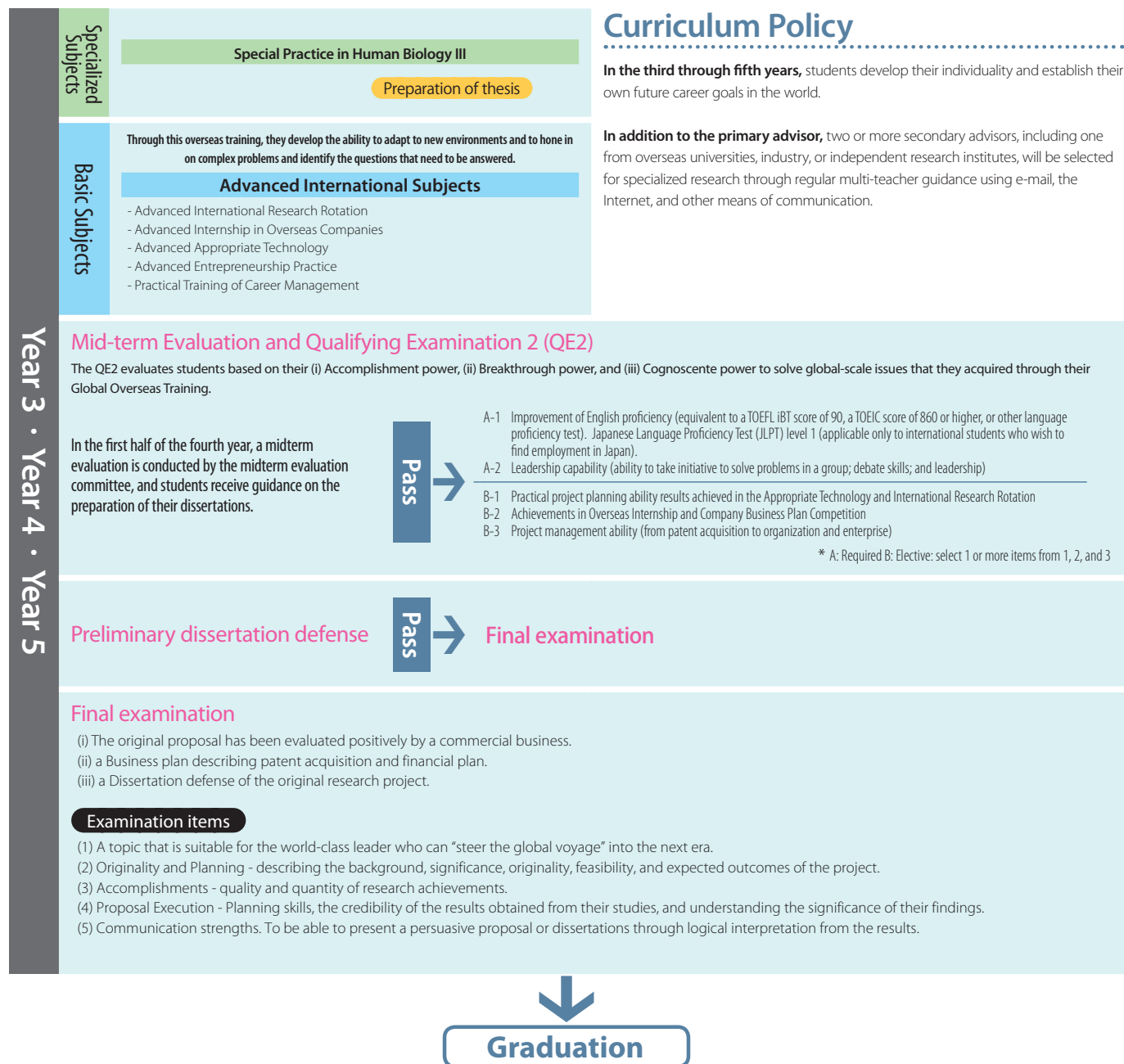
Year 1 · Year 2	Common Subjects	Initiation Subjects <ul style="list-style-type: none"> - Initiation Seminar - World-science Leaders' Seminar - Business Leaders' Seminar - Serendipity in Human Biology 	International Subjects <ul style="list-style-type: none"> - International research rotation - Internship in Overseas Companies - Appropriate Technology - Entrepreneurship Training
		Basic Subjects <ul style="list-style-type: none"> - Scientific Ethics (Year 1) - International Discussion on Human Biology I (Year 1) - International Discussion on Human Biology II (Year 1) - Research Presentation and Discussion (Year 2) 	
	Basic Specialized Subjects I	Medical Subjects <ul style="list-style-type: none"> - Human Anatomy and Embryology - Human Pathology and Oncology - Human Infection and Immunology - Human Endocrinology and Metabolism - Environmental Medicine 	Mathematics and Computational Science <ul style="list-style-type: none"> - Application of Information Technology in Science (Year 1) - Basic Computational Biology (Year 1) - Computational Algorithms (Year 2) - High Performance Computing Technology (Year 2) - Computational Structural Biology and Drug Discovery (Year 2) - Genomics Database Access and Application (Year 1)
	Basic Specialized Subjects II	Molecular Subjects <ul style="list-style-type: none"> - Biochemistry and Molecular Biology (Year 1) - Molecular Cell Biology (Year 1) - Basic Toxicology (Year 1) - Frontier Science in Drug Discovery (Year 1) - Prominent Discoveries in Neuroscience (Year 1 or 2) - Neurobiology (Year 1) 	
	Human Biology Specialized Subjects	Human Biology Specialized Subjects <ul style="list-style-type: none"> - Basic Experiments in Human Biology (Year 1) - Special Lectures in Human Biology I (Year 1) - Special Seminars in Human Biology I (Year 1) - Special Lectures in Human Biology II (Year 2) - Special Seminars in Human Biology II (Year 2) - Special Research in Human Biology II (Year 2) - Special Practice in Human Biology I (Year 1) - Special Practice in Human Biology II (Year 2) - Laboratory Training in Human Biology I (Year 1) 	Basic Specialized Subjects <ul style="list-style-type: none"> - Gene Engineering and Genetically Modified Mice - Epigenome Physiology - Signal Transduction and Drug Design - Stem Cell Therapy

the Qualifying Examination 1 (QE1)

- (1) A clear commitment to contribute to the world.
- (2) The ability to solve problems by negotiating with people from all over the world and with knowledge of medical degree-level human biology and computational sciences
- (3) A basic understanding of human biology research
- (4) Confirmation of students' ability to conduct research independently and assessment of their overseas activities

The principal academic advisers determine the successful candidates.





Criteria for Degree Conferral

1. Ability to create knowledge: Ability to create new knowledge to be able to contribute to future society.
2. Management ability: Ability to plan and implement measures to identify and solve challenges from a higher perspective.
3. Communication ability: Ability to express the nature of academic findings positively and clearly.
4. Leadership ability: Ability to accomplish objectives under one's leadership.
5. International character: High level of awareness and motivation to be internationally active and contribute to international society.
6. Professional skills: Academic skills in human biology necessary for solving global issues.
7. Connoisseurship: Ability to independently discover issues that may lead to a paradigm shift.
8. Breakthrough ability: Ability to solve problems with sincerity and diligence.
9. Conclusion: Ability to disseminate the results of solutions to society and apply them to social contribution.

HBP Curriculum an Innovative

Research lab rotation

HBP students engage in a research lab rotation as part of “Basic Experiments in Human Biology” for a month and a half in spring or autumn.

The students learn the outline of each research and basic experimental methods/research concepts and perform elementary experiments/simulation at research laboratories headed by program professors.



Students' Comment on Lab Rotation

A. Wakimoto

What was particularly impressive about the lab rotations was not only the technology that each lab possessed, but also the completely different atmosphere of the lab itself. It was a very enjoyable experience because you can learn about the technology to a certain extent from the papers, but you can never know the atmosphere unless you actually go there.

Y. Miura

I was able to spend a valuable time while engaging in the laboratories of a variety of fields. I was able to gain knowledge and techniques outside of my field and get to know faculty members who worked together in the laboratories.

T. Kikuchi

I was able to deepen my interest and insight through the experimental studies in which I engaged using other model organism than mice that I normally use in my laboratory, such as yeast and nematodes. Those experiments in different fields enabled me to penetrate insight to my research from different angles.

M. Fujino

I had clear purposes of the lab rotation, that is to experience to use many kinds of experimental animals and to know about non-research aspects such as creating an atmosphere and rules necessary for having one's own laboratory in my future. During this period, I had a very fulfilling period with one laboratory that I attended for three weeks or that I conducted experiments for figures of my paper. It is not easy to adjust the time with my own experiment and I have experimented until midnight during this period, but I feel that I have grown by overcoming it. I'm thinking about long-term overseas lab rotation, so I think I was able to do a good simulation for that.

C. Louis

For the curious ones, Lab Rotation is such a wonderful opportunity to explore different approaches in scientific study. From the fundamental research on yeast where famous autophagy was discovered up to the translational research on animal study. Please take a good use of this opportunity to explore your motivation and passion in research.

N. Goto

We could have a wide perspective, not focusing on one thing too much. Also we could get acquainted with professor/seniors who are working in different fields from us, they advised my research from the different view. That were very good opportunities.

L. Sha

I observed cellular responses to growth factor stimuli through a fluorescence microscope and entire biological responses of genetically modified nematodes to temperature stress. From this experience, I became more interested in the issues concerning the relations between life and environment. I believe that I can apply the new aspects and approaches I learnt to my own research.

M. Hashimoto

I have expanded my academic perspective through learning immunology, yeast research, bioinformatics, and embryology from the basic to the experimental level from the faculty members in a short period of time. I found it exciting that all the techniques being used conventionally in other research fields can be applied to my research.

W. Lyu

Stepping out of the comfort zone and learning knowledge of different fields helped me know my drawbacks and strengths and the lab rotation is such a chance. Discussing with the professors and lab members about what to do but not just following their ongoing projects, I used the rotation as an opportunity to learn experiments that I cannot do in my own lab. Also, the techniques learnt from other labs gave me alternative ways to leverage the knowledge and experience which can even be used to delve deeper into my own study field.

A Takemura

During my lab rotation, I extracted proteins from cancer cells, took the skin off laboratory mice, and solved eigenvalue problems. Those experiments were quite shocking to me who merely handle bacteria. This invaluable experience broadened my perspectives of my research.

Approach to Education

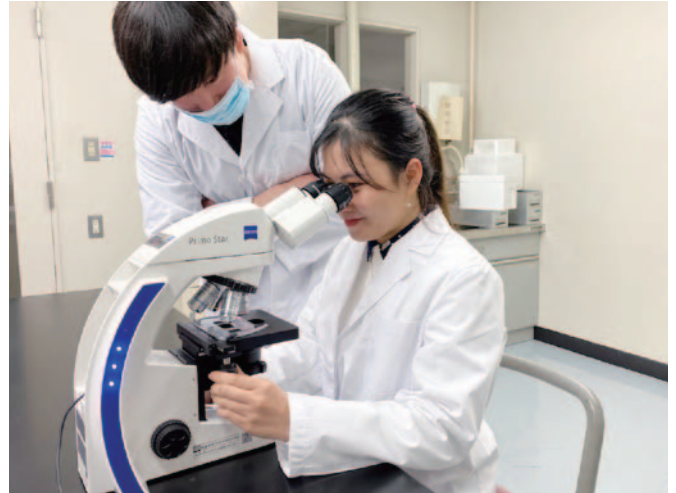
Entrepreneurship Training

In the Entrepreneurship Training course, taught by professional leaders from various fields, students learn the knowledge and skills necessary for developing scientific research into enterprising business ventures. AS part of this course students also visit a number of companies to gain firsthand experience of entrepreneurial business. Students learn the entrepreneurial way of thinking, the determination to expand their own capacity in order to overcome any difficulties that life in the business world might throw at them.



Basic Experiments in Human Biology

The Basic Experiments in Human Biology course is designed for first-year students to gain their first experience at working in laboratory. in this course, students work in four different laboratories headed by program professors. The students learn the outline of each laboratory's research, the basic experimental methods and techniques, and perform elementary experiments.



International Discussion on Human Biology

The International Discussion on Human Biology Course brings together three research and education powerhouses: Kyoto University, the National Taiwan University and the University of Tsukuba. Students from the three universities engage in interactive online distance learning via state-of-the-art telecommunications links. It is a great opportunity to present their thesis, enjoy discussion, and meet like-minded friends and colleagues.



Appropriate Technology

In terms of local needs, cultures, environments, and people, Appropriate Technology provides opportunities for the students to develop the optimum technology needed for targeted communities and to generate problem-solving skills, improvisational capabilities, and entrepreneurial abilities for future social needs.

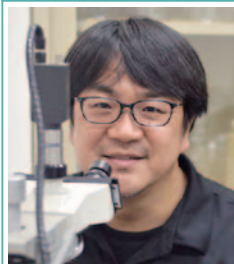


Supervisor Spotlight

Biochemistry · Molecular Biology · Cell Biology

Biochemistry, Molecular Cell Biology

<http://www.md.tsukuba.ac.jp/public/basic-med/molcellbiol/index.html>



IRIE Kenji

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In our laboratory, we are focusing on understanding the molecular mechanisms and the physiological functions of the following processes. (1) Post-transcriptional regulation of gene expression by RNA-binding proteins. (2) Molecular mechanism of mRNA localization and local translation regulating cell polarity, asymmetric cell division, and cell-fate. (3) Regulation of the endoplasmic reticulum stress response by protein kinases. (4) Prospore membrane formation by vesicle docking.

Biochemistry, Molecular Biology

Life Science Center for Survival Dynamics

http://akif2.tara.tsukuba.ac.jp/Top_iweb/Welcome.html



FUKAMIZU Akiyoshi

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What is longevity? What factors do determine how long we live? We have discovered that methylation (the biological reaction to transfer the methyl group [-CH₃]) has the key to determine the longevity by investigating the regulation of gene expression. The reaction is deeply involved not only in protein methylation, but also in that of DNA and RNA. To understand the longevity of multicellular organisms, we are approaching the molecular entity of the longevity by applying the techniques of genetics, biochemistry, chemistry, and metabolomics of mouse and *C. elegans*. Through advances of the longevity research, our laboratory is working on with the aim of knowing how long organisms can live and survive, and feeding back to the increase in the quality of health and life.

Physiological genetics

Life Science Center for Survival Dynamics

<https://sites.google.com/view/niwa-lab-tsukuba>



NIWA Ryusuke

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We are interested in understanding interorgan communication to regulate animal homeostasis and transistasis by studying neuroendocrine systems in the fruit fly *Drosophila melanogaster* and its parasitoid wasps. We are currently focusing on the following research topics: (1) Interorgan communication of germline stem cell proliferation and energy homeostasis; (2) Regulatory system of reproductive dormancy in insects; (3) Molecular, cellular, and systemic interactions between parasitic wasps and their hosts; (4) Regulation of morphology and developmental timing by steroid hormone (ecdysone); (5) Elucidation of the mechanisms of action of various chemical compounds and xenobiotics.

Molecular and Developmental Biology

<https://www.md.tsukuba.ac.jp/MDBiology/mbiol.index.html>



KOBAYASHI Makoto

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We are studying Human Biology using zebrafish and short-lived annual killifish as model animals. Our aim is to discover interesting biological events in animal life and clarify their molecular mechanisms using techniques of genetics, embryology, and molecular biology. Current themes are: 1) dietary antioxidants/lactic acid bacteria and extension of healthy life expectancy; 2) biological defense mechanisms against oxidative stress and/or cellular stress; 3) hematopoiesis and formation of digestive organs; 4) animal behavior and epigenetic control; 5) animal models of congenital human diseases.

Biochemistry, Molecular Cell Biology

<http://tchibalab.org>



CHIBA Tomoki

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The proteins in our cells are selectively degraded in a spatiotemporal manner, and such degradation is essential for the regulation of a wide range of cellular events, such as cell cycle progression, stress response, and so on. The major pathway that mediates the selective protein degradation is the Ubiquitin and Proteasome System (UPS). Our laboratory is analyzing the regulatory mechanism of the UPS to understand the physiology of "regulated protein degradation".

Gene Regulation

<https://www.md.tsukuba.ac.jp/basic-med/biochem/gene/>



NISHIMURA Ken

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Our group studies transcription factor and chromatin structure to understand cellular differentiation and the roles of gene expression in this process. Utilizing the iPS cell production, adipocyte differentiation, and chondrocyte induction system, we analyze mechanisms of epigenetic transcriptional regulation that will provide an invaluable intellectual background necessary for medical application of these cells. We also try to apply our original gene transfer system to obtain safe differentiated tissue cells for regenerative medicine.

Anatomy · Pathology · Laboratory Animal Science

Anatomy and Embryology

<https://www.md.tsukuba.ac.jp/basic-med/anatomy/embryology/index.html>



TAKAHASHI Satoru

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- Elucidation of molecular mechanism of pancreatic beta- cell development and its application.
- Functional analysis of large Maf transcription factor family, MafB and c-Maf in macrophage development and functions.
- Elucidating biological roles of carbohydrates using glycosyltransferase conditional KO mice.
- Transcriptome analysis of mice in the space.
- Molecular function of autophagy receptor p62.

Laboratory Animal Science

<https://www.md.tsukuba.ac.jp/basic-med/lab-animal/>



SUGIYAMA Fumihiko

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Using genome-edited mice, we aim to reveal the molecular mechanisms of phenomena that are difficult to analyze without experimental animals, such as germ cells maintenance, embryonic development, and cardiovascular systems. In particular, by using originally developed genome-editing tools and new gene-modification systems, we will conduct research into the essence of the robust and flexible homeostasis mechanisms, including analysis of the non-coding genomic regions and multi-gene redundancy that has rarely been analyzed before. Each student will be given an independent theme and will be responsible for producing the genetically modified mice necessary for the theme. Through this experience, students will be able to acquire basic skills in reproductive biology and genetic modification.

Experimental Pathology

<https://www.md.tsukuba.ac.jp/epatho/>



KATO Mitsuyasu

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Cancer cells continue to proliferate as a population. This is the primary characteristic of cancer cells. Recent cancer research indicated that only cancer stem cells are capable of tumorigenesis, recurrence, and metastasis, and we originally discovered the phenomenon of stem cell induction, in which stem cell properties are newly acquired in a cancer cell population. Based on this discovery, we have been conducting research from a new perspective on the characteristics of cancer cells, such as the determination of cell division lifespan of non-stem cancer cells and the mechanism of release from the lifespan during stem cell induction, while analyzing the dynamics of cancer stem cells by visualization.

Virus · Microbiology · Immunology

Molecular Virology

<https://www.md.tsukuba.ac.jp/basic-med/infectionbiology/virology/>



KAWAGUCHI Atsushi

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We focus on emerging virus diseases such as influenza viruses and SARS-CoV-2. These viral infections originate from wild animals and are transmitted to humans after receiving adaptive mutations (zoonosis). We are analyzing the mechanisms by which viruses adapt from their natural hosts to humans, and the expression mechanisms of viral pathogenesis via excessive immune responses. We are also working on the development of antiviral drugs.

Supervisor Spotlight

Bacteriology

<https://www.md.tsukuba.ac.jp/basic-med/infectionbiology/microbiology/>



MORIKAWA Kazuya

We aim to clarify bacterial survival strategies in the context of the establishment of infectious diseases or symbiotic status. We have found a group of genes named "esp (expression in minor subpopulation)" that are expressed in a minor subpopulation. Some were responsible for horizontal gene transfer and acquisition of antibiotics resistance genes. However, the function of many esp genes remains to be clarified, which must be clues for unknown bacterial properties based on population heterogeneity. Other topics include dynamics of nucleoid, and anti-virulence drugs.

Immunology

<http://immuno-tsukuba.com>



SHIBUYA Kazuko

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Humans have built a highly integrated immune system as a biological defense mechanism against pathogenic microorganisms. However, infectious diseases are still the greatest threat to humankind even today. On the other hand, abnormalities in the immune system are also an essential cause of intractable diseases such as autoimmune diseases and allergies. In addition, cancers and rejection of transplanted organs are also issues that are directly related to the immune system. Our laboratory identified several novel immunoreceptors, including DNAM-1 (CD226), MAIR (CD300), Fcα/μR (CD351), Allergin-1, and Clec10a, which are involved in the development of inflammatory diseases, allergy, cancer, infectious diseases or autoimmune diseases. Our goal is to clarify the basic principles of the immune system, and then to develop innovative molecular targeting therapies for these intractable diseases.

Bacterial cell-cell communication and bacterial biofilm

URL: <https://www.u.tsukuba.ac.jp/~nomura.nobuhiko.ge/index.html>



NOMURA Nobuhiko

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Comprehension and application of microbial cell-cell interactions, diversity, community
Microbial communities demonstrate a wealth of behavior in response to environmental stimuli due to the variety of and interactions between microbes in these communities. Furthermore, they have a significant impact on human life and well-being, highlighting the need for innovative technologies to control microbial community development. We aim to elucidate the behavior of individual bacteria within communities and interactions between communities and to clarify community adaptation to the environment and microbial interactions with other environmental organisms. To achieve this, we will develop novel technologies to image and analyze microbial communities from the individual to the community level. We will clarify the role of heterogeneity and cell-cell interactions within these communities.

Molecular Parasitology · RNA modification

https://www.md.tsukuba.ac.jp/basic-med/kiongho/Ho_Lab/Welcome.html



Ho Kiong

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In kinetoplastid parasites, post-transcriptional events have central roles in controlling gene expression. Recent studies suggest that certain transcripts are silenced by removal of 5'-cap structure and silenced in the cytoplasm. The silenced transcripts can reacquire the 5'-cap to regenerate translatable mRNAs. The purpose of this research is to elucidate how gene expression is regulated through mRNA decapping and recapping pathway. The mRNA recapping pathway could potentially expand the information content of genes by regulating abundance and stability of translatable mRNA. We are also interested in how RNA are repaired in the cells. This is accomplished by understand the targets for RNA ligase, which act to join the the breakage in the RNA molecules in the cells.

Neuroscience · Physiology

Molecular Neurobiology

<https://www.md.tsukuba.ac.jp/basic-med/molneurobiol/>



MASU Masayuki

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Our main research focus is to study the molecular mechanisms that regulate neural network formation and higher brain functions using integrative approaches, which include molecular biology, biochemistry, pharmacology, developmental biology, neuroanatomy, and behavioral sciences. Major research topics are development and function of the corticospinal tract, regulatory mechanism of spinal motor nerve formation, and regulation of dopamine signal transmission.

Neurophysiology

<https://www.md.tsukuba.ac.jp/physiology/t-kogane/index.html>



KOGANEZAWA Tadachika

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Cardiovascular and respiratory regulations by the central nervous system play crucial roles in homeostasis. Disorder of the systems causes severe problems in a living body. Despite this, it has remained that lots of unknown mechanisms in the cardiovascular and respiratory centers. To investigate these mechanisms, we are electrophysiologically approaching neural mechanisms of the cardiovascular and respiratory regulations using in vivo and in situ preparations of rodents.

Developmental Biology

Life Science Center for Survival Dynamics

<http://skob.tara.tsukuba.ac.jp/Top/index.html>



KOBAYASHI Satoru

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Mechanisms underlying Germ Cell Formation

Germ cells are specialized cells that can transmit genetic materials from one generation to the next in sexual reproduction. All of the other cells of the body are somatic cells. This separation of germ and somatic cells is one of the oldest problems in developmental and reproductive biology. In many animal groups, a specialized portion of egg cytoplasm, or germ plasm, is inherited by the cell lineage (germline) which gives rise to germ cells. It has been demonstrated that the germ plasm contains maternal factors required and sufficient for germline development. Our laboratory aims to find the maternal factors for germline segregation, and molecular mechanisms regulating germline sex determination in *Drosophila*.

Molecular and cellular neurobiology

<https://fmsuruta.wixsite.com/fuminori-tsuruta>



TSURUTA Fuminori

Our laboratory is interested in understanding the mechanisms of how glial cells contribute to neurogenesis, synaptogenesis, and neural circuits formations. Also, we have been investigating mechanisms by which glial dysfunctions cause an increased risk of neuronal disorders. Currently, we implement several projects, such as (1) microglial diversity regulated by extracellular micronuclei, (2) microglial maturation and purine metabolism, (3) atypical secretory pathway in neurons and astrocytes, (4) hypothermia control mediated by neuron-astrocyte interaction. Moreover, we have been developing tools and screening systems to elucidate abnormal post-translational modifications that induce neuroinflammation. We aim to clarify some of the principles of neuron-glia interactions in the developing brain through these challenging projects. We welcome highly motivated students interested in molecular neuroscience to investigate the mechanisms underlying glial functions.

Vascular Matrix Biology

Life Science Center for Survival Dynamics

<https://www.saggymousehkytsukuba.com>



YANAGISAWA Hiromi

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Based on our long-term interest in vascular biology and matrix biology, our laboratory aims to identify the components of the extracellular microenvironment (i.e., extracellular matrix (ECM), mechanical stress, hypoxia, etc.) in development, homeostasis, and aging, and to elucidate their molecular interactions with responding cells. In addition, we will investigate how the extracellular microenvironment is altered in various diseases and affects cellular properties and behavior. We will identify intervention points and methods, which will lead to clinical applications. We use a mouse as a model system and study various tissues, including cardiovascular, kidney, skin, and bone. Furthermore, we plan to identify niche factors involved in the construction of cerebral blood vessels and the brain and the maintenance of tissue stem cells.

Stem Cells · Regenerative Medicine

Regenerative Medicine and Stem Cell Biology

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



OHNEDA Osamu

oohneda@md.tsukuba.ac.jp

Analysis of Tissue Stem Cells derived from Patients

Our laboratory mainly focus on the development of tissue stem cells for clinical application. Tissue stem cells are undifferentiated cells found in variety of tissues, which induce immense potential in the form of a long-time rejuvenation ability, and differentiation potency to several type of cells. However, in clinical setting, the success of stem cell transplantation depends on the donor's background; factors such as age, pathological condition or drug consumption. In order to maximize the best potential of tissue stem cells for clinical application, our laboratory study how tissue stem cells could function depends on their backgrounds after the transplantation.

Supervisor Spotlight

Stem Cell Therapy

<https://www.md.tsukuba.ac.jp/basic-med/sct/>



YAMAZAKI Satoshi

y-sato4@md.tsukuba.ac.jp

In our laboratory, we are conducting basic research on stem cell biology and its applications. In recent years, the field of stem cell research has been greatly enhanced by the discovery of various pluripotent stem cells and adult stem cells (tissue-specific stem cells). However, one of the most exciting aspects of stem cell research is that it is still largely unexplored. To answer these questions, we are trying to propose new biological concepts by using analytical methods that integrate molecular biology, developmental engineering, immunology, engineering, and mathematical science.

Medical Genetics · Informatics

Molecular and Genetic Epidemiology

<https://www.md.tsukuba.ac.jp/community-med/publicmd/GE/>



TSUCHIYA Naoyuki

tsuchiya@md.tsukuba.ac.jp

Functional genes in the immune system are highly polymorphic, and some of them are associated with individual differences in susceptibility and/or clinical course of various diseases, or in responses to drugs. Our laboratory is interested in the search of genetic variants (polymorphisms) associated with intractable immune system disorders such as systemic lupus erythematosus, ANCA-associated vasculitis and systemic sclerosis, using human genome analysis. We hope our research will lead to understanding of disease pathogenesis, identification of drug targets and biomarkers, and development of precision medicine in autoimmune rheumatic diseases.

Bioinformatics

<https://sites.google.com/view/ozakilab-jp>



OZAKI Haruka

haruka.ozaki@md.tsukuba.ac.jp

Bigdata and informatics have become very important in the biomedical field. We work on the development of bioinformatic methods for understanding and interpreting diverse massive biological data: (1) Development of methods for interpreting and predicting the function of genome sequences, (2) Development of methods for analyzing single-cell and spatial omics, (3) Automation of life science research (Laboratory automation), (4) Medical data analyses. In addition, we apply bioinformatics, programming, informatics, statistics, and applied mathematics to biological and disease research. We welcome students from diverse backgrounds who have the ambition to integrate biomedical and information sciences.

Genome Biology

<https://www.md.tsukuba.ac.jp/basic-med/genome/index.html>



MURATANI Masafumi

muratani@md.tsukuba.ac.jp

The main research interests in our group is genomics and epigenomics in space medicine and clinical research, with particular focus on development of technologies for limited sample analysis. We also collaborate with clinicians and industry partners* to implement our methods to personalized medicine and automated laboratory testing using AI and robotics. These collaborative projects provide our group members with opportunities to learn real-world technological demands and to shape unique research programs fitting to individual career aspiration.

In silico Drug Discovery and Chemical Biology

http://www.md.tsukuba.ac.jp/tmrc/research_lab/informatics/



HIROKAWA Takatsugu

t-hirokawa@md.tsukuba.ac.jp

With the development of increasing number of genome sequence data and protein structure determination, pharmacological and drug discovery research based on the structural biology data have been accelerated. However, some of experimental structural data may be inconvenient to use for drug discovery due to the constraints on crystallization conditions or undesirable biological state. Molecular modeling and simulation can help to bridge the gap between original state of experimental structural data and drug discovery oriented structural models. Structural models from the collaboration between the experimental data and in silico technology will be useful to guide sophisticated drug discovery process. We propose the supporting and developing of in silico drug discovery using molecular modeling and simulation based on fundamental technologies such as homology modeling, docking simulation, molecular dynamics (MD) simulation, chemical biology and cheminformatics.

Molecular mechanism of sleep regulation

International Institute for Integrative Sleep Medicine (WPI-IIS)
Yanagisawa/Funato Laboratory

<https://sleepmouse.jp/>



YANAGISAWA Masashi

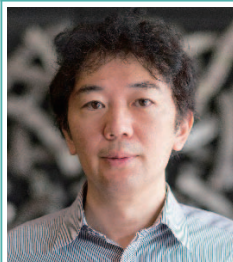
yanagisawa.masa.fu@u.tsukuba.ac.jp

We spend nearly one-third of our lives asleep. The mechanism and function of sleep, however, remains unclear. Many factors such as mental illness, 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 have convinced us that we have to take boldly new approaches to gain fundamental insights on 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.

Neural circuits controlling sleep and hibernation

International Institute for Integrative Sleep Medicine (WPI-IIS)
T Sakurai/Hirano Laboratory

<https://sakurai-lab.com/>



SAKURAI Takeshi

sakurai.takeshi.gf@u.tsukuba.ac.jp

Sleep and wakefulness are controlled by the functional connections between the hypothalamus, brain stem and cerebral cortex. Various biologically active factors are involved in this process. We are attempting to clarify the whole picture of the control system of sleep and wakefulness by elucidating the functions of these brain substances and their receptors, and the neural circuits that connect these systems.

Glia/neuron interactions in sleep · Sleep / wake neuronal circuits

International Institute for Integrative Sleep Medicine (WPI-IIS)
Lazarus/Oishi Laboratory

<http://www.wpiisilazaruslab.org/>



LAZARUS Michael

lazarus.michael.ka@u.tsukuba.ac.jp

The investigative focus of our laboratory is the cellular and synaptic basis by which the brain regulates sleep and wakeful consciousness. Our experiments seek to link the activity of defined sets of neurons with neurobehavioral and electroencephalographic outcomes in behaving animals by using innovative genetically or chemically engineered systems (optogenetics, chemogenetics or optopharmacology) in conjunction with in-vivo imaging (e.g. fiber-optic endomicroscopy). We also employ single-cell or spatial gene expression profiling to understand how the sleep/immune system crosstalk is regulated at cellular and molecular levels. We made key contributions to our understanding of sleep/wake behaviors, for example, why coffee wakes us up, why we fall asleep when bored, or how REM sleep loss increases the desire for junk food.

Neural activity dynamics across sleep-wake cycles

International Institute for Integrative Sleep Medicine (WPI-IIS)
Honjoh Laboratory

<http://www.u.tsukuba.ac.jp/~honjoh.sakiko.gf/index.html>



HONJOH Sakiko

honjoh.sakiko.gf@u.tsukuba.ac.jp

Sleep is a universal biological process across organisms with a nervous system. Prolonged wakefulness beyond spontaneous sleep/wake rhythm results in marked cognitive decline, showing that sleep is essential for the maintenance of normal cognitive functions. Although the detrimental effects of sleep loss have been long established, it still remains unclear why the brain cannot sustain waking cognition over a certain duration, and how sleep restores fatigue of the brain. Therefore, to better understand why we need to sleep, we investigate neural activity and gene expression dynamics across the sleep-wake cycle. We use mice as an model organism and mainly focus on the thalamocortical system that plays critical roles in cognition.

Brain plasticity during sleep and its application

International Institute for Integrative Sleep Medicine (WPI-IIS)
Sakaguchi Laboratory

<https://sakaguchi-lab.org/>



SAKAGUCHI Masanori

sakaguchi.masa.fu@alumni.tsukuba.ac.jp

As the brain grows, its plasticity shifts from tissue and cells to synapses. In the dentate gyrus of the hippocampus, however, an exceptionally small number of neurons continue to be generated even after brain maturation. We found that these newborn neurons decrease their activity during REM sleep after learning, and surprisingly, a small amount of their activity is required for memory consolidation (Kumar et al., Neuron, 2020). We are currently investigating the mechanisms of memory circuit reorganization based on the cellular plasticity of the adult brain. In addition, we are conducting a clinical study on patients to apply these research results.

Supervisor Spotlight

Role of sleep in human mind and behavior

International Institute for Integrative Sleep Medicine (WPI-IIIS)
Abe Laboratory

<https://www.u.tsukuba.ac.jp/~abe.takashi.gp/>



ABE Takashi

abe.takashi.gp@u.tsukuba.ac.jp

Our laboratory aims to understand how sleep is related to the human mind and behavior, and to manipulate this relationship. Currently, we are investigating methods to effectively facilitate specific processes of human sleep by non-invasive stimulations using such as auditory stimulation, odor stimulation, or vestibular stimulation. We also aim to establish a novel method that evaluates neurobehavioral responses to sleep loss based on an accurate and unobtrusive measure of alertness. These researches will contribute to solving social problems related to sleep as well as understanding how sleep relates to the human mind and behavior.

Brain circuit organization and sleep function

International Institute for Integrative Sleep Medicine (WPI-IIIS)
Greene/Vogt Laboratory

<https://wpi-iiis.tsukuba.ac.jp/japanese/research/member/detail/kaspervogt/>



VOGT Kaspar

vogt.kaspar.fu@u.tsukuba.ac.jp

We all need regular sleep to maintain our brain function. In sleep the brain is still active, but the activity looks very different from waking. We want to find out how the brain produces these different patterns and how they help us to wake up in the morning, refreshed and ready for a new day. For this we study signals from groups of neurons and from individual neurons in mice in waking and sleep, using functional imaging and implanted electrodes. We try to detect patterns that indicate how neurons communicate in waking and sleep. For electro-encephalographic (EEG) recordings from humans and mice we develop novel analytical tools to determine how much a subject is active, how much it needs to sleep, or how good that sleep is.

Clinical medicine

Metabolism, Endocrinology, and Lipid Biology

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



SHIMANO Hitoshi

hshimano@md.tsukuba.ac.jp

We have been enchanted by mystery of bio-lipids. We are enjoying the following projects and try to break the dogma of molecular biology.

- # Fatty acid elongase Elovl6 and its role in energy homeostasis and metabolic diseases- Development of new strategy for the treatment of lifestyle-related diseases by qualitative control of fatty acids -
- # CtBP2, a new energy sensor -Unraveling and therapeutic exploitation of a novel metabolic system orchestrated by an energy metabolite sensor-
- # SREBP vs. CREBH -Elucidation of transcription factor network regulating gene expression of enzymes involved in metabolic syndrome-
- # Nutrigenomics Genomic and epigenomic approaches to nutritional gene expression
- # Visualization and manipulation technology of metabolic responsive transomics network

Lipid Medicine

<https://sites.google.com/view/matsuzakalab-tsukuba/home>



MATSUZAKA Takashi

t-matsuz@md.tsukuba.ac.jp

Fatty acids are essential for our life as a source of energy, structural components of membranes, and signaling molecules. We identified and characterized a novel mammalian fatty acid elongase, Elovl6, which catalyzes the elongation of C16 saturated and monounsaturated fatty acids to form C18 fatty acids. Our work is focused on the regulation of fatty acid chain length and its role in metabolic disease, neurodegenerative disease, cancer, and rare disease. As well as unravelling the mysteries of the fatty acid diversity and biology, we are interested in the development of new therapeutic approaches to treat various diseases based on the quality control of fatty acids.

Hematology

<http://www.ketsunai.com>



CHIBA Shigeru

schiba-t@md.tsukuba.ac.jp

We aim at developing new therapeutics for blood cancers such as leukemias and malignant lymphomas, through elucidating their pathophysiology at the cellular and molecular levels. To this end, we analyze genomic abnormalities of the tumors and their microenvironments. New technologies such as single-cell RNA sequencing are incorporated, as well as advanced bioinformatics approach required for the analysis. Blood, bone marrow, and a part of resected tumors provided by patients will be used, together with genetically modified mice as a disease model. Students have individual themes and write at least one English paper, in principle, as the first author under the guidance.

Mathematical algorithms / artificial intelligence

Mathematical Modeling and Algorithms Lab.

<https://www.cs.tsukuba.ac.jp/~sakurai/>



SAKURAI Tetsuya

sakurai@cs.tsukuba.ac.jp

We are developing computer algorithms for data analysis using artificial intelligence and simulation using mathematical models. In particular, we are developing data collaboration analysis techniques to analyze distributed data from hospitals, research institutions, and companies while protecting privacy and confidential information. We are also developing analysis methods for data in the medical and healthcare fields, such as genome, gene expression, metabolome, and medical data.

Computational Life Science / Theoretical Structural Biology / Quantum Chemistry

Computational Life Science

<https://www.ccs.tsukuba.ac.jp/eng/research-divisions/division-of-life-sciences/biological-function-and-information-group/>



SHIGETA Yasuteru

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Phenomena concerning to Life are often governed by a series of chemical reactions driven by biological molecules such as proteins, nucleic acids, lipids, and sugars. Therefore, the fundamental molecular mechanisms of biological phenomena can be clarified by exploring the changes in electronic states and spatial rearrangement of atoms during chemical reactions. In this group, we use computational methods such as first-principles calculations based on quantum theory and molecular dynamics calculations based on classical (statistical) mechanics to elucidate the dynamic structure-function relationships inherent in biological molecules and to understand the essence of biological phenomena.

Faculty Members from Companies

Takeshi Nagata	Mizuho Research & Technologies, Ltd. Information and Communication Research Division. Senior Manager, Professor, SIGMA
Hiroaki Tateno	National Institute of Advanced Industrial Science and Technology

Research faculty members from other Universities

Aristidis Moustakas	Uppsala University
Arthur D. Lander	University of California Irvine
Bernd Fleischmann	University of Bonn
Carl-Henrik Heldin	Uppsala University
Hong-Gang Wang	Pennsylvania State University College of Medicine
Joseph S. Takahashi	University of Texas Southwestern Medical Center
Seong-Jin Kim	Research Institute of GILO Foundation
Lewis L. Lanier	University of California, San Francisco
Michael Kann	University of Gothenburg
Peter ten Dijke	Leiden University
Tsai-Kun Li	National Taiwan University
Kyoko Yokomori	University of California Irvine

Student Support



In the Ph.D. Program in Human Biology, the Student Support Committee plays a central role and conducts various activities to support enrolled students in their studies. For example, it provides support for students' living expenses and tuition fees from the Financial Support Scheme for Special Fellows, as well as financial support for overseas activities and for students' self-initiated activities.

Financial support

- Estimated stipend in the amount of 70,000 yen per month.
- Support for Overseas Activities
- Estimated tuition Fee Exemption: 0 yen per year (for 5 years)

Financial Support Scheme for Special Fellows

For the students who are accepted into the Ph.D. Program in Human Biology, financial support in the form of a stipend will be provided under the Financial Support Scheme for Special Fellows. The objective of the scheme is to support the students of this Ph.D. Program to take the initiative in conducting creative research and lead them to become the global leaders of the future.

Housing support

- Priority Allocation of Dormitory Accommodation
Monthly rent: about 30,000 yen per month (at one's own expense)
- Secure dormitory accommodation consisting of a private room with its own entrance, kitchen, and bathroom, and furnished with a single bed and a desk.

Others

- Support for globalization
TOEFL Course, International Symposia / Overseas Summer School
- Risk management support
Mentor system
- Mental health-care support
Initial mentor system, support by Student Support Committee
- Career support
Initiation Seminar, Business Leaders Seminar, Internship in Overseas Companies

Application



The Entrance Examination: August (Enrollment for April)

- Application Period: July
- Examination: Late August

The result will be announced on September
(See details on our website)

The Entrance Examination: January- February (Enrollment for April or October)

- Application Period: December
- Examination: Late January – early February

The result will be announced on February
(See details on our website)



Messages from Faculty



Professor (Life Science Center for Survival Dynamics), Immunology,
Former Program Leader

Expectations for the HBP family

I was the program leader for seven years from 2012 to this spring. During this time, we were able to welcome 78 students from 15 countries around the world to HBP. At the time of its founding, it was a groping situation, but now HBP has grown tremendously as a program that is highly evaluated not only on campus but also off campus. Being in the path of program growth and being able to interact directly with many excellent students is a fortunate as a faculty member at the University of Tsukuba and a great pride in my faculty life.

This program started from the beginning with the full support of the Ministry of Education, and is still receiving special support from the university. Currently, the program has a capacity of only 8 students per grade, but a huge number of faculty members from inside and outside the university participate in the program, and it is operated together with the administrative staff. Students should always remember that HBP is such a special program and have the pride of learning here. HBP graduates are obliged to become captains who can steer unknown routes aimed at creating a society in which humans live like humans. I have no doubt that the HBP family will be active in the oceans around the world in the near future.



Professor, Anatomy and
Embryology Laboratory

Aiming to be a world leader

The Human Biology Program (HBP) was launched in 2011 as a program to develop world leaders. Unlike traditional Japanese graduate schools, all education is conducted in English for acquiring the ability to perform discussions in English. In addition, overseas laboratory and company rotation and appropriate technology course are obligatory. Because of these, it is possible to cultivate the ability to work around the world. HBP is an innovative program that reforms previous graduate school education in Japan. I've been in charge since I applied for the program, and I was worried if we could really achieve such a high goal, but our graduates so far have proved that the goal has been fully achieved. As examples, there are several graduates who have found employment as postdocs at well-known overseas Universities such as Stanford University, MIT, and the University of Michigan, and some of them have published their papers with their current affiliations in top journals. In addition, some students were hired as faculty members at the University of Tsukuba and Gifu University immediately after graduation. In this way, HBP functions as a program to develop true world leaders.

I hope that everyone will join HBP with the aim of becoming the next world leader.



Research Manager, Information and
Communication Research Department,
Mizuho Research & Technologies, Ltd.

Bringing the power of computational science to life science!

There are very few modern science researches that does not require computational science. I am a technical consultant, solving the problems of various customers with the power of computational science. Computational science includes various fields such as physical simulation, computational mathematics including optimal solution search, signal processing, cryptographic processing, image recognition, statistical analysis, machine learning, and many experts are not familiar with non-specialty fields. My strength is having knowledge and experience in such various fields. Therefore, I can proceed with multifaceted research.

Many of the issues facing humanity today cannot be solved by experts in one field alone, and it will be necessary for experts in various fields to gather and proceed with multifaceted research. I believe that this program will foster the human resources who will lead such research. I have no doubt that computational science is essential there, so I am providing my own knowledge and experience to this program. I look forward to the new light that guides humanity from sessions in computational science and other fields in this program.



Assoc. Professor, Molecular Parasitology

Develop Your Scientific Leadership Skills for Human Society

In less than a decade, the HBP had gained recognition as one of the most successful graduate programs in the nation and has served as a prototype for the other graduate programs in Japan. The program has attracted students from overseas, with more than 70% of students from abroad. The success of HBP can be attributed to several key factors. Firstly the diversity of the faculty members, drawn from the academia, government, and industrial sectors. Students learn interdisciplinary approaches to developing projects towards addressing global questions that cannot be approached within single traditional disciplines. Secondly, its unique curriculum, such as the Appropriate Technology Course, and the availability of travel scholarships to attend conferences and advanced training courses overseas.

Aside from the traditional Ph.D. requirements, HBP students need to satisfy two qualifying examinations, consisting of oral examinations focused on the student-written research or business proposals. The first qualifying exam is taken in the early stages of their research project to encourage students to think critically about their theoretical and practical aspects of their dissertation project. The second qualifying exam is scheduled in the 5th year of the program focus on students' original proposal on the topic outside of their dissertation, with the expectation that they will be able to apply for individual funding for their future career. Upon completing the degree, I am confident that HBP graduates will have an adequate breadth and depth of knowledge to become global leaders in the emerging field of Human Biology.



KAO Corporation
R&D-Development Research-Sanitary
Products Research
Senior Principal Research Scientist

Breaking down the status quo and future oriented

Eight years have passed since I started working for Doctoral Program in Human Biology, during which time I have had the opportunity to perform experiments and participate in activities with many students and teachers. I have also served as a mediator between companies and students, helping students desiring to work as a corporate researcher after graduation. Now, in 2020, the whole world is in the middle of a corona virus crisis. The pandemic has transformed social life in a way that no one could have imagined, and has already presented numerous challenges for how to reconstruct our lives. This situation has made me realize once again that our generation can pass on our experience and knowledge to the next generation, but we may not be able to provide a guide on how to cope with the arrival of a new society that we had never expected and on how it should be transformed in the future. We need to propose and implement different social systems and lifestyles. In that sense, I look for the willingness and effort of young, future-oriented people who will forge a way through this current situation.



Professor (Life Science Center for
Survival Dynamics),
Vascular Matrix Biology

Diversity of HBP students

I have welcomed five HBP students to my laboratory since I arrived at the University of Tsukuba from the University of Texas in 2015. All HBP students are energetic and have big goals for their lives in graduate school. In fact, since the program's inception in 2012, I learned that many of our graduates are doing very well in research and business around the world. We value diversity, and all students have equal opportunities to focus their efforts on domestic and international training. In addition, experts in various fields such as medicine, biology, and mathematics work around the axis of the students and act as advisors to the students in their research. One of the main features of our program is that it allows each student to construct his/her own research based on their rich character and passion. In addition, although we cannot get together easily due to the pandemic, we have many opportunities to deepen our ties with each other, such as organizing initiation seminars, mutual preparation meetings for the Qualifying Examinations, and training at the University of Edinburgh. The office for student support is always ready to assist them. We hope you will become leaders who will steer the world voyage through the HBP Program.

Voices of Student



GOTO Nohara

Enrolled in April 2019

FIGHT ON, GET ON, KEEP ON, STEP UP!

Getting results and publish papers are the requirements for being "good" Ph.D candidate. However, the information we can get is limited as long as we sit down to our desk or bench. In this program, we can go out of the lab anytime and get opportunities to know what happens in the world and what the world really need. Not only in my lab but also in the world, I want to be attractive global leader who have wide perspective and flexible thinking.



Thanasis Poullikkas

Enrolled in April 2018

A whole new level of Diversity, Multidisciplinary and International Networking

A PhD program like nothing else! Enrolling in Human Biology Program I gain not only laboratory skills but a plethora of extracurricular experiences which rocketed my CV high enough to reach global standards. The calculus offers lectures from a wide range of fields; from Stem Cells to Appropriate Technology. Also, the process and grants for joining international symposiums and laboratories through HBP is easy and generous. I recommend this program for anyone that wants to seize his/her dreams as a global leader figure.



ISHITSUKA Akari

Enrolled in April 2018

The excellent supportive environment for Ph.D. students

Human Biology Program (HBP) is 5-year Ph.D. program that offers a lot of opportunities to students, not only in research but also in business field. I think one good point of HBP is that it allows us to do laboratory rotation. By doing so, we will be able to find the field that we are much interested in or the laboratory that suits us best. I feel that this is a great advantage for aspiring PhD candidates like me. In addition, this program provides ample amount of financial supports such as scholarship, overseas travel grant, and preferential occupancy in student dormitories. Through such, we can just focus on our research without worrying about our finances. Considering all these, I think HBP is an excellent program for students who want to broaden their perspective and be experts on their chosen field.



MURATA Rikito

Enrolled in April 2018

An environment where you can feel your growth as a researcher every day

HBP offers lectures by professors who lead current world's science. I'm convinced that these lectures provided me to obtain scientific knowledge, logical thinking and discussion skills, which largely contributed to my growth as a researcher. In addition, an international internship at Shimadzu Asia Pacific Pte. Ltd. in Singapore was a great opportunity to discover the appeal of working abroad and my strengths that I hadn't noticed before. Altogether, I'm thinking that HBP is a best place where I can feel my growth as a researcher every day.



Manoj Kumar Yadav

Enrolled in April 2015

HBP provides an excellent environment for developing ours towards science multidimensionally.

The human biology program(HBP) has provided me with an excellent opportunity to learn from basics and identify my research interest through several lab rotations associated with the HBP. Among the laboratories working with different life science and computational biology disciplines, I had chosen one as per my interest and incorporated a multidimensional approach in my research through learning.

Voices of Alumni



NIIZUMA Kouta

Enrolled in April 2013
TOEIC 520 when I enrolled and
TOEIC 865 when I completed.

A view beyond hard work

To be honest, it is very hard to fulfill the graduation requirements while studying life science, medicine, computational science, material science, appropriate technology, and overseas laboratory rotations to understand the concept of human biology.

However, it is a solid fact that these five years have been the fastest-growing years of my life. This is because HBP is an environment where you can't help but work hard. If you keep stepping forward from your current position, the scenery around you will change before you know it.



Weizhe Lu

Enrolled in September 2014
TOEIC 730 when I enrolled and
TOEIC 870 when I completed.

The Best Way to Achieve Your Goals

You may want to be a researcher in academia or get a position in the company. No matter what kind of goals you have before your Ph.D. program, you can make it come true in HBP! There are a lot of opportunities such as lab rotation and internship in companies both in national and abroad. These wonderful experience helped me to achieve my own goal as well. In addition, I made friends from all over the world that let me understand different culture. Although there were many challenges in HBP, all of it became good memory finally!



KUNO Akihiro

Enrolled in April 2013
TOEIC885 when I enrolled

The three attractions of HBP ~Diversity at HBP and Speciality on you~

I would like to introduce three of valuable points of HBP. Firstly, you have a plenty of interdisciplinary research opportunities. I have changed a suitable specialty from these experiences. Secondly, HBP has an extensive support for students. There were incentives and travel grants, so you can really concentrate on your activities. Lastly, you can meet various different and promising students. I was always inspired by the HBP's friends. I am sure that your life will be broadened by this experience at HBP.

I think the best thing about HBP is to show us the 'diversity'. This is because of the diverse backgrounds and interests of all the students, faculty and staff at HBP. As a student, you will be exposed to different and fascinating research and activities on a daily basis, and you may not be able to decide where to go. However, you will be able to choose a path with confidence with your experiences and knowledge through HBP. Please enjoy having thoughts of your way.



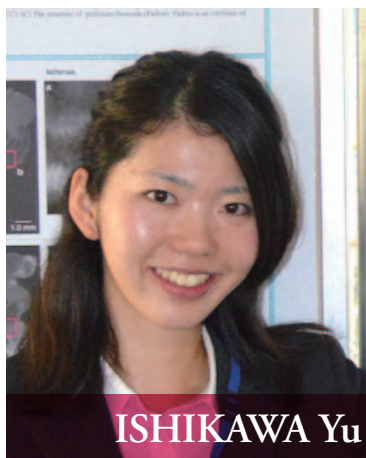
HASHIMOTO Misuzu

Enrolled in April 2012
TOEIC 825 when I enrolled and
TOEIC 910 when I completed.

Lab rotation in different places

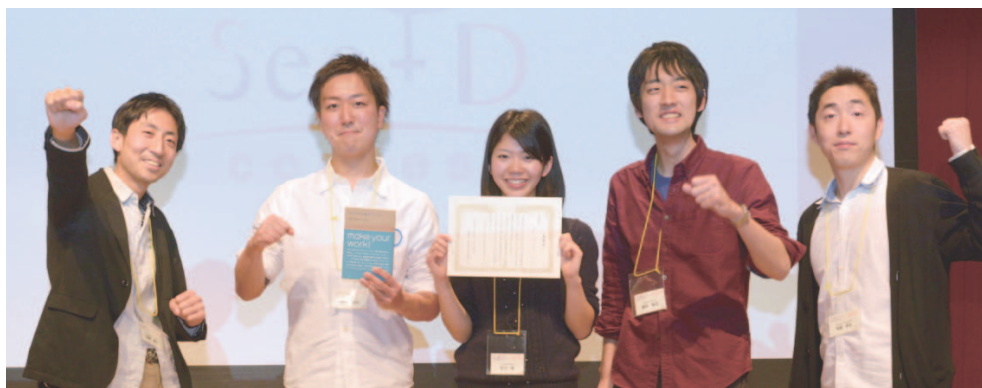
HBP lab rotation is one of the great programs. I went to the US twice and UK once during my Ph.D. These opportunities prompt you to see your own research from different ways, which is really helpful. Even if you go to a lab in different fields from your research topic, enjoy thinking how to link the new knowledge to your own study. HBP people are very helpful for supporting your originality.

Career Path



ISHIKAWA Yu

Enrolled in September 2013
TOEIC 400 when I enrolled and
TOEIC 880 when I completed.



HBP provides interdisciplinary education to expand my curiosity

The great attraction of HBP is that you can take various classes in practice as well as classroom lectures without bias in your research field. In appropriate technology education, I learned about business in developing countries and had many discussions within the team members. When I visited East Timor, I was able to experience many "Facts" and "Finds" through field trips. This experience has been put to good use not only in business but also in my research. Thus, the interdisciplinary environment provided by HBP has enriched my graduate school life.



KIKUCHI Takuya

Enrolled in April 2012
TOEIC 780 when I enrolled and
TOEIC 880 when I completed.



Excellent study opportunities and environment of HBP

The Ph.D. Program in Human Biology provides various financial supports for students' living expenses, overseas activities, dormitory accommodation, etc. Furthermore, we can select the field of study from the excellent opportunities in domestic and foreign industry, government and academia. Thus, in the program we can concentrate on self-initiated activities and do our best to dream come true. After my graduation from HBP, I can make use of great experiences I've got in five years of HBP at the current job as a corporate researcher.

HBP is a program that embodies the “internationality” and “interdisciplinary” of the University of Tsukuba. In an environment where students can study with international students, they have trained global leaders by making full use of complex methodologies that cross life sciences, medicine, material sciences, and computational sciences. HBP graduates are active in the world as overseas postdocs, corporate researchers, and university faculty members.

Year of admission		Position or Employment
2015	April	Academia
		Postdoc / Researcher
		Postdoc / Researcher
		Postdoc / Researcher
		Postdoc / Researcher
	September	Company
2014	April	Company
		Postdoc / Researcher
		Company
		Academia
		Postdoc / Researcher
	September	Postdoc / Researcher
		Company
		Postdoc / Researcher
2013	April	Company
		Company
		Company
		Academia
		Company
		Postdoc / Researcher
		Postdoc / Researcher
		Postdoc / Researcher
		Postdoc / Researcher
		Postdoc / Researcher

Year of admission		Position or Employment
2013	September	Postdoc / Researcher
		Company
		Postdoc / Researcher
		Academia
		Company
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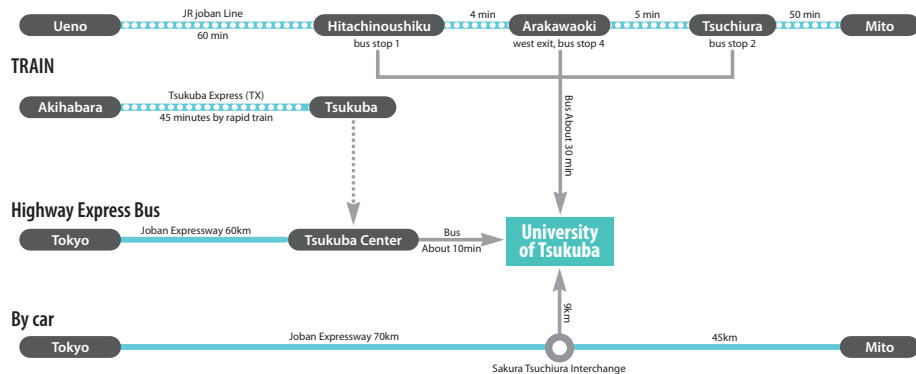
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