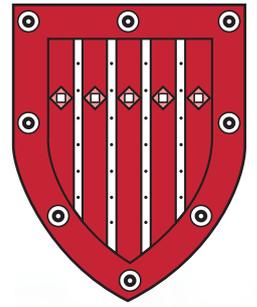


The University of Tokyo  
Faculty of Medicine  
Graduate School of Medicine



PROSPECTUS 2023–2024



## A Message From the Dean of Faculty of Medicine and Graduate School of Medicine, the University of Tokyo

Medicine has two important aspects. Medicine is basic science to elucidate life phenomenon. Medicine is also applied science to conquer disease and contribute to human welfare. During its long history of more than 160 years, the University of Tokyo School of Medicine has trained numerous medical researchers and health-care professionals, many of whom have distinguished themselves in Japan and other countries. We in the Graduate School of Medicine aim to build on these achievements and to continue to play a leading role in promoting human welfare.

Several new projects have been implemented to strengthen the foundation of our research and clinical activities. The Molecular & Life Innovation Building is promoting joint research with other faculties, including the Graduate School of Engineering and Graduate School of Science. Clinical Research Center Building A is functioning as a core clinical research facility. The South Research Building now features the Iron-Gate (Tetsu-Mon) Clinical Lecture Hall. In basic research, the International Research Center for Neurointelligence (IRCN) was started as part of the World Premier International Research Center Initiative (WPI) in collaboration with the Graduate School of Medicine. A new cryo-electron microscopy facility has been opened as a shared facility, allowing researchers inside and outside the University to contribute to the field of structural biology in Japan.

As part of our ongoing improvements in graduate education, the University of Tokyo has successfully implemented multiple doctoral degree programs as part of the World-leading Innovative & Smart Education (WISE) program. In particular, the World-leading Innovative Graduate Study Program for Life Science and Technology (WINGS-LST) helps graduate students acquire advanced expertise and broad perspectives in the life sciences. As the core of life sciences research at the University of Tokyo, we will continue to promote cutting-edge research, accumulate clinical resources, and encourage cooperation with other university faculties.

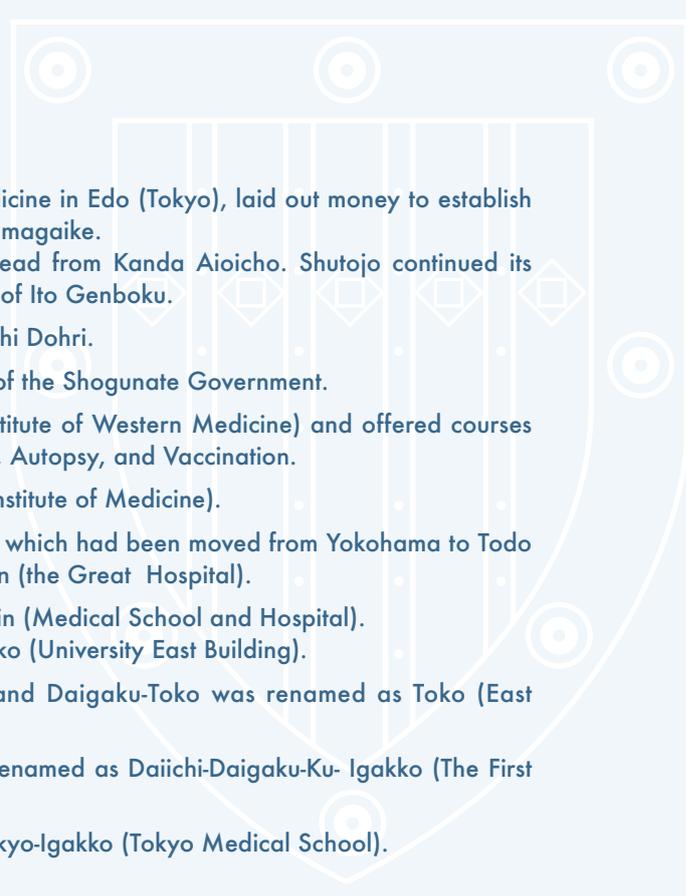
Students and staffs of the Graduate School of Medicine of our university should become international leaders in medicine and contribute to human welfare. All our laboratories provide young researchers and students with a state-of-the-art research environment. Moreover, we promote an atmosphere of inquiry in which students and principal investigators actively discuss important and emerging issues in the life sciences and medicine. This stimulating, interactive environment enables students to establish clear goals for their own original research. Finally, the advanced medical care provided at the University Hospital enables clinical studies that utilize the hospital's rich clinical data and is an optimal setting for research requiring big-data health-care analysis. Our fundamental mission is to develop new technologies for preventing, diagnosing, and treating disease, to apply these advances in clinical settings, and to train the medical researchers and practitioners who will establish the next generation of medicine.



Masaomi Nangaku, MD, PhD  
Dean, Faculty of Medicine and Graduate School of Medicine,  
The University of Tokyo



# HISTORY

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- 1858 May Practitioners, trained in Dutch (European) medicine in Edo (Tokyo), laid out money to establish the Shutojo (vaccination center) in Kanda Mitamagaikae.  
Nov. Shutojo was destroyed in a fire that had spread from Kanda Aioicho. Shutojo continued its operations at other sites such as the residence of Ito Genboku.
- 1859 Sep. Shutojo was reconstructed at Shitaya Izumibashi Dohri.
- 1860 Oct. Shutojo became an official medical institution of the Shogunate Government.
- 1861 Oct. Shutojo was renamed as Seiyo Igaku-Sho (Institute of Western Medicine) and offered courses of Western Medicine in the fields of Education, Autopsy, and Vaccination.
- 1863 Feb. Seiyo Igaku-Sho was renamed as Igaku-Sho (Institute of Medicine).
- 1868 Jul. Igaku-Sho, affiliated with the Military Hospital which had been moved from Yokohama to Todo residence in Shitaya, was renamed as Daibyoin (the Great Hospital).
- 1869 Feb. The Daibyoin was renamed as Igakko-Ken-Byoin (Medical School and Hospital).  
Dec. Igakko-Ken-Byoin was renamed as Daigaku Toko (University East Building).
- 1871 Jul. The Ministry of Education was established and Daigaku-Toko was renamed as Toko (East Building).
- 1872 Aug. A School System was established. Toko was renamed as Daiichi-Daigaku-Ku- Igakko (The First University District Medical School).
- 1874 May Daiichi-Daigaku-Ku-Igakko was renamed as Tokyo-Igakko (Tokyo Medical School).
- 1876 Nov. Tokyo-Igakko was moved to Hongo.
- 1877 Apr. Tokyo Igakko, affiliated with Tokyo-Kaisei School, was renamed as The University of Tokyo. Tokyo Medical School was renamed as The University of Tokyo Faculty of Medicine.
- 1886 Mar. The University of Tokyo was renamed as Imperial University, and The University of Tokyo Faculty of Medicine was renamed as the Imperial University Medical College. A Graduate School was established.
- 1897 Jun. The Imperial University was renamed as Tokyo Imperial University.
- 1917 Aug. Eiraku Hospital, affiliated with the Ministry of Education Medical Practice License Examination, moved to Tokyo Imperial University and was renamed as Koishikawa Hospital affiliated with Tokyo Imperial University Medical College.
- 1919 Apr. A faculty system was established renaming Tokyo Imperial University Medical College as the Faculty of Medicine.
- 1931 Feb. The first building of the Faculty of Medicine was constructed.
- 1936 Jan. The Brain Research Laboratory was built with funds donated by Mr. Hisasaburo Horikoshi.  
Nov. The second building of the Faculty of Medicine (main building) was constructed.
- 1947 Oct. Tokyo Imperial University was renamed as The University of Tokyo.
- 1950 Apr. The Institute of Nursing was renamed as The University Nursing School.
- 1953 Apr. The School of Health Care and Nursing was founded.  
Jul. The Graduate School was founded, and the Division of Medical Doctor Biological Science was established. The Brain Research Laboratory became the Brain Research Institute of the Faculty of Medicine.
- 1956 Apr. The Midwives School was established.
- 1958 Apr. The Division of Pharmaceutical Sciences became an independent faculty.  
May The University of Tokyo Faculty of Medicine celebrated its centennial anniversary.
- 1961 Mar. The Medical Library was built in commemoration of the centenary.  
Apr. The Institute of Medical Electronics was established.
- 1965 Apr. The Research Institute of Logopedics and Pediatrics was established. The School of Health Care and Nursing was reorganized as the School of Health Sciences. The Graduate School of The University of Tokyo was reorganized and the Division of Medical Doctor Biological Science became the Faculty of Medicine. The Health science Course was established in the Medical Science Division.

- 1966 Sep. The third building of the Faculty of Medicine was constructed.
- 1971 Apr. The Laboratory of Animal Experiments was established.
- 1973 Mar. The Animal Center for Biomedical Research was constructed.
- 1983 Jan. An annex of the third building of the Faculty of Medicine was constructed.
- 1985 Sep. The office of International Academic Affairs was established.
- 1987 Apr. Specialized courses were introduced to the Graduate School of Medicine.
- 1992 Apr. The School of Health Sciences became the School of Health Science and Nursing. The School of International Health was established in the Medical Science Division.  
Jul. The Radiation Research Institute was established.
- 1995 Apr. As a result of the shift to the chair system of the Graduate School of Medicine, four divisions, Third Basic Medicine, Social Medicine, Third and Fourth Clinical Medicine, were replaced with Pathology, Immunology and Microbiology, Social Medicine, Reproduction and Development, and Aging Science and Surgery.
- 1996 Apr. As a result of the shift to the chair system of the Graduate School of Medicine, three divisions, First Clinical Medicine, Health Science, and International Health, were replaced with Internal Medicine, Health Science and Nursing, and International Health.
- 1997 Apr. As a result of the shift to the chair system of the Graduate School of Medicine, three divisions, First and Second Basic Medicine, and Second Clinical Medicine, were replaced with Molecular Cell Biology, Functional Biology, Radiology and Biomedical Engineering, and Neuroscience. As a result of the above-mentioned reorganization, three institutes, the Institute of Brain Research, the Institute of Medical Electronics, and the Institute of Logopedics and Phoniatics were made redundant.
- 1999 Apr. The Master course of Medical Science was established in the Graduate School of Medicine. This course accepts graduates of all faculties except those from Schools of Medicine, Dentistry, and Veterinary Medicine.
- 2000 Apr. The International Research Center for Medical Education was established (A shared facility for education and research).
- 2001 Apr. The University Branch Hospital was united with the University Hospital.
- 2002 Mar. Nursing School and Midwives School was closed.  
Experimental Building (First Stage) was constructed.
- 2003 Apr. The Center for Disease Biology and Integrative Medicine was established. The Radiation Research Institute and the Laboratory of Animal Experiments were integrated into the Center for Disease Biology and Integrative Medicine.
- 2004 Apr. All the National Universities owned by the Japanese Government became National University Corporations. and the University of Corporation.
- 2005 Mar. Experimental Building (Second Stage) was constructed.
- 2007 Apr. The School of Public Health was established. This school offers programs for Master of Public Health.
- 2008 May. The University of Tokyo Faculty of Medicine and the University of Tokyo Hospital celebrated their 150th anniversary.
- 2010 Apr. The School of Health Science and Nursing became the School of Integrated Health Sciences.
- 2011 Jan. The Museum of Health and Medicine was established.
- 2012 Apr. The Office for Research Ethics Support was established.
- 2013 Apr. The International Research Center for Medical Education became a facility of the Graduate School of Medicine.
- 2013 Oct. The Life Sciences Core Facility was established.
- 2015 Apr. The Office for Clinical Practice and Medical Education was established.
- 2016 Apr. The Advisory Office for Conflict of Interest was established.
- 2017 Apr. The Global Nursing Research Center was established.
- 2021 Apr. The Center for Diversity in Medical Education and Research was established.

## Graduate School of Medicine

Dean Masaomi Nangaku



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## Molecular Cell Biology

<b>Cell Biology and Anatomy</b>	Cell Biology	Professor	Yasushi Okada
	Structural Biology	Professor	Masahide Kikkawa
	Cytoarchitectonics		
	Cellular Neurobiology	Professor	Shigeo Okabe
<b>Biochemistry and Molecular Biology</b>	Molecular Biology	Professor	Noboru Mizushima
		Associate Professor	Ikuko Honda
	Genome Informatics	Professor	Yukinori Okada
		Associate Professor	Qingbo Wang
	Physiological Chemistry and Metabolism	Professor	Hiroki Kurihara
Associate Professor		Yukiko Kurihara	
	Advanced Structural Studies	Professor	Radostin Danev
<b>*Joint Program</b>	Clinical Genome Informatics / Medical Lipid Science / Cancer Cellular Signaling		



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## Functional Biology

<b>Physiology</b>	Integrative Physiology	Professor	Kenichi Ohki
	Cellular and Molecular Physiology	Professor	Masanori Matsuzaki
	Neurophysiology	Professor	Kenichi Ohki
<b>Pharmacology</b>	Cellular and Molecular Pharmacology	Professor	Kenzo Hirose
	Systems Pharmacology	Professor	Hiroki Ueda
		Project Associate Professor	Yoichi Minami
<b>*Joint Program</b>	Brain Functional Dynamics		



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## Pathology, Immunology and Microbiology

<b>Pathology</b>	Pathology and Diagnostic Pathology	Professor	Tetsuo Ushiku
		Associate Professor	Daizo Koinuma
	Molecular Pathology	Professor	Yasuhiro Yamada
<b>Microbiology</b>	Microbiology	Professor	Makoto Takeda
		Associate Professor	Hiroshi Katoh
	Infection Control and Prevention	Professor	Takeya Tsutsumi
<b>Immunology</b>	Immunology	Professor	Hiroshi Takayanagi
		Associate Professor	Takeshi Nitta
		Associate Professor	Noriko Komatsu
	Applied Pathology	Distinguished University Professor	Kohei Miyazono
<b>*Joint Program</b>	Tumor Pathology / Infection Pathology / Molecular Oncology		



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## Radiology and Biomedical Engineering

<b>Radiology</b>	Diagnostic Radiology	Professor	Osamu Abe
		Associate Professor	Takeyuki Watadani
	Radiotherapy	Associate Professor	Hideomi Yamashita
	Nuclear Medicine	Associate Professor	Hidemasa Takao
<b>Biomedical Engineering</b>	System Physiology	Associate Professor	Kimiko Yamamoto
	Chemical Biology and Molecular Imaging	Professor	Yasuteru Urano
		Associate Professor	Ryosuke Kojima
	Biosystem Construction and Control		
	Integrative Genomics	Professor	Katsutoshi Oda
Associate Professor		Aya Ushiku	



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## Neuroscience

<b>Basic Neuroscience</b>	Neuropathology	Professor	Takeshi Iwatsubo
	Neurochemistry	Professor	Haruhiko Bito
	Neurobiology		
<b>Integrative Medical Neuroscience</b>	Developmental Neuroscience		
	Cognitive Neuroscience		
	Systems Medical Neuroscience		
	Child Neuropsychiatry	Associate Professor	Yukiko Kano
<b>Clinical Neuroscience</b>	Neuropsychiatry	Professor	Kiyoto Kasai
		Associate Professor	Seiichiro Jinde
		Associate Professor	Shuntaro Ando
	Neurology	Professor	Tatsushi Toda
		Associate Professor	Wataru Satake
	Neurosurgery	Professor	Nobuhito Saito
<b>*Joint Program</b>	Biomedical Neural Dynamics / Brain Disorders		



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## Social Medicine

<b>Occupational, Environmental and Preventive Medicine</b>	Preventive Medicine	Professor	Shumpei Ishikawa
		Associate Professor	Hiroto Katoh
	Public Health	Professor	Takahiro Higashi
		Associate Professor	Haruhiko Inada
<b>Forensic Medicine, and Medical Informatics and Economics</b>	Forensic Medicine	Professor	Hirotarō Iwase
		Associate Professor	Yohsuke Makino
	Biomedical Informatics	Professor	Kazuhiro Ohe
		Associate Professor	Kayo Waki
<b>*Joint Program</b>	Cancer Control Policy and Research / Cancer Epidemiology / Cancer Communication		



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## Internal Medicine

<b>Medicine I</b>	Cardiovascular Medicine			
	Respiratory Medicine			
	Gastroenterology	Professor	Mitsuhiro Fujishiro	
		Associate Professor	Ryosuke Tateishi	
	Nephrology	Professor	Masaomi Nangaku	
		Associate Professor	Hiroshi Nishi	
<b>Medicine II</b>	Endocrinology	Professor	Masaomi Nangaku	
		Associate Professor	Noriko Makita	
	Nutrition and Metabolism	Professor	Toshimasa Yamauchi	
		Associate Professor	Nobuhiro Shojima	
	Hematology and Oncology	Professor	Mineo Kurokawa	
		Allergy and Rheumatology	Professor	Keishi Fujio
	Infectious Diseases		Professor	Hirofumi Shoda
		Stress Science and Psychosomatic Medicine	Professor	Takeya Tsutsumi
	Associate Professor		Shu Okugawa	
	<b>Clinical Laboratory Medicine and Pathology</b>	Clinical Laboratory Medicine	Professor	Kazuhiro Yoshiuchi
		Transfusion Medicine	Professor	Makoto Kurano
<b>*Joint Program</b>	Molecular Diabetology			



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## Reproductive, Development and Aging Sciences

<b>Obstetrics and Gynecology</b>	Reproductive Endocrinology		
	Gynecological Oncology	Professor	Yutaka Osuga
		Associate Professor	Yasushi Hirota
	Perinatal Medicine		
<b>Pediatric Sciences</b>	Molecular Cellular Reproductive Medicine	Professor	Yutaka Osuga
		Associate Professor	Osamu Hiraike
	Pediatrics	Professor	Motohiro Kato
		Associate Professor	Yutaka Harita
	Developmental Pediatrics	Associate Professor	Hikoro Matsui
<b>Aging Sciences</b>	Pediatric Surgery	Professor	Jun Fujishiro
	Pediatric Oncology		
	Geriatric Medicine	Professor	Masahiro Akishita
		Associate Professor	Sumito Ogawa
	Aging Research	Professor	Masahiro Akishita
<b>*Joint Program</b>	Health Policy for Children and Families / Medical Science for Life and Aging		



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## Surgical Sciences

<b>Surgery</b>	Thoracic Surgery		
	Cardiovascular Surgery	Professor	Minoru Ono
		Associate Professor	Yasutaka Hirata
	Gastrointestinal Surgery	Professor	Yasuyuki Seto
		Associate Professor	Sachiyo Nomura
	Hepatobiliary Pancreatic Surgery	Professor	Kiyoshi Hasegawa
	Urology	Professor	Haruki Kume
	Artificial Organ and Transplantation Division	Professor	Kiyoshi Hasegawa
	Surgical Oncology	Professor	Soichiro Ishihara
		Associate Professor	Hiroaki Nozawa
	Vascular Surgery	Professor	Soichiro Ishihara
		Associate Professor	Katsuyuki Hoshina
	Breast and Endocrine Surgery	Associate Professor	Masahiko Tanabe
	<b>Sensory and Motor System Medicine</b>	Dermatology	Professor
		Associate Professor	Sayaka Shibata
Plastic and Reconstructive Surgery		Professor	Mutsumi Okazaki
		Associate Professor	Shimpei Miyamoto
Oral and Maxillofacial Surgery		Professor	Kazuto Hoshi
		Associate Professor	Hideto Saijo
Orthopaedic Surgery		Professor	Sakae Tanaka
		Associate Professor	Taku Saito
		Associate Professor	Yasushi Oshima
Ophthalmology		Professor	Makoto Aihara
		Associate Professor	Megumi Honjo
		Associate Professor	Ryo Obata
Otolaryngology and Head and Neck Surgery		Associate Professor	Kenji Kondo
		Associate Professor	Akinori Kashio
Rehabilitation Medicine	Professor	Toru Ogata	
<b>Vital Care Medicine</b>	Anesthesiology	Professor	Kanji Uchida
	Emergency and Critical Care Medicine	Associate Professor	Kent Doi



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## Health Sciences and Nursing

<b>Health Sciences</b>	Health Sociology		
	Mental Health	Professor	Daisuke Nishi
	Epidemiology and Preventive Health Sciences	Professor	Yutaka Matsuyama
		Associate Professor	Koji Oba
	Biostatistics		
	Health Education	Professor	Hideki Hashimoto
<b>Preventive and Administrative Nursing</b>	Biomedical Ethics	Associate Professor	Yoshiyuki Takimoto
	Advanced Clinical Nursing	Associate Professor	Aya Kitamura
	Nursing Administration	Associate Professor	Aya Kitamura
	Family Nursing	Professor	Mari Ikeda
	Community Health Nursing	Associate Professor	Kyoko Yoshioka-Maeda
<b>Clinical Nursing</b>	Public Health Nursing		
	Gerontological Home Care and Long-term Care Nursing	Professor	Noriko Yamamoto-Mitani
		Associate Professor	Ayumi Igarashi
	Palliative Care Nursing	Professor	Noriko Yamamoto-Mitani
	Midwifery and Women's Health	Professor	Megumi Haruna
	Psychiatric Nursing	Professor	Daisuke Nishi
		Associate Professor	Yuki Miyamoto
	Gerontological Nursing	Professor	Gojiro Nakagami
Wound Care Management	Professor	Gojiro Nakagami	
<b>*Joint Program</b>	Public Mental Health Policy		



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## International Health

<b>International Social Medicine</b>	Global Health Policy	Professor	Masahiro Hashizume
		Associate Professor	Chris Fook Sheng Ng
<b>International Biomedical Sciences</b>	Community and Global Health		
	Human Genetics	Professor	Akihiro Fujimoto
		Associate Professor	Motoko Unoki
	Developmental Medical Sciences	Professor	Moi Meng Ling
	Human Ecology	Professor	Masahiro Umezaki
		Associate Professor	Shoko Konishi
	Biomedical Chemistry	Professor	Tomoyoshi Nozaki
		Associate Professor	Yoh-ichi Watanabe



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## School of Public Health

<b>Epidemiology and Health Sciences</b>	Biostatistics	Professor	Yutaka Matsuyama
		Associate Professor	Koji Oba
	Social and Preventive Epidemiology		
	Clinical Epidemiology and Health Economics	Professor	Hideo Yasunaga
	Health Communication	Professor	Takahiro Kiuchi
<b>Behavioral Health Sciences</b>		Associate Professor	Tsuyoshi Okuhara
	Mental Health	Professor	Daisuke Nishi
	Health Sociology and Health Education		
	Health and Social Behavior	Professor	Hideki Hashimoto
	Health Promotion Sciences	Associate Professor	Yoshiyuki Takimoto
<b>Health Services Sciences</b>	Biomedical Ethics	Associate Professor	Yoshiyuki Takimoto
	Health Policy		
	Healthcare Informatics	Professor	Kazuhiko Ohe
	Clinical Information Engineering	Professor	Hiroshi Oyama
	Forensic Medicine and Medical Law	Professor	Hirotarō Iwase
		Associate Professor	Yohsuke Makino
	Global Environmental Health	Associate Professor	KIM Yoonhee
<b>*Joint Program</b>	Public Health Science		



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**Center for Disease Biology and Integrative Medicine**

Director Haruhiko Bito

Laboratory of Molecular Biomedicine for Pathogenesis		
Laboratory of Structural Physiology		
Laboratory of Biomedical Equipment and Biomaterials	Associate Professor	Kanako Harada
Laboratory of Clinical Biotechnology	Professor	Ungil Chung
	Associate Professor	Hironori Hojo
Laboratory of Microenvironmental and Metabolic Health Sciences	Professor	Makoto Murakami
	Associate Professor	Seiichiroh Ohsako
Laboratory of Animal Resources	Professor	Atsu Aiba
Laboratory of Molecular Radiology	Associate Professor	Noriko Hosoya
Laboratory of Biomedical Infomatics	Associate Professor	Takeshi Imai



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**The International Research Center for Medical Education**

Director Makoto Aihara

Department of Medical Education Studies	Professor	Masato Eto
Department of International Cooperation for Medical Education		



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**Global Nursing Research Center**

Director Noriko Yamamoto-Mitani

Division of Care Innovation	Professor	Gojiro Nakagami
	Professor	Megumi Haruna
	Associate Professor	Aya Kitamura
Division of Care Systems	Professor	Noriko Yamamoto-Mitani
	Associate Professor	Kyoko Yoshioka-Maeda
	Associate Professor	Ayumi Igarashi



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**Center for Diversity in Medical Education and Research**

Director Kiyoto Kasai

Center for Diversity in Medical Education and Research	Associate Professor	Yoshihiro Satomura
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**Institution**

Medical Library	Director	Hideo Yasunaga
Office of International Academic Affairs	Director	Shinichi Sato
Medical Scientist Training Program	Director	Shumpei Ishikawa
Museum of Health and Medicine	Director	Kazuhiko Ohe
Office for Human Research Studies	Director	Masahiro Akishita
	Vice Director	Yuzaburo Uetake
Life Sciences Core Facility	Director	Masahide Kikkawa
The Office for Clinical Practice and Medical Education	Director	Masato Eto
Advisory Office for Conflict of Interest	Director	Saeko Aketani

## Endowed Department

Department of Bone & Cartilage Regenerative Medicine	Project Associate Professor	Yasunori Omata
Department of Immunotherapeutics	Project Professor	Kazuhiro Kakimi
Department of Advanced Clinical Science and Therapeutics	Project Associate Professor	Mutsuo Harada
Computational Diagnostic Radiology and Preventive Medicine	Project Professor	Takeharu Yoshikawa
	Project Associate Professor	Soichiro Miki
Science for Joint Reconstruction	Project Professor	Toru Moro
Department of Therapeutic Strategy for Heart Failure	Project Associate Professor	Eisuke Amiya
Department of Osteoimmunology	Project Associate Professor	Kazuo Okamoto
Department of Biostatistics and Bioinformatics	Project Professor	Daisuke Koide
Laboratory for Advanced Research on Pathophysiology of Metabolic Diseases	Project Associate Professor	Miki Iwabu
Department of Home Care Medicine	Project Professor	Takashi Yamanaoka
Department of Advanced Cardiology	Project Associate Professor	Katsuhito Fujii
Artificial Intelligence in Healthcare	Project Associate Professor	Yoshimasa Kawazoe
Comprehensive radiation oncology	Project Professor	Keiichi Nakagawa
Research on Cell Therapy of Regenerative Medicine	Project Associate Professor	Chang Dehua
Department of Frontier Cardiovascular Science	Project Associate Professor	Seitaro Nomura
Clinical application for Development of Therapy for Rare and Intractable Diseases	Project Associate Professor	Kazuki Taoka

## Social Cooperation Program

Department of Lipidomics	Project Professor	Yoshiya Oda
Department of Health Services Research	Project Associate Professor	Taisuke Jo
Department of Healthcare Quality Assessment	Project Professor	Hiroaki Miyata
	Project Associate Professor	Hiraku Kumamaru
	Project Associate Professor	Hiroyuki Yamamoto
Department of Functional Genomics and Immunological Diseases	Project Associate Professor	Tomohisa Okamura
Department of Prevention of Diabetes and Lifestyle-Related Diseases	Project Associate Professor	Satoko Yamaguchi
Department of Next-Generation Pathology Information Networking	Project Professor	Takeshi Sasaki
Chronic kidney disease pathophysiology	Project Professor	Reiko Inagi
Tissue stem cell / life dentistry	Project Professor	Makoto Komura
Department of Preventive Medicine for Locomotive Organ Disorders	Project Professor	Noriko Yoshimura
Department of Eat-loss Medicine	Project Associate Professor	Kazumichi Yonenaga
Next-Generation Precision Medicine Development Laboratory	Project Associate Professor	Hidenori Kage
Department of Pain & Palliative Medical Sciences	Project Associate Professor	Maiko Hasegawa
Department of Retinal Biology and Pathology	Project Associate Professor	Toshiro Iwagawa
Department of Medical Information Engineering	Project Associate Professor	Taichi Kin
Laboratory for cryo-electron microscopy	Project Associate Professor	Chieko Saito
Department of Digital Mental Health	Project Professor	Norito Kawakami
	Project Associate Professor	Kotaro Imamura
Department of Cellular and Tissue Communication	Project Professor	Jun Yamashita
Clinical stem cell biology	Project Professor	Atsuhiko Hikita
Department of Precision Medicine Neurology	Project Associate Professor	Jun Mitsui
Department of Real-world Evidence	Project Associate Professor	Yusuke Sasabuchi
Next-generation Endoscopic Computer Vision	Project Associate Professor	Yosuke Tsuji
Department of Healthcare economics and Health policy	Project Professor	Tomoyuki Takura
Department of Clinical Cannabinoid Research	Project Associate Professor	Ayumi Yoshizaki
Department of nutritional epidemiology and behavioral nutrition	Project Professor	Kentaro Murakami
Division of Musculoskeletal AI System Development	Project Associate Professor	Hiroyuki Oka

## Faculty of Medicine

Dean Masaomi Nangaku

### School of Medicine

Cell Biology and Anatomy / Biochemistry and Molecular Biology / Physiology / Pharmacology / Pathology / Microbiology / Immunology / Radiology / Biomedical Engineering / Basic Neuroscience / Integrative Medical Neuroscience / Clinical Neuroscience / Occupational, Environmental and Preventive Medicine / Medical Principles and Medical Ethics / Forensic Medicine, and Medical Informatics and Economics / Medicine I / Medicine II / Clinical Laboratory Medicine and Pathology / Obstetrics and Gynecology / Pediatric Science / Aging Science / Surgery / Sensory and Motor System Medicine / Vital Care Medicine

### School of Integrated Health Sciences

Family Nursing / Community Health Nursing / Fundamental Nursing / Gerontological Nursing / Midwifery and Women's Health / Adult Health and Nursing / Mental Health and Nursing / Health Sociology / Health Administration / Epidemiology and Biostatistics / Human Ecology / Biochemistry and Nutrition / Maternal and Child Health



## Hospital Management Support Organization

Office of Personnel and Human Resources	Professor	Kiyoto Kasai
Office of Performance Monitoring and Risk Management	Professor	Kanji Uchida
Office of Education and Staff Development	Professor	Yutaka Osuga
Office of Hospital Planning and Management	Professor	Haruki Kume
Office of Research Support	Professor	Yutaka Osuga

## Clinical Management Organization

Office of Inpatient Services	Professor	Mitsuhiro Fujishiro
Office of Outpatient Services	Professor	Toshimasa Yamauchi
Office of Central Clinical Services	Associate Professor	Masahiko Sumitani
Office of Patient Support	Professor	Kiyoto Kasai

## Clinical Services

### Department of Internal Medicine

General Internal Medicine	Professor	Tatsushi Toda
Cardiovascular Medicine		
Respiratory Medicine		
Gastroenterology	Professor	Mitsuhiro Fujishiro
	Associate Professor	Ryosuke Tateishi
Nephrology and Endocrinology	Professor	Masaomi Nangaku
	Associate Professor	Noriko Makita
	Associate Professor	Hiroshi Nishi
Diabetes and Metabolic Diseases	Professor	Toshimasa Yamauchi
	Associate Professor	Nobuhiro Shojima
Hematology and Oncology	Professor	Mineo Kurokawa
Allergy and Rheumatology	Professor	Keishi Fujio
	Associate Professor	Hirofumi Shoda
Infectious Diseases	Professor	Takeya Tsutsumi
	Associate Professor	Shu Okugawa
Neurology	Professor	Tatsushi Toda
	Associate Professor	Wataru Satake
Geriatric Medicine	Professor	Masahiro Akishita
	Associate Professor	Sumito Ogawa
Psychosomatic Medicine	Associate Professor	Kazuhiro Yoshiuchi

### Department of Surgery

General Surgery	Professor	Soichiro Ishihara
Stomach and Esophageal Surgery	Professor	Yasuyuki Seto
	Associate Professor	Sachiyo Nomura
Colon and Rectal Surgery	Professor	Soichiro Ishihara
	Associate Professor	Katsuyuki Hoshina
Hepato-Biliary-Pancreatic Surgery	Professor	Kiyoshi Hasegawa
	Associate Professor	Nobuhisa Akamatsu
Vascular Surgery	Professor	Soichiro Ishihara
	Associate Professor	Katsuyuki Hoshina
Breast and Endocrine Surgery	Associate Professor	Masahiko Tanabe
Artificial Organ and Transplantation Surgery	Professor	Kiyoshi Hasegawa
	Associate Professor	Nobuhisa Akamatsu
Cardiovascular Surgery	Professor	Minoru Ono
	Associate Professor	Yasutaka Hirata
Thoracic Surgery	Associate Professor	Masaaki Sato
Neurosurgery	Professor	Nobuhito Saito
Anesthesiology and Pain Relief Center	Professor	Kanji Uchida
Urology and Andrology	Professor	Haruki Kume
Gynecologic Surgery	Professor	Yutaka Osuga
	Associate Professor	Miyuki Harada
	Associate Professor	Osamu Hiraike

<b>Department of Sensory and Motor System Medicine</b>	Dermatology	Professor	Shinichi Sato
	Ophthalmology	Professor	Makoto Aihara
		Associate Professor	Megumi Honjo
		Associate Professor	Takashi Miyai
	Orthopaedic Surgery and Spinal Surgery	Professor	Sakae Tanaka
		Associate Professor	Taku Saito
		Associate Professor	Yasushi Oshima
	Otolaryngology and Head and Neck Surgery	Associate Professor	Kenji Kondo
		Associate Professor	Akinori Kashio
	Rehabilitation Medicine	Professor	Toru Ogata
		Associate Professor	Sayaka Fujiwara
	Plastic, Reconstructive and Aesthetic Surgery	Professor	Mutsumi Okazaki
		Associate Professor	Shinpei Miyamoto
	Oral-Maxillofacial Surgery and Orthodontics	Professor	Kazuto Hoshi
Associate Professor		Hideto Saijo	
<b>Department of Pediatrics, Perinatal and Women's Medicine</b>	Pediatrics	Professor	Motohiro Kato
		Associate Professor	Yutaka Harita
		Associate Professor	Hikoro Matsui
	Pediatric Surgery	Professor	Jun Fujishiro
	Obstetrics and Gynecology	Professor	Yutaka Osuga
Associate Professor		Yasushi Hirota	
<b>Department of Neuropsychiatry</b>	Neuropsychiatry	Professor	Kiyoto Kasai
		Associate Professor	Seiichiro Jinde
		Associate Professor	Shuntaro Ando
<b>Department of Radiology</b>	Radiology	Professor	Osamu Abe
		Associate Professor	Hideomi Yamashita
		Associate Professor	Hidemasa Takao
		Associate Professor	Takeyuki Watadani
<b>Department of Emergency and Critical Care Medicine</b>	Emergency and Critical Care Medicine	Professor	Kent Doi
		Associate Professor	Takehiro Matsubara
<b>Department of Cross-Sectional Services</b>	Advanced Medical Center for Heart Failure	Associate Professor	Masaru Hatano
	Center for Cardiac Arrhythmias and Electrophysiology	Project Associate Professor	Katsuhito Fujii
	Marfan Syndrome Center		
	Epilepsy Center		
	Dementia Center	Professor	Tatsushi Toda
	Scleroderma Center	Associate Professor	Hirofumi Shoda
		Associate Professor	Masaru Hatano
	Lupus Center	Professor	Keishi Fujio
		Associate Professor	Hiroshi Nishi
	Osteoporosis Center	Associate Professor	Taku Saito
	Center for Female Pelvic Medicine and Reconstructive Surgery	Professor	Yutaka Osuga
		Professor	Haruki Kume
		Professor	Soichiro Ishihara
	Spine Center	Associate Professor	Yasushi Oshima
	Department of Clinical Genomics	Professor	Katsutoshi Oda
		Professor	Tatsushi Toda
		Project Associate Professor	Hidenori Kage
	Department of Child Psychiatry	Associate Professor	Yukiko Kanou
	Children, AYA and Family Centered Mental Care Center	Associate Professor	Yukiko Kanou
Department of Pain and Palliative Medicine	Associate Professor	Masahiko Sumitani	

## Central Clinical Services

Department of Pharmacy	Professor	Tappei Takada
Nursing Department		
Department of Clinical Laboratory	Associate Professor	Makoto Kurano
Department of Blood Transfusion	Professor	Hitoshi Okazaki
Department of Pathology	Professor	Tetsuo Ushiku
	Associate Professor	Aya Ushiku
Department of Infection Control and Prevention	Professor	Takeya Tsutsumi
Radiology Center	Professor	Osamu Abe
Rehabilitation Center	Professor	Toru Ogata
	Associate Professor	Sayaka Fujiwara
Surgical Center	Professor	Kazuhiko Fukatsu
Central Supply Service	Professor	Kazuhiko Fukatsu
Department of Clinical Engineering	Professor	Kent Doi
Department of Endoscopy and Endoscopic Surgery	Associate Professor	Yosuke Nakai
Department of Hemodialysis and Apheresis	Professor	Masaomi Nangaku
Critical Care and Emergency Medical Center/ER	Professor	Kent Doi
	Associate Professor	Takehiro Matsubara
Department of Intensive Care Unit	Professor	Kent Doi
Department of Pediatric and Neonatal Intensive Care Unit	Professor	Naoto Takahashi
	Associate Professor	Hikoro Matsui
Perinatal Center	Professor	Yutaka Osuga
Children's Medical Center	Professor	Motohiro Kato
	Professor	Jun Fujishiro
Department of Outpatient Chemotherapy Unit	Professor	Mitsuhiro Fujishiro
	Associate Professor	Hironori Ishigami
Cancer Center		
Immune-Mediated Diseases Therapy Center	Associate Professor	Hiroko Kanda
	Associate Professor	Hiroaki Nozawa
	Project Associate Professor	Ayumi Yoshizaki
Organ Transplantation Center	Professor	Minoru Ono
	Professor	Haruki Kume
	Professor	Kiyoshi Hasegawa
	Associate Professor	Masaaki Sato
Tissue Bank	Associate Professor	Sumihito Tamura
Department of Corneal Transplantation	Associate Professor	Takashi Miyai
Department of Cell Therapy and Transplantation Medicine	Professor	Mineo Kurokawa
Admission and Discharge Center		
Perioperative Assessment and Care Center	Professor	Kanji Uchida
	Associate Professor	Hideto Saijo
Clinical Nutrition Center	Professor	Kazuhiko Fukatsu
	Associate Professor	Naoto Kubota
Swallowing Center	Associate Professor	Rumi Ueha
International Medical Center	Associate Professor	Sumihito Tamura
Center for Epidemiology and Preventive Medicine	Associate Professor	Nobutake Yamamichi
Center for International Preventive Medicine		
Cancer Board	Professor	Haruki Kume
	Associate Professor	Masahiko Sumitani
Vascular Board	Associate Professor	Katsuyuki Hoshina
Hip Fracture Board	Associate Professor	Takehiro Matsubara
Palliative Care Consultation Team	Associate Professor	Masahiko Sumitani
Nutrition Support Team	Professor	Kazuhiko Fukatsu
Medical Community Network and Discharge Supporting Center	Associate Professor	Masahiko Sumitani
Cancer Resource Center	Associate Professor	Sachiyo Nomura
Patient Relations and Clinical Ethics Center	Associate Professor	Yoshiyuki Takimoto

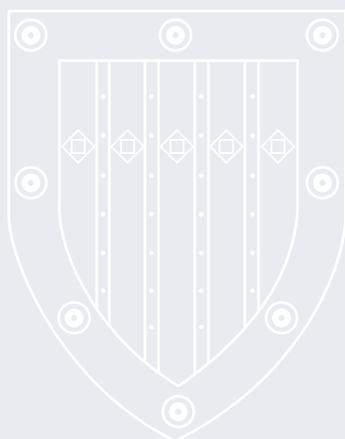
## Clinical Research Services

Clinical Research Promotion Center	Professor	Takashi Moritoyo
	Associate Professor	Tatsuya Maruyama
22nd Century Medical and Research Center	Professor	Yutaka Osuga
	Project Associate Professor	Miki Iwabu
Department of Tissue Engineering	Professor	Kazuto Hoshi
	Project Professor	Atsuhiko Hikita
Cooperative Unit of Medicine and Engineering Research	Professor	Minoru Ono
Translational Research Center	Professor	Yutaka Osuga
Genomic Research Support Center	Professor	Yutaka Osuga
	Associate Professor	Nobuhiro Shojima
Unit for Early and Exploratory Clinical Development	Professor	Takeshi Iwatsubo
BioResource Center	Professor	Tetsuo Ushiku
	Professor	Katsutoshi Oda
Center for Brain Imaging in Health and Diseases	Professor	Kiyoto Kasai

## Hospital Management Services

Medical Safety Management Center	Associate Professor	Tomotaka Yamamoto
Infection Control Center	Professor	Takeya Tsutsumi
Office of Performance Monitoring	Associate Professor	Tomotaka Yamamoto
Department of Highly Advanced Novel Medical Technologies Evaluation	Professor	Haruki Kume
	Professor	Kazuhiro Fukatsu
Department of Unapproved New Drugs and Medical Devices Evaluation	Professor	Kanji Uchida
Professional Development Center	Professor	Masato Eto
Clinical Simulation Center	Professor	Masato Eto
Hospitality Center		
Department of Clinical Research Governance	Professor	Yutaka Osuga
	Project Professor	Rika Wakao
Department of Healthcare Information Management	Project Associate Professor	Yoshimasa Kawazoe
Department of Medical Record Management		
University Hospital Medical Information Network Center	Professor	Takahiro Kiuchi
	Associate Professor	Tsuyoshi Okuhara
Datebase Center of the National University Hospitals		
Labor Safety and Health Management Office	Associate Professor	Tomotaka Yamamoto
Staff Wellness Consulting Office	Professor	Kiyoto Kasai
Office of Medical Clerical Support for Physicians	Professor	Haruki Kume
	Associate Professor	Noriko Makita
Medical Devices Management Center	Professor	Kent Doi
Department of Disaster Medical Management	Professor	Kent Doi
Legal and Compliance Office	Professor	Kanji Uchida
Center for Liaison and Public Relations	Professor	Kiyoto Kasai
Administration Department		





# Faculty of Medicine Graduate School of Medicine The University of Tokyo

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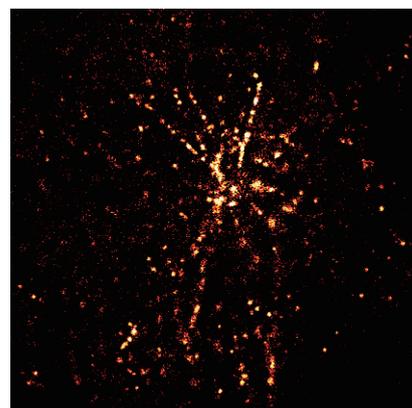


## Molecular Cell Biology

### Cell Biology

Our goal is to deepen the physical understanding of living cells. Our main approach is observing the dynamics of the individual molecules in living cells. For this end, we are also working on the development of the underlying technologies, including fluorescent probes and other probes, microscope and other equipment, analytical techniques using machine learning or physical theories.

- Development and application of super-resolution and/or single-molecule imaging
- Development of fluorescent probes to visualize cellular states
- Application of machine learning to analyze microscope images
- Single molecule measurement of molecular motors under crowding environments in living cells.
- Measurement of non-equilibrium fluctuation in living cells and exploration of its physiological meanings.



Single molecule imaging of kinesin molecules in living cell.

### Structural Biology

Kikkawa lab is interested in eukaryotic flagella/cilia, which works as a propeller and a sensor of cells. We study regulatory mechanisms of flagella/cilia beating by combining cryo-electron microscopy, optical microscopy with high-speed camera, cell biology, and genetics. We also provide cryo-electron microscopes as shared facilities.

Our current focuses are:

- How cilia/flagella are assembled.
- Molecular mechanisms of flagella and axonemal dyneins.
- Provide cryo-electron microscopy as shared facility

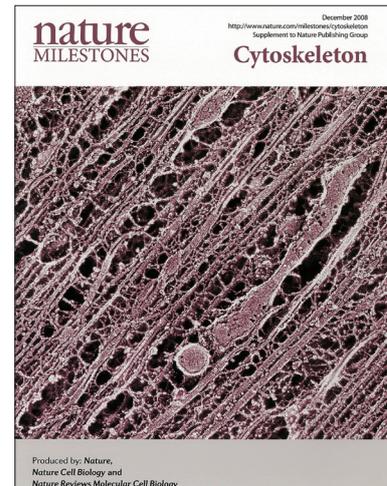
Cryo-electron microscopies installed in the University of Tokyo.  
From left to right: Titan Krios G3i (upper left), Talos Arctica (upper right), Aquilos (FIB-SEM, lower left), JEOL JEM-F200 (lower right).

<http://structure.m.u-tokyo.ac.jp/>



## Cytoarchitectonics

Our laboratory aims to study the function of microtubule-based molecular motors, kinesin superfamily proteins (KIFs). We have previously identified 45 KIF genes from human and mouse genomes. According to mouse molecular genetics and structural biological analyses, we have identified their functional relevance in higher brain function, brain wiring, left-right determination, tumor suppressing pathway, metabolic diseases, and so on. However, there still exist multiple interesting questions in this field, which we aim to solve by multidisciplinary and comprehensive approaches.

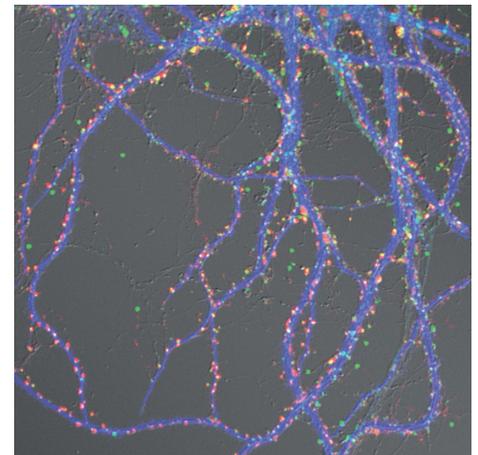


*The neuronal cytoskeleton and its associated organelles (From Nature Milestones 2008)*

## Cellular Neurobiology

The Laboratory of Cellular Neurobiology is interested in understanding the molecular mechanisms regulating synapse formation and maintenance, which are essential in proper function of neural circuits in the brain. The laboratory is using optical imaging of synaptic molecules in live neurons, in combination with molecular biological approaches to modify neuronal functions.

- Molecular architecture of the postsynaptic density
- Molecular mechanisms of activity-dependent synapse remodeling
- Regulation of synapse functions by glial cells
- Regulation of synapse formation and maintenance in vivo
- Synapse dysfunction in psychiatric diseases

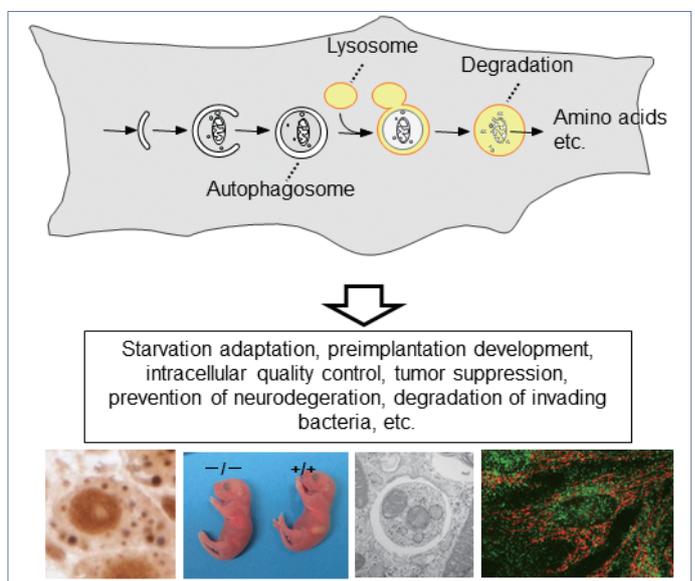


*Quantitative fluorescence imaging of cultured hippocampal neurons (green: postsynaptic protein and calibrated fluorescent microspheres, red: presynaptic protein, blue: microtubule-associated protein)*

## Molecular Biology

Our laboratory has been doing trans-disciplinary studies primarily on autophagy, an intracellular degradation system, and trying to elucidate the mechanisms and biological and pathophysiological functions of autophagy.

- Molecular mechanism of autophagy (membrane dynamism, lysosomal degradation, selectivity, etc.)
- Physiological and pathophysiological roles of autophagy
- Development of new methods for monitoring and modulating autophagy
- Autophagy-independent mechanisms of intracellular degradation



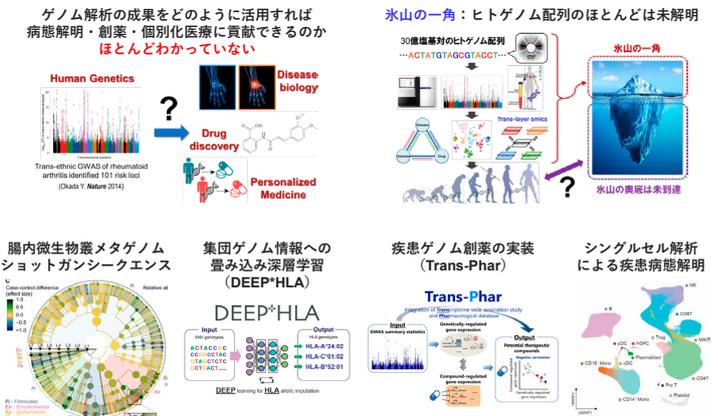
## Genome Informatics

<http://www.sg.med.osaka-u.ac.jp/index.html>

Our department investigates statistical genetics to translate multi-layer human omics resources to elucidation of disease biology, genomics-driven drug discovery, and implementation of personalized medicine. To fully understand the human genome sequences, a blueprint of humans, we explore the research activity by massively utilizing the omics and informatics analysis technologies.

- Large-scale and biobank-scale disease genetic studies to identify disease risk genes
- Exploring new human omics layers such as single cell and metagenome analyses
- Application of machine learning to large-scale human omics data and development of novel statistical genetics algorithms
- Translational research towards implementation of genomics-driven drug discovery and personalized medicine

遺伝統計学を主軸に、多彩なヒトオミクス情報のデータ解析を通じた  
疾患病態解明・ゲノム創薬・個別化医療の実現への取り組み

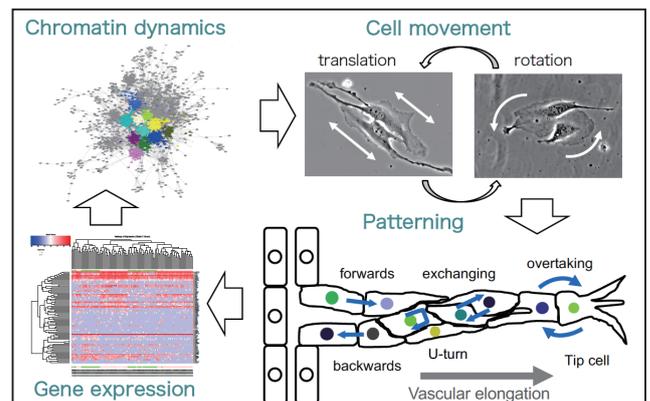


## Physiological Chemistry and Metabolism

<http://bio.m.u-tokyo.ac.jp/>

We are investigating cellular behavior and signaling mechanisms underlying cell fate determination, morphogenesis and organogenesis in embryonic development.

- Mechanisms of neural crest fate determination and craniofacial morphogenesis
- Mechanisms of cardiac development
- Mechanisms of angiogenesis



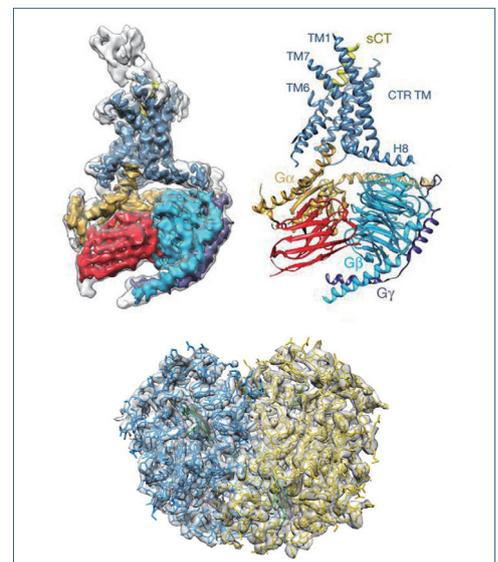
Understanding morphogenesis and organogenesis based on collective cell movement

## Advanced Structural Studies

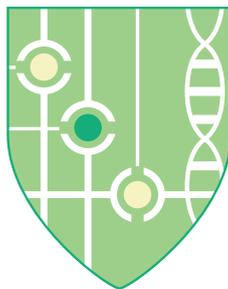
<http://danevlab.m.u-tokyo.ac.jp/>

Our main interest is development of new methods and improvement of existing techniques for structure determination by cryo-electron microscopy (cryo-EM). Simultaneously, we are using state-of-the-art cryo-EM to study the structures of "difficult" samples, such as membrane proteins, small (< 100 kDa) molecules, heterogeneous samples and intact cellular volumes.

Cryo-EM is already past the tipping point and is being widely accepted and appreciated as a capable structural biology method. There are several areas where further progress is expected and/or already ongoing. Instrumentation, sample preparation, automation, deep learning and streamlining of the research process are of great interest to us and we are trying to contribute in these directions.



The structures of G-protein coupled receptors (upper) and hemoglobin (lower) solved by cryo-electron microscopy



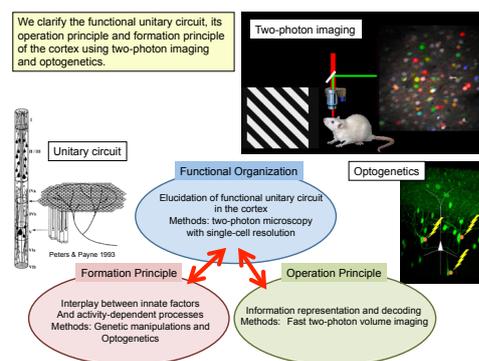
# Functional Biology

## Integrative Physiology

The cerebral cortex acquires complicated response selectivity by receiving and processing information from the outside of the world. However, it is still unknown what kind of neural circuit actually is involved in this information processing. In recent years, progress of imaging technology (two-photon excitation method) has made it possible to simultaneously measure the activity of thousands of neurons from a living animal (Ohki et al., 2005, 2006). In addition to that, various technologies for studying neural circuits are being developed one after another and research on neuroscience is entering a transition era. In our laboratory, by using these latest methods, we are trying to find out how the neural circuits of mammalian visual cortex process information.

- Functional organization in the visual cortex
- Development of neural circuits in the visual cortex
- Information representation in the visual cortex
- Roles of each cell-type in the processing of visual information

<https://physiol1.m.u-tokyo.ac.jp/ern24596/>

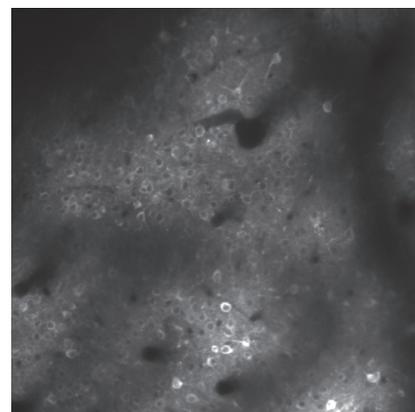


## Cellular and Molecular Physiology

Our laboratory studies the neural circuits in the frontal cortex, which emerge movement and thought. Applying two-photon imaging, optogenetics, and electrophysiology to behaving mice and marmosets, we measure and manipulate the activities of multiple neurons and analyze their dynamics.

- Neural circuits for motor learning and motor execution.
- Neural circuits for decision making.
- Neural circuits for brain-machine-interface.
- Development of novel fluorescent microscopy system.

<http://plaza.umin.ac.jp/~Matsuzaki-Lab/>



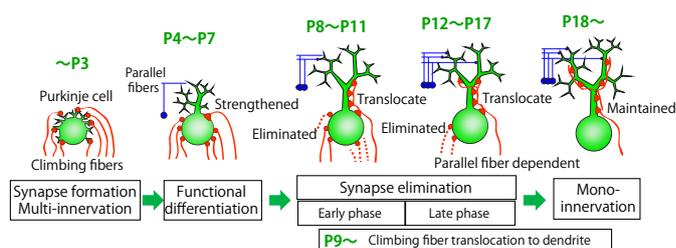
Two-photon image of the mouse motor cortical neurons

## Neurophysiology

<http://plaza.umin.ac.jp/~neurophy/>

The synapse is a key structure essential for brain function. We study how synapses work and undergo changes during postnatal development, learning and memory by recording neural activity in real time. We use various methodologies including electrophysiology, molecular biology, and optical imaging of functional molecules.

- Postnatal development of synaptic function and organization in the cerebellum
- Retrograde synaptic modulation mediated by endogenous cannabinoids
- Synaptic integration in intact animals
- Synaptic plasticity and motor learning in the cerebellum

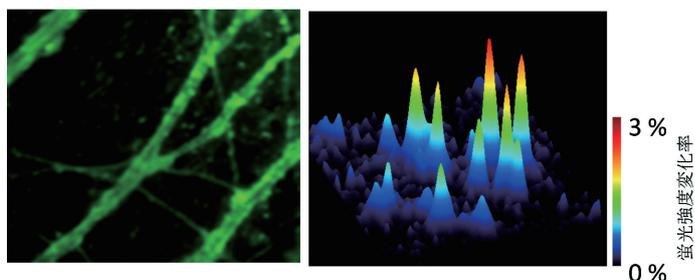


Postnatal development of cerebellar climbing fiber to Purkinje cell synapses

## Cellular and Molecular Pharmacology

<http://www.pharmacol.m.u-tokyo.ac.jp/>

We aim to elucidate the regulation mechanism of physiological functions mainly on the central nervous system by making full use of our unique fluorescent imaging technique. Currently, we are developing unique molecular tag, super-resolution imaging, and calcium imaging technique by fusing cutting-edge methods such as chemical biology, organic chemistry, molecular biology, and optics. By applying these novel imaging techniques to neuroscience research, we are promoting research on the mechanism of synaptic transmission in the central nervous system, mainly focusing on the molecular mechanism underlying releasing neurotransmitters in the presynaptic terminal.



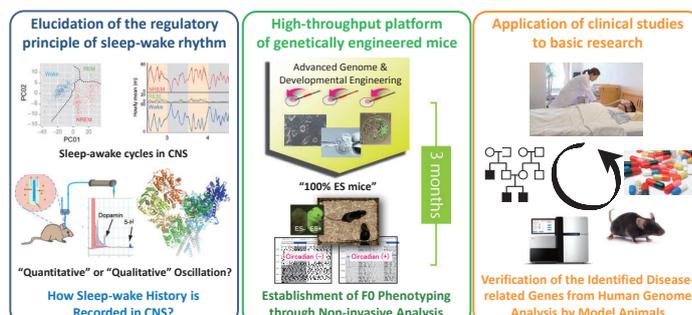
## Systems Pharmacology

<https://sys-pharm.m.u-tokyo.ac.jp/>

We are aiming at understanding of how multi-stability and homeo-dynamics in sleep-wake systems, as a model system, can be achieved through regulation of neuronal firing patterns via protein phosphorylation, and neural circuit structures. Also, we are establishing a high-throughput production platform of genetically engineered mice to facilitate a quantitative analysis and perturbation at the organismal level, and paving the way for the basic research by associating with human genome analysis obtained from human datasets.

- Elucidation of the regulatory principle of sleep-wake rhythm
- High-throughput production platform of genetically engineered/perturbed mice
- Application of human genome analysis from human studies to basic research

### Organism-level Systems Biology through Understanding of Sleep-awake Cycle



Toward multi-scale understanding of biological systems, we are planning multi-scale research activities based on different backgrounds such as physics, chemistry, informatics, engineering, and medicine, and intercommunicating between foundations and clinics.



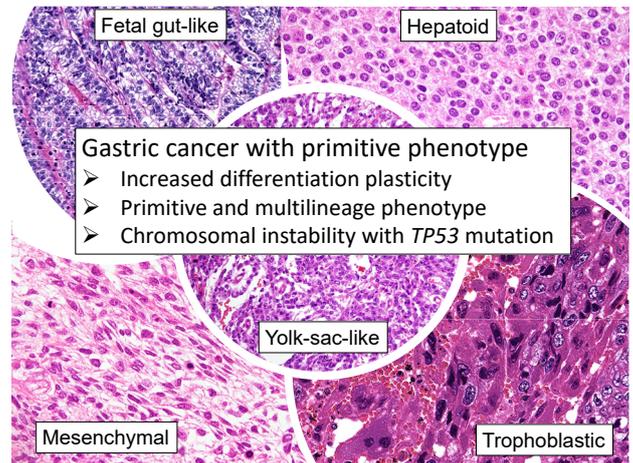
# Pathology, Immunology and Microbiology

## Pathology and Diagnostic Pathology

[http://pathol.umin.ac.jp/index\\_e.htm](http://pathol.umin.ac.jp/index_e.htm)

Our laboratory performs a wide range of pathology research using morphology-based methods along with cutting-edge technologies, which will lead to earlier diagnosis, more precise prognosis, and tailored therapy. We are developing next-generation diagnostic system and platform with integration of genomic information and advanced decision-support tools using artificial intelligence to deliver more accurate diagnosis and tailored treatment.

- Pathology Research
  - Gastrointestinal cancers and others
  - Primitive phenotypic transformation of cancer cell
  - Inflammatory conditions of gastrointestinal tract
  - Neurodegenerative diseases
  - Others
- Next generation Diagnostic Pathology
  - Application of machine learning technology
  - Cancer gene panel testing
  - 3D pathology
  - Telepathology and Digital Pathology

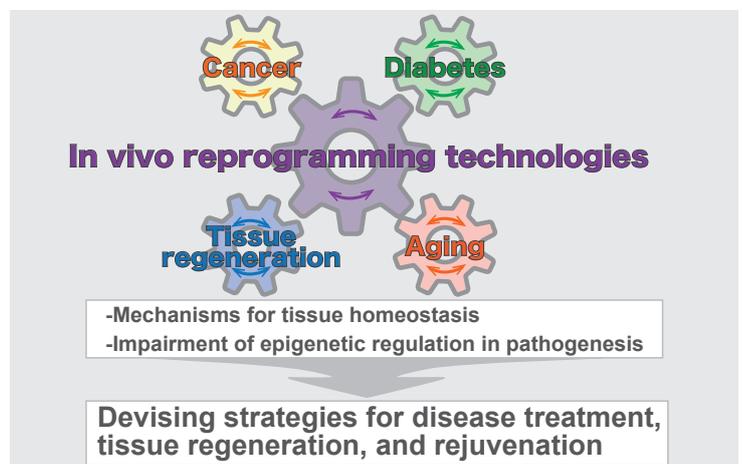


## Molecular Pathology

[http://molpathology2.m.u-tokyo.ac.jp/home\\_E/index.html](http://molpathology2.m.u-tokyo.ac.jp/home_E/index.html)

Epigenetic regulation plays a critical role in cell fate specification during normal development and stable maintenance of somatic cell fate. We aim to elucidate the impact of epigenetic regulation in pathogenesis and organismal aging. Finally, taking advantage of in vivo reprogramming technology, we aim to develop strategies for disease treatment, tissue regeneration, and rejuvenation through epigenetic regulation.

- Roles of epigenetic regulation in cancer
- Impairment of epigenetic regulation in pathogenesis and organismal aging
- Devising strategies for disease treatment, tissue regeneration, and rejuvenation with in vivo reprogramming technologies



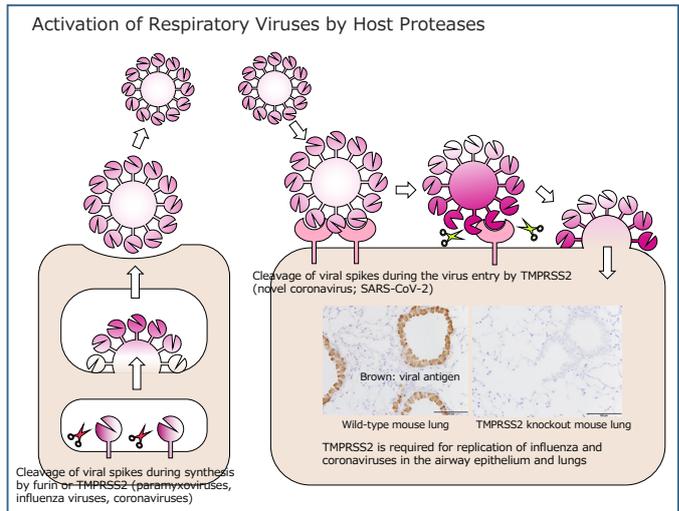
*Regulation of biological functions at the organismal level*

## Microbiology

<https://microbiology-en.labby.jp>

Our laboratory mainly studies respiratory viruses such as coronaviruses and influenza viruses, with a focus on paramyxoviruses. We aim to contribute to society by elucidating the molecular mechanisms of viral diseases. We also aim to contribute to the state-of-art medicine by developing new technologies related to recombinant virus vectors.

- Molecular Mechanisms of Paramyxovirus Replication and Pathogenicity
- Mechanism of Activation of Respiratory Viruses by Host Proteases
- Research on the Development of Viral Vectors and their Application to Vaccine Development



Activation of Respiratory Viruses by Host Proteases

## Infection Control and Prevention

We conduct clinical activities aimed at controlling healthcare-associated infections. We also conduct research activities targeting viral infections such as COVID-19 and hepatitis B virus, as well as bacterial infections such as drug-resistant bacteria such as MRSA and *Clostridioides difficile*, which are important problems in healthcare-associated infections. We aim to establish a preemptive and total infection control against infectious diseases.

- Development of coordinated strategies for the control of healthcare-associated infection
- Elucidation of acquisition of resistance mechanism of drug-resistant bacteria
- Development of measures to prevent endoscopy-related infection
- Pathogenesis of *Clostridioides difficile* enteritis
- Development of candidate therapeutics for COVID-19
- Genetic analysis of pathogenic microorganisms for nosocomial infection
- Investigation and development of control of blood-borne infections during needlestick injuries
- Examination and analysis of environmental microorganisms by monitoring

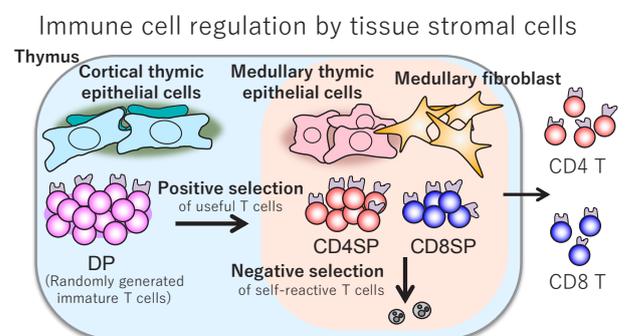


## Immunology

<http://www.immunol.m.u-tokyo.ac.jp/english>

We aim to comprehensively understand immune responses by analyzing molecular mechanisms of the development of immune cells and the regulation of innate and adaptive immune systems, and to provide novel strategies for the treatment of immune diseases. We focus on the molecules and immune cells that contribute to autoimmune diseases, employing genetically modified mice to address their physiological significance in vivo.

- Animal models for studying immune cells by genome engineering technology
- Molecular mechanisms of immune cell development
- Role of immune tissue microenvironment in immune cell regulation
- Mechanisms and pathogenesis of autoimmune diseases
- Regulation of bone metabolism by the immune system
- Regulation of immune cells in bone microenvironment
- Osteoimmunology and stromal immunology



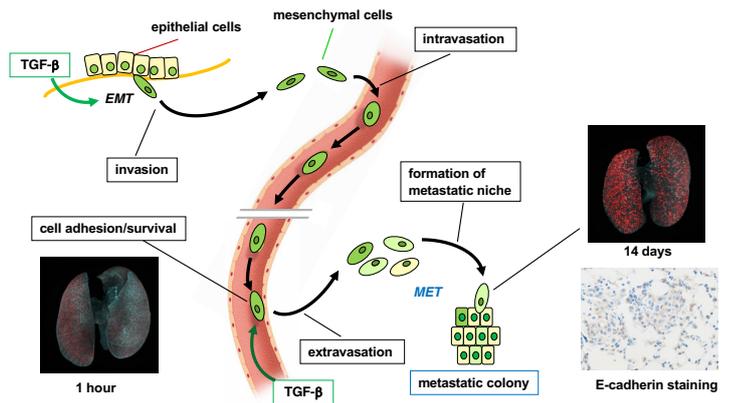
Thymic medulla is composed of various stromal cells that induce self-tolerance of T cells.

- Medullary thymic epithelial cells: Tomofuji et al, *Nat Immunol* 2020
- Medullary fibroblasts: Nitta et al, *Nat Immunol* 2020

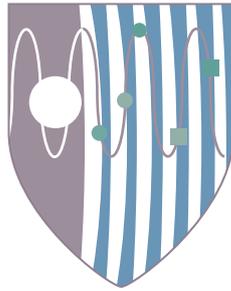
The transcription factor ETS1 governs pathological tissue-remodeling programs in fibroblasts. Yan et al, *Nat Immunol* 2022

We study signaling mechanisms of the TGF- $\beta$  family proteins, and elucidate how they regulate progression of cancers. Mechanisms of regulation of TGF- $\beta$ -Smad target genes will be studied by genome-wide approaches. Based on these findings, we will develop new strategies for the treatment of cancer.

- Dynamic changes in the transcriptional machinery regulated by TGF- $\beta$
- Roles of TGF- $\beta$  in epithelial-mesenchymal transition (EMT)
- Roles of tumor microenvironment - approach by orthotopic transplantation models
- Analysis of cancer metastasis by tissue-clearing methods



Multiple functions of TGF- $\beta$  on metastatic colony formation



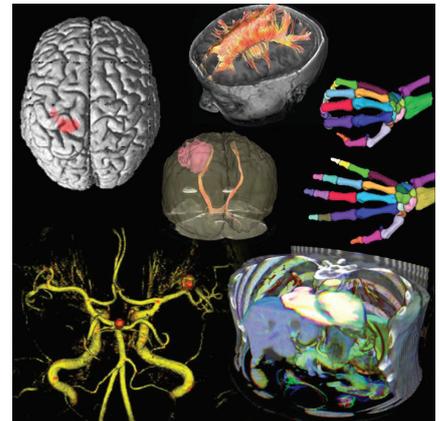
# Radiology and Biomedical Engineering

## Radiology

<http://www.ut-radiology.umin.jp/>

We have been performing a variety of research studies in biomedical imaging and analysis, computer-assisted diagnosis (CAD) and radiation therapy.

- Diagnostic Radiology
  - MRI analysis of brain morphology, diffusion, function and network
  - Development and application of CAD systems
  - Simulation of interventional radiology procedures using 3D printing
- Radiation Oncology
  - Stereotactic irradiation by gamma knife, synergy system and intensity modulated radiotherapy (IMRT)
  - Clinical and biological studies for the reduction of radiation-induced damage
- Nuclear Medicine
  - Functional imaging using radioisotope-labeled tracer technology
  - Imaging of brain metabolism and aggregated proteins using PET



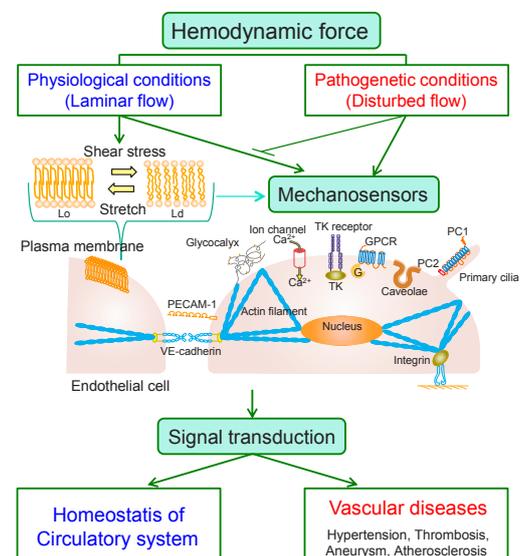
Representative images analyzed with computer-assisted technology

## System Physiology

[https://square.umin.ac.jp/bme/research\\_Eng.html](https://square.umin.ac.jp/bme/research_Eng.html)

We study biomechanics dealing with mechanical phenomena in the human body, especially focusing on cellular sensing and mechanisms underlying the responses to mechanical stimuli. The main theme of our work is to elucidate how vascular endothelial cells sense hemodynamic forces (i.e., shear stress and stretch) generated by blood flow and blood pressure. This would be of benefit not only for understanding the blood flow-mediated regulation of vascular functions, angiogenesis, and vascular remodeling but also for the elucidation of clinically important problems, such as hypertension, thrombosis, and the developments of atherosclerosis and cerebral aneurysms.

- Mechanosensing and mechanotransduction
- Hemodynamic force-induced cellular responses
- Hemodynamic force-mediated gene regulation
- Disturbed flow-induced vascular diseases



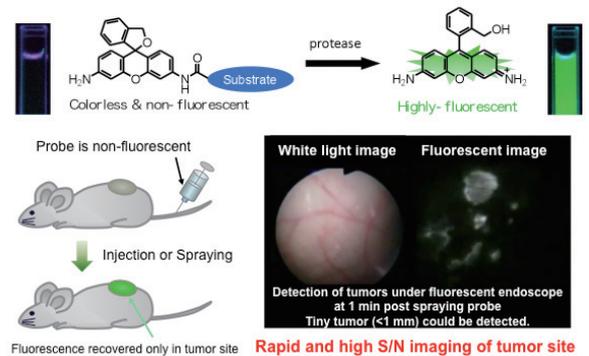
## Chemical Biology and Molecular Imaging

<http://cbmi.m.u-tokyo.ac.jp/>

Our research group focuses on the design, synthesis, and development of small molecular chemical probes for biological and medical research. These include fluorescent probes for visualizing various events occurring in living cells and animals. We are also collaborating with medical surgeons to establish an intraoperative diagnostic technique by using our fluorescent probes for rapid and sensitive detection of tumor site. Moreover, we are also interested in developing new therapeutics based on synergistic use of functional small molecules, proteins, cells, and extracellular vesicles.

- Development of novel fluorescent probes, sensitizers, anti-cancer drugs, caged compounds, and Raman probes
- Biological applications and imaging of functional probes developed and their use in cancer treatment
- Development of next-generation medical technologies by combining functional proteins, cells, and extracellular vesicles.

### Rapid detection of tumors by originally developed fluorescence probes

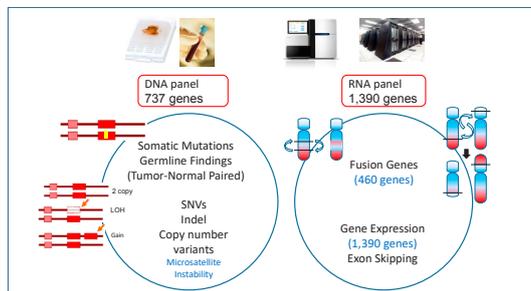


## Integrative Genomics

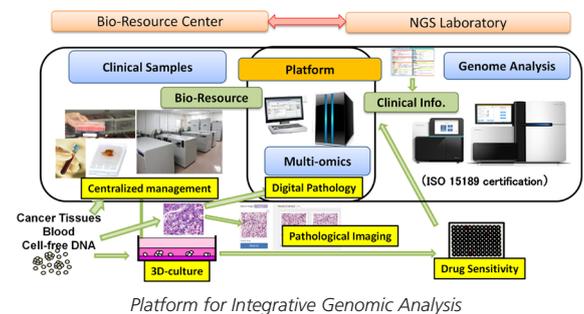
<https://www.h.u-tokyo.ac.jp/patient/depts/genomeshinryou/>

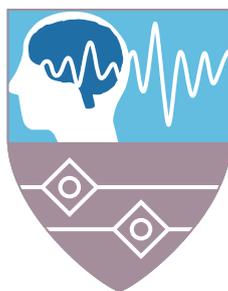
Our goal is to achieve clinical application of various types of genomic analysis, including cancer and other disorders. We focus on multi-omic analysis by using clinical samples to develop a novel cancer genomic profiling test and to establish novel therapeutics and biomarkers to drug sensitivity. We will also integrate pathological findings and genomic data, in collaboration with "Next-Generation Precision Medicine Development Laboratory".

- Clinical application of Todai OncoPanel 2, a novel cancer genomic profiling test, originally developed at the University of Tokyo
- Standardization of handling of pathological tissue samples and digital pathology
- Genomic/Epigenomic sub-classification of specific cancer types
- Drug sensitivity analysis by using organoid 3D-cultures



Multi-functional Cancer Genomic Profiling: Todai OncoPanel 2 (TOP2)



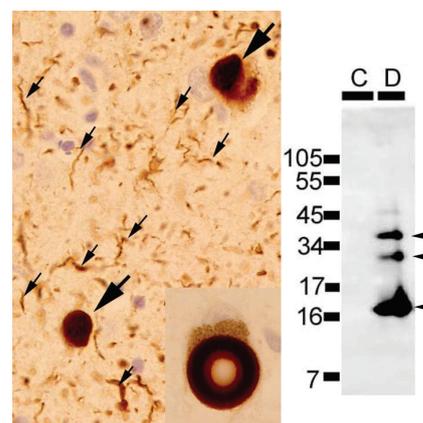


# Neuroscience

## Neuropathology

Elucidate the pathomechanism of neuronal degeneration and death in major neurodegenerative disorders (e.g., Alzheimer disease, Parkinson disease), and develop novel strategies for disease-modifying therapies.

- Mechanism of A $\beta$  production, aggregation and clearance
- Function of  $\beta$ -amyloid binding proteins (e.g., CLAC)
- Mechanism of aggregation and neurotoxicity of  $\alpha$ -synuclein
- Pathological function of familial Parkinson disease gene LRRK2
- Strategies for development and validation of disease modifying therapies for Alzheimer disease
- Mechanism of extracellular release and propagation of tau protein
- Pathological function of TDP-43 and FUS in amyotrophic lateral sclerosis



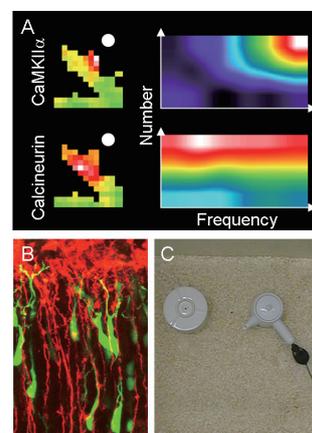
Phosphorylated  $\alpha$ -synuclein deposited in Lewy bodies of Parkinson's disease and Lewy body disease

## Neurochemistry

Our brain is able to recognize and memorize external and internal events as they occur. A functional neural network further stands out by its capacity to extract patterns and rules, and to associate them with abstract meaning and affective valence. What are the local and global spectra of the molecular signaling events in neurons that underlie such complex information processing at the systems level? Are these events, in turn, converted into more profound modifications of the synaptic wiring mechanisms? To address these issues, we are currently investigating the chemistry and physiology of various neuronal protein complexes near and at synapses.

- Understanding molecular and circuit mechanisms controlling memory and emotional behaviors, through integration of state-of-the-art in vitro and in vivo neurobiological techniques in molecular optogenetics/imaging, genetical circuit tracing, and quantitative and behavioral experiments in combination with genetically modified mice and gene transfer using viral vectors.
- Optical and molecular investigation (including real-time imaging and optical manipulation) of biochemical signaling in single synapse, synapse to nucleus, and living brain circuits that are involved in activity-dependent modification of neural circuit function and behavior.

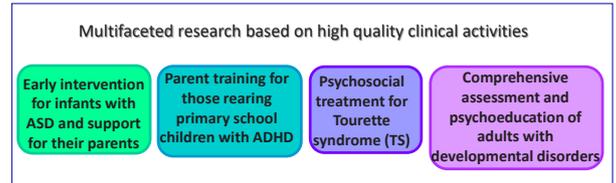
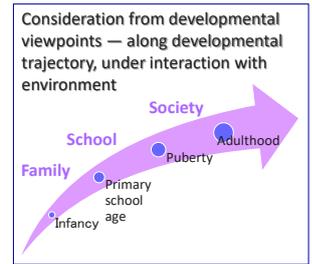
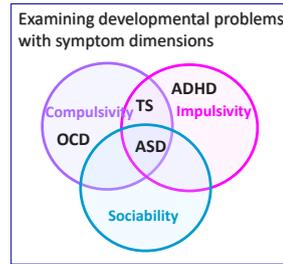
<http://www.neurochem.m.u-tokyo.ac.jp/>



A. Single-synapse imaging (left) and frequency-number response profile (right) of CaMKII $\alpha$  and calcineurin  
 B. Visualization of migrating neurons (green) and radial glial fibers (red) during corticogenesis  
 C. Novel object recognition task

## Child Neuropsychiatry

Main diseases of our current research are autism spectrum disorder (ASD), ADHD, Tourette syndrome and childhood Obsessive-compulsive disorder (OCD). From the viewpoint of development of brain and mind, we are trying to investigate pathogenesis of these diseases by integrating phenomenological, neuropsychological, brain-imaging and genetic studies. We are also applying this integrative approach to treatment research for patients with these diseases.

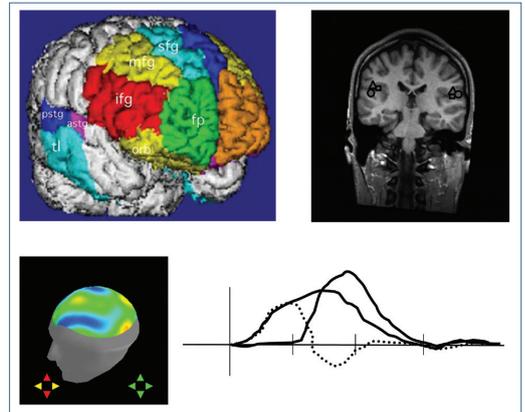


- Epidemiological, behavior phenotype, neuropsychological, genetic and treatment study of Tourette syndrome and childhood OCD
- Brain-imaging study of ASD, ADHD and Tourette syndrome
- Genomic and epigenomic analysis of ASD and Tourette syndrome
- Development of predictor of pharmacotherapy and parent training for ADHD
- Effectiveness study of early intervention for autistic preschoolers and support for their parents
- Investigation on clinical evaluation and psychological education for adults with developmental disorders

## Neuropsychiatry

<http://npsy.umin.jp/en/>

Although many psychiatric disorders do not directly cause death, they are known to incur significant reduction of disability-adjusted life years (DALYs) and economic losses due to their young age of onset, making it essential to elucidate their causes and establish better treatments. We are conducting longitudinal and integrative studies of ill-being and well-being in the AYA generation (10s to early 30s), the age group with the highest onset of psychiatric disorders. We are combining neuroimaging, genetic, neuropsychological, epidemiological, and qualitative studies in patients with psychiatric disorders such as schizophrenia, mood disorders, and neurodevelopmental disorders, as well as in general population cohorts and in animals.



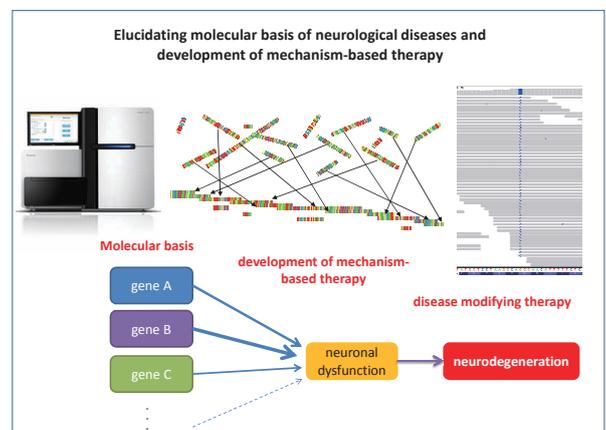
Multi-modality neuroimaging in neuropsychiatry using a combination of high-resolution MRI, EEG, MEG, NIRS, and PET

- **CAYAC** (Comprehensive research for AYA for better mental health Care): A comprehensive study of the mental health of the Adolescent and Young Adult (AYA) generation
- **COCORO** (The Cognitive Genetics Collaborative Research Organization): Investigation of neuropathology of psychiatric disorders using MRI and other multicenter data collected from more than 30 institutions in Japan.
- **Tokyo Teen Cohort**: Prospective population-based birth cohort study aimed at investigating physiological and psychological development, including self-regulation, during adolescence
- Research for psychosocial support of AYA generation with **22q11.2 deletion syndrome**
- Other studies include optical topography, EEG event-related potentials, genetic and epidemiological studies.

## Neurology

<https://www.utokyo-neurology.org/>

Our Department is conducting research programs to elucidate the pathophysiological mechanisms of neurological diseases including neurodegenerative diseases, immune-mediated diseases and neuromuscular diseases, and to establish new therapeutic approaches for these diseases. We are also providing excellent training programs to become a board-certified neurologist.

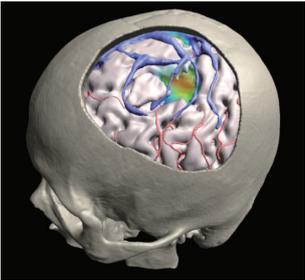


- Molecular Genetics (identification of disease genes and development of therapeutic approaches)
- Molecular pathophysiology of neurological diseases (protein structures and functions)
- Immune-mediated diseases (autoantibodies)
- Neurophysiology and cognitive neuroscience (magnetic stimulation, NIRS, MEG, PET, and fMRI)
- Neuropathology of neuromuscular diseases (pathological studies on biopsy and autopsy materials)
- Multicenter-based clinical research

# Neurosurgery

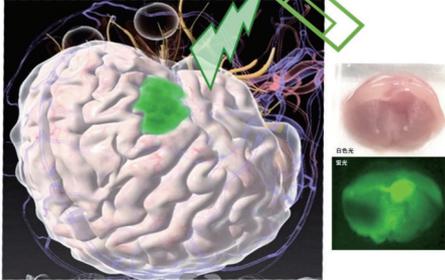
The 21st century has been designated as "The Century of the Brain". To lead Japanese surgical neuroscience, we have devoted our activities to the following: advanced clinical neurosurgery, neuroscience research and graduate and postgraduate education.

- Skull base surgery in managing benign or malignant skull base tumors and cerebrovascular disorders
- Genetic analysis of cerebrovascular diseases and benign brain tumors
- Functional neurosurgery including epilepsy surgery
- Multi-omics analysis of brain tumors (genetic analysis)
- Development of new therapeutic strategies for malignant brain tumors
- Development of novel fluorescence probes for brain tumors
- Radiogenomics analysis of brain tumors
- Clinical study on gamma-knife surgery
- Application of brain functional imaging for neurosurgery
- Development of surgical simulation method for AI and XR technology
- Cognitive neuroscience using intracranial EEG
- Development of brain-machine interface



Pre-operative simulation using 3D-fusion images

Development of brain tumor-specific fluorescent probe



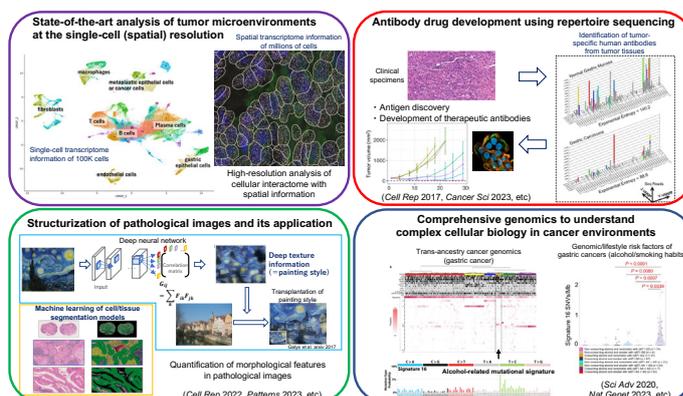


# Social Medicine

## Preventive Medicine

<https://plaza.umin.ac.jp/prm/>

Our goal is to discover appropriate intervention points for the prevention and therapeutics of human diseases in views of human health care and hygiene, with special focuses on malignant tumors, based on genomics and information sciences. Using bioinformatics for complex eco-systems of wide varieties of cells in human diseases (e.g., large-scale genomic information at single cell (spatial) resolution and multi-dimensional histopathological image information), we have been exploring preventive/therapeutic targets or biomarkers as well as analyzing their biological significance in human diseases.



- State-of-the-art analysis of tumor microenvironments at the single-cell (spatial) resolution.
- Antibody drug development using repertoire sequencing.
- Structurization of pathological images and its application.
- Comprehensive genomics to understand complex cellular biology in cancer environments.

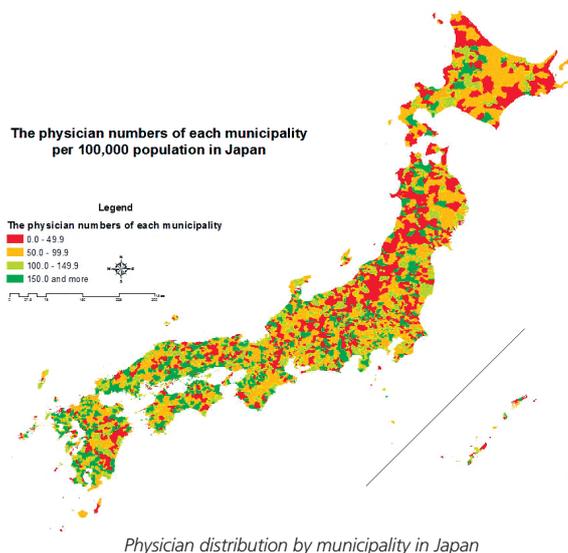
Exploration of preventive/therapeutic interventions for diseases by genomics & informatics

## Public Health

<https://plaza.umin.ac.jp/publichealth/>

Public health is the science and art of preventing disease, prolonging life, and promoting health and quality of life (QOL) through organized community effort. Through studies in various fields and laboratories, our department aims to advance research, support policy development, and promote education toward these ends.

- Health services research
- Epidemiology of diseases and injuries
- Health impact of the COVID-19 pandemic



## Forensic Medicine

<http://ut-forensic.jp>

We conduct autopsies, and various examinations including histology, biochemistry, radiology, toxicology, and genetics as usual practices. We also perform the following research with other institutes and departments including Education and Research Center of Legal Medicine, Chiba University, and Department of Forensic Medicine, School of Medicine, International University of Health and Welfare.

- Application of imaging modalities such as CT and MRI for death investigation
- Age and stature estimation and sex determination using CT
- Biomechanical properties of human tissue
- Diagnosis of drowning
- Research for infectivity of SARS-CoV-2 in decedents
- Analysis and pathophysiology of illegal drugs including new psychoactive substances
- Application of relatively new DNA testing method for practice of forensic medicine



CT room



Forensic autopsy room

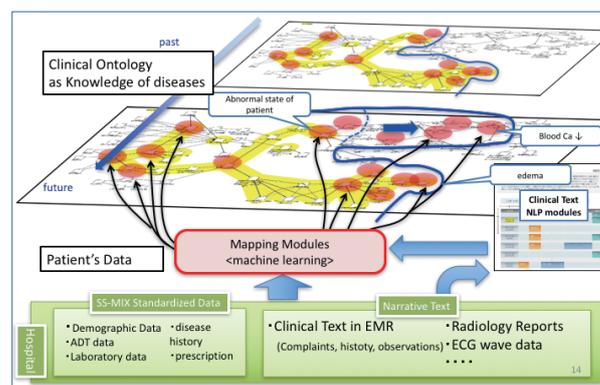
## Biomedical Informatics

<http://www.m.u-tokyo.ac.jp/medinfo/>

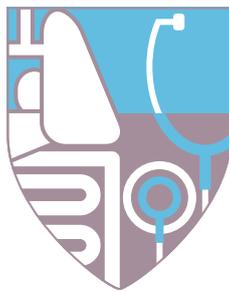
The Department of Biomedical Informatics aims to reform medical systems and make social contribution by applying information technology to medical and clinical field including hospital information management. The department develops innovative methods that are applicable to medical information systems in the boundary area of healthcare and information science, establishes infrastructures for information environment, and applies knowledge and technique acquired through these efforts to medical and healthcare field.

The main keywords are medical and clinical information systems, next-generation electronic health record systems, virtual health care environment, AI, natural language processing, machine learning, mHelath, and digital therapeutics.

- Development and application of clinical ontology
- Sharing healthcare data among medical institutions and the application for clinical epidemiology
- Extraction of medical knowledge from electronic medical record database using natural language processing
- Development of knowledge-driven real time alerting system in clinical practice
- R&D of medical artificial Intelligence, mobile health and digital therapeutics



Automatic Mapping from Clinical Case Data to Knowledge of Disease Transition



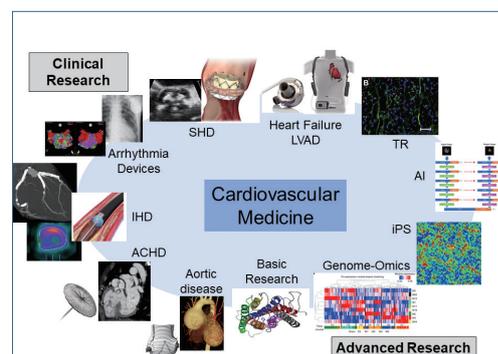
## Internal Medicine

### Cardiovascular Medicine

<https://cardiovasc.m.u-tokyo.ac.jp/>

We aim to provide the finest medical care for all cardiovascular diseases, including heart failure, ischemic heart disease, arrhythmia, valvular disease, structural heart disease, pulmonary hypertension, adult congenital heart disease, and arterial diseases. In particular, we have treated the largest number of patients with serious heart failure in Japan. In collaboration with the Department of Cardiovascular Surgery, we would like to work as the last bastion against heart failure. Moreover, with ongoing basic research and translational studies, we are developing new diagnostic modalities and treatments for refractory diseases.

- Investigation of disease pathophysiology (severe heart failure, arrhythmia, pulmonary hypertension, etc.) and development of novel therapies
- Analysis of genome, epigenome, and transcriptomes in various cardiovascular diseases
- Investigation of pathophysiology of cardiomyopathy using iPS cells
- Research on the role of chronic inflammation in the pathogenesis of various cardiovascular diseases
- Epidemiology and prevention of cardiovascular disease
- Artificial Intelligence in cardiology
- Improvement of imaging techniques (echocardiography, MRI, CT, SPECT) for cardiovascular diseases
- Clinical research of severe heart disease, pulmonary hypertension, arrhythmia

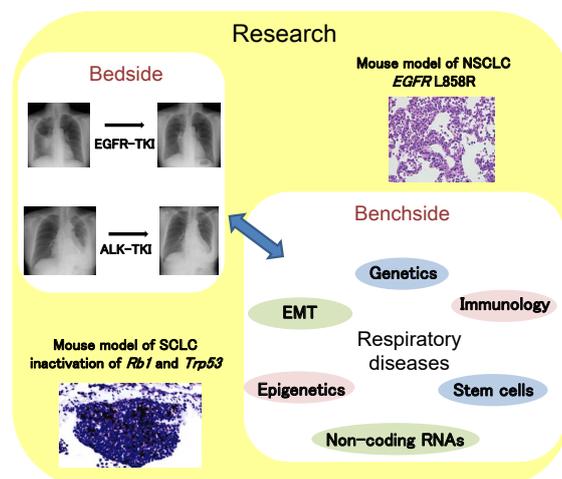


### Respiratory Medicine

<http://kokyuki.umin.jp/>

The number of patients with pulmonary diseases is increasing. At the Department of Respiratory Medicine, we conduct a wide variety of basic and clinical research. We focus on molecular analysis of lung diseases to develop novel treatment strategies.

- Molecular profiling of lung cancer
- Discovery of novel prognostic biomarkers in lung cancer
- Targeted clinical sequencing of lung cancer specimens
- Clinical research using the lung cancer database
- Molecular analysis of COPD using animal models
- Molecular analysis of asthma
- Molecular analysis of pulmonary fibrosis using animal models
- Clinical epidemiology using the DPC database
- Case reports



## Gastroenterology

<http://gastro.m.u-tokyo.ac.jp/med/home.html>

Our Department of Gastroenterology is one of the top institutions in the world in the treatment of hepatocellular carcinoma by unique ablation(RFA) and gastrointestinal/pancreatobiliary cancer/stone by endoscopic manipulation (ESD&ERCP). The goal of our department is to accurately diagnose and give the best available treatment to these patients, and to this end, we are performing a wide variety of basic as well as clinical research.



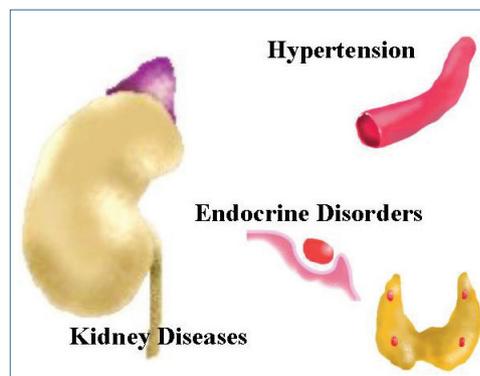
- Development of better therapeutic strategy for hepatitis B and C
- Elucidation of hepatocarcinogenesis mechanism in viral hepatitis
- Development of a better therapeutic modality for hepatocellular carcinoma & metastatic liver tumor
- Elucidation of gastric injury mechanisms by *Helicobacter pylori*
- Elucidation of stem cell and carcinogenic mechanism of gastrointestinal cancer
- Development of therapeutic strategy for advanced pancreatobiliary cancer
- Development of a better endoscopic therapeutic modality for pancreatobiliary cancer/stone
- Development of better diagnostic & therapeutic strategy for chronic pancreatitis
- Development of an endoscopic *en bloc* resection method for early gastric, esophageal and colonic cancer
- Elucidation of the mechanisms of metabolism-associated liver diseases
- Development of better diagnostic & therapeutic strategy for small intestinal diseases

## Nephrology / Endocrinology

<http://www.todai-jinnai.com/>

We are investigating the pathophysiology of renal and endocrine disorders for the development of innovative diagnostic and therapeutic tools.

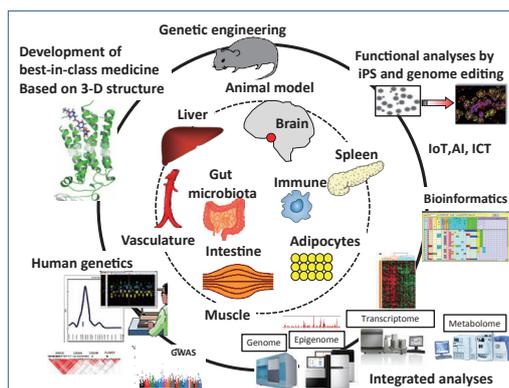
- Analysis of pathophysiology and development of therapy of chronic kidney disease
- Abnormal oxygen metabolism of kidney disease
- Epigenetic changes in CKD
- Development of biomarkers and therapy of acute kidney injury
- Renal physiology and morphology
- G protein signaling in health and disease
- Clinical and basic investigation of bone and mineral disorders
- Pathophysiology of hypertension
- Development of novel telemedicine



## Nutrition and Metabolism

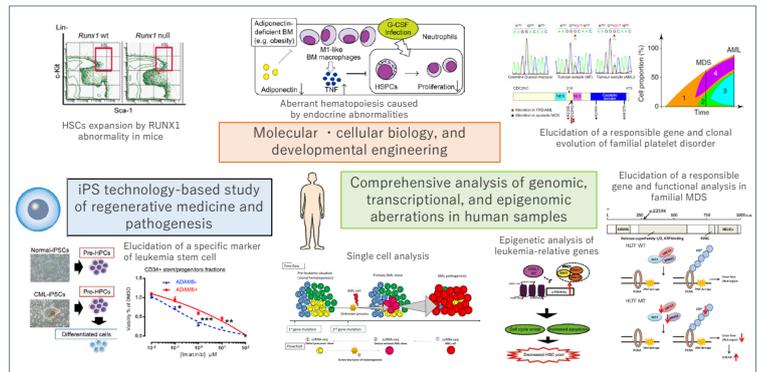
We are investigating to reveal the molecular mechanisms underlying the development of metabolic diseases (diabetes mellitus, lipid metabolic disorders, obesity disease, sarcopenia, metabolic syndrome and atherosclerosis) using interdisciplinary approaches and state-of-the-art technology including genetically engineered model animals, iPS cells, omics analyses (epigenome, metabolome etc), human genetics, clinical epidemiology and bioinformatics. Our major goal is to develop mechanism-based fundamental treatment and prevention strategies for the metabolic diseases.

- Elucidation of molecular mechanism of insulin resistance linked to obesity, sarcopenia and development of novel treatment focusing on AdipoR, myokines etc
- Epigenetic analysis of the mechanisms of metabolic control and their disruption in type 2 diabetes and obesity
- Elucidation of the molecular mechanism of metabolic diseases and development of novel treatment using iPS cells
- Molecular mechanism of insulin signal transduction
- Molecular mechanism of insulin secretory defect in type 2 diabetes
- Genetic susceptibility and risk factors of type 2 diabetes
- Using IoT, AI, development of accurate diagnosis, prevention, treatment algorithm for type 2 diabetes
- Molecular mechanism of adipogenesis and obesity
- Transcriptional regulation of lipid metabolism
- Molecular mechanism of atherosclerosis
- Mouse genetic models of diabetes, lipid metabolism disorder and atherosclerosis



We investigate the pathogenesis, diagnostic methods, and novel therapeutics of hematological diseases by the comprehensive use of research technologies in molecular biology, cellular biology, developmental engineering, and genomic science. Studies about transcriptional regulation and signal transduction in hematopoiesis and analyses of regulation of hematopoietic stem cells are promoted. We also implement basic and clinical studies based on genomics, regenerative medicine, immunotherapy and transplantation medicine, which aim at application to therapeutic strategies.

- Mechanisms in the regulation of self renewal and differentiation in hematopoietic stem cells
- Comprehensive genomic and epigenetic analysis of hematological malignancies
- Elucidation of the molecular mechanisms underlying the pathogenesis of leukemia
- Development and analysis of mouse models of leukemogenesis
- Regenerative medicine and pathogenesis study based on human iPS cell technology
- Adoptive immunotherapy with T cells engineered with chimeric antigen receptor or T cell receptor for cancer

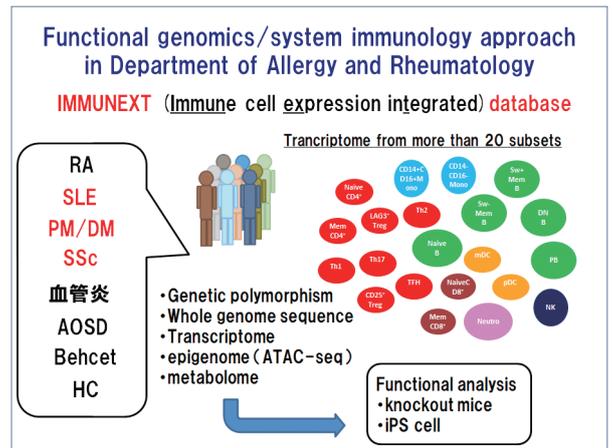


Elucidation of the genomic and molecular mechanisms underlying hematopoiesis and leukemogenesis

# Allergy and Rheumatology

The primary aim of our department is to provide best care and support to patients with rheumatic disease. It is our mission to provide excellent clinical care while seeking to better define the causes, stratification of patients, and best treatment approaches for rheumatic disease. To this end, we have to clarify the mechanisms for autoimmunity seen in rheumatic disease. We perform basic and clinical research to translate laboratory findings into novel therapeutic approach by combining genetics, transcriptome informatics and immunology (Ota M et al. Cell. 2021; Nakano et al. Cell 2022). We think research of human immunology in collaboration with patients is the key to overcome rheumatic disease.

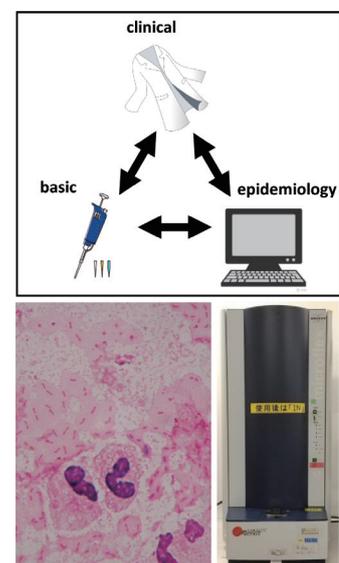
- Genome/transcriptome analysis of immunological diseases
- Disease classification and diagnosis with genome/transcriptome of immunological diseases
- Pathogenic T cell analyses in autoimmune diseases
- Identification of molecular pathway related to prognosis in SLE
- Identification of molecular pathway related to prognosis in polymyositis/dermatomyositis
- Identification of molecular pathway related to prognosis in systemic sclerosis
- Molecular analysis using conditional knockout mice
- Molecular analysis using iPS cells



# Infectious Diseases

Our main research subjects are viral infections such as HIV, hepatitis viruses, and SARS-CoV-2, as well as bacterial infections and opportunistic infections. We conduct basic and clinical research on various pathogens, host immune responses, and mechanisms of multidrug-resistant bacteria as well as antimicrobial stewardship. Based on these results, we are also developing new strategies of prevention, diagnosis, and treatment for infectious diseases.

- Treatment and prevention of viral hepatitis
- Clinical studies of HIV infection
- Molecular pathogenesis of hepatocellular carcinoma in HCV infection
- Molecular pathogenesis of hepatitis B viral infection
- Pathogenesis of influenza viral infection
- Molecular epidemiology and pathogenesis of bacterial infection
- Host defenses to microorganisms
- Mechanism of multi-drug resistant microorganisms
- Promotion of antimicrobial stewardship

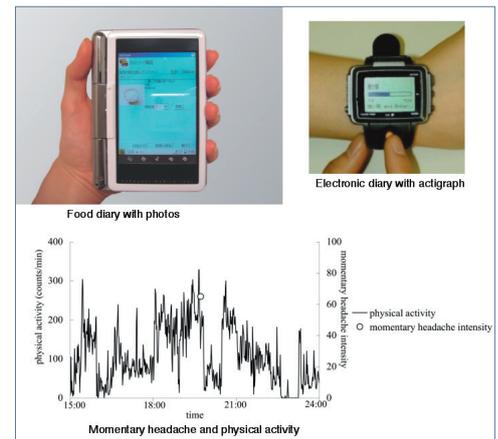


## Stress Sciences and Psychosomatic Medicine

<http://psmut.umin.ac.jp/>

The targets of our laboratory include stress-related diseases such as primary headaches and lifestyle-related diseases, eating disorders and malignancies. The goals of our work are to determine the mechanisms of these conditions, to develop objective markers for diagnosis and severity, and to discover new treatment approaches using ecological momentary assessment (EMA), Ecological Momentary Intervention (EMI), and physiological assessment of autonomic nervous function.

- We are using ecological momentary assessment (EMA) techniques to collect and evaluate subjective and objective data including physical activity and autonomic nervous function in natural settings in stress-related diseases. We are also developing new treatments using these methods called "Ecological Momentary Intervention (EMI)".
- Investigation into the pathophysiology, psychopathology and neurobehavioral basis of stress-related diseases by use of ecological momentary assessment methods
- Using heart rate and blood pressure variability, we are investigating autonomic nervous function in eating disorders. This work uses non-linear analyses such as fractal analysis, as well as linear analysis.
- We have developed an egogram questionnaire, which we refer to as the TEG.

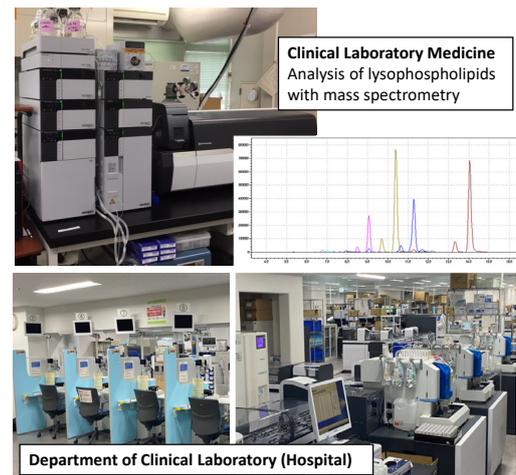


## Clinical Laboratory Medicine

<http://lab-tyk.umin.ac.jp/>

The main goal of our research projects is the development of new and useful laboratory tests, and elucidation of pathophysiology of diseases through laboratory tests.

- (Patho)physiological roles of lipid mediators, and its application to laboratory medicine
- Introduction of mass spectrometry into clinical laboratory practice
- Cancer genomic medicine using next generation sequencing
- Clinical introduction of the assay of oxidized albumin and the novel laboratory diagnosis in thrombosis and hemostasis
- Neuroscience research using magnetoencephalography and non-invasive brain stimulation
- Echocardiographic studies of the pathophysiology of valvular heart disease and the hemodynamics
- Promotion of medical-science-engineering cooperation



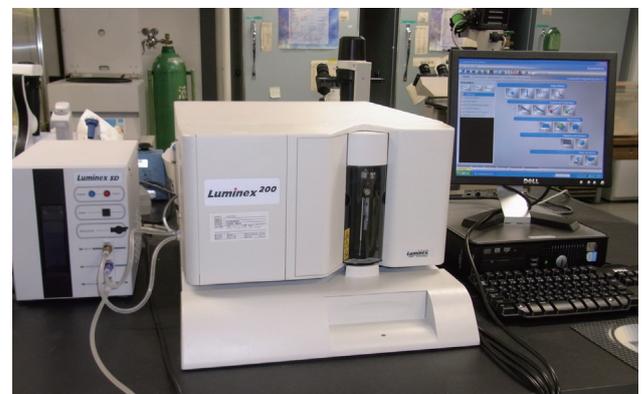
## Transfusion Medicine

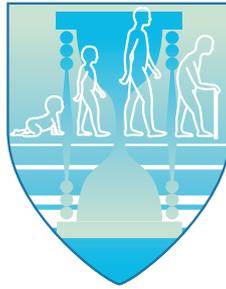
<http://square.umin.ac.jp/traf-tyk/>

The Department of Transfusion Medicine aims the achievement of safe and appropriate transfusion practice in the hospital, and for this purpose, controls, tests and supplies all blood products for transfusion.

The research fields include:

- Detection of red cells/ leukocytes/platelets antigens/antibodies
- Investigation on the pathophysiology of the immunological adverse effects of transfusion
- Clinical study for the safety of autologous blood donation





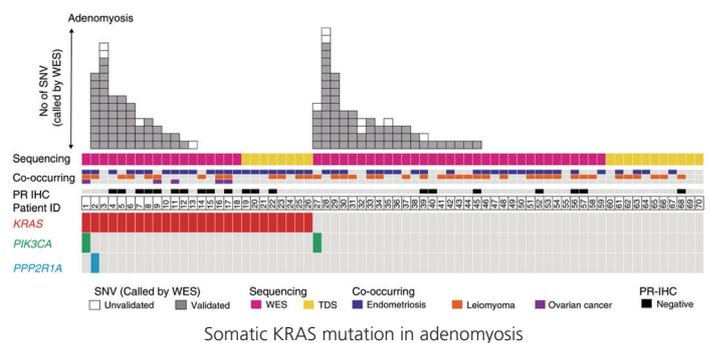
# Reproductive, Developmental and Aging Sciences

## Gynecologic Oncology

<https://www.h.u-tokyo.ac.jp/english/centers-services/clinical-divisions/gynecologic-surgery/index.html>

We perform basic research focusing on genetic and epigenetic analyses in gynecologic oncology to establish novel diagnostic and therapeutic tools. In the clinical aspects, we provide life-long medical care for the patients with endometriosis and/or adenomyosis and perform advanced gynecologic surgeries such as adenomyomectomy and radical trachelectomy. We actively perform endoscopic and robot-assisted surgeries in gynecologic oncology.

- Optimization of surgery for fertility preservation in endometriosis, adenomyosis and uterine fibroid
- Minimally invasive surgery (laparoscopic and robot-assisted surgery)
- Genomic medicine in hereditary gynecologic cancers
- Development of diagnostic / therapeutic methods for genomic and epigenomic analyses
- Development of novel therapeutic tools to target DNA repair pathway
- Development of new gynecologic medical system using artificial intelligence

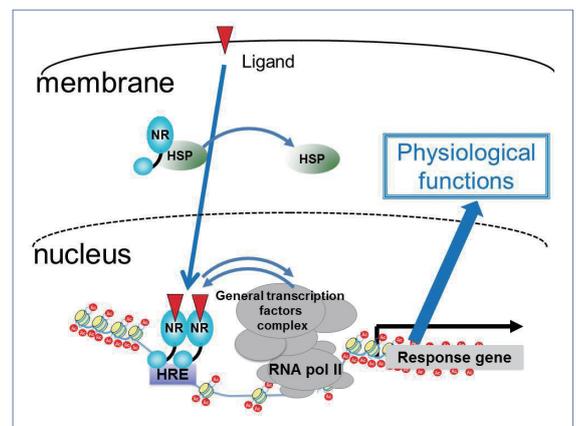


## Molecular and Cellular Reproductive Medicine

We investigate the molecular mechanisms of reproductive functions using the knowledge and techniques of molecular and cellular biology and genetics.

Our studies are focusing on the pathophysiological mechanism of sex steroid hormones to elucidate how these hormones effect on reproductive phenomena including embryogenesis, spermatogenesis and fetal development, and on the prenatal genetic diagnosis.

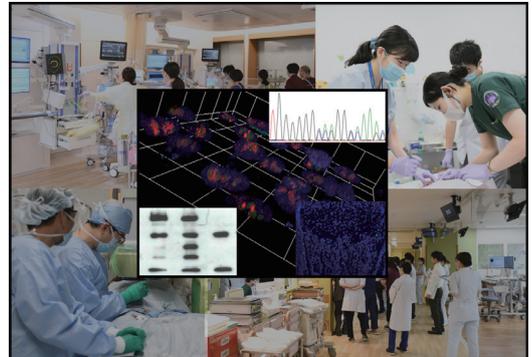
- Effect of sex steroid hormones on reproductive medicine
- Molecular mechanisms of embryogenesis
- Analysis of implantation mechanism
- Pathophysiology of ovarian aging and elucidation of its mechanism
- Molecular analysis of follicular atresia



Molecular mechanisms of sex steroids

We are actively engaged in medical care, education, and research on various pathological conditions and social issues of children.

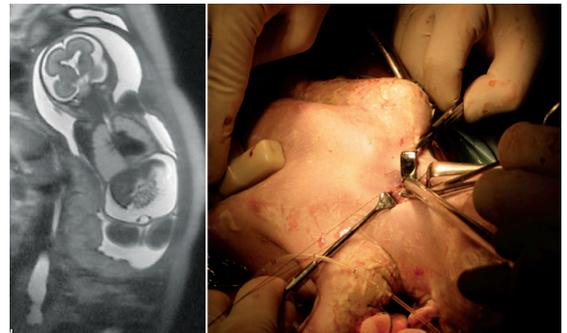
- Molecular diagnosis and analyses of hematologic diseases and solid tumors
- Clinical studies on leukemia and solid tumors
- Molecular diagnosis, analysis and collaborative treatment of pediatric renal diseases
- Molecular analysis and diagnosis and collaborative treatment of endocrine/metabolic diseases and diabetes
- Diagnosis, molecular analysis and collaborative treatment of congenital heart diseases
- Molecular mechanism of Neonatal immune tolerance
- Comprehensive analysis of biomarkers in neonatal diseases
- Microbiome and immune function in neonates
- Immunity of neonates born to mothers with systemic autoimmune diseases
- Neurocognitive effects of intrauterine infection and environmental toxins
- Diagnosis and comprehensive treatment of neuromuscular disorders
- Molecular diagnosis and treatment of mitochondrial disorders
- Early intervention of developmental disorders
- Patho-physiological analysis by digital data in pediatric critical care
- Protective respiratory care by trans-pulmonary pressure in children
- Development of educational program of transitional care



## Pediatric Surgery

Pediatric surgical diseases have great variety. In our department all kinds of pediatric surgical conditions are treated, and in these fetal and neonatal surgical care is our main interest. We also treat many pediatric patients using minimally invasive surgeries such as laparoscopy and thoracoscopy.

- Fetal surgery and treatment
- Pediatric minimally invasive surgery
- Pediatric robotic surgery
- Biliary atresia and biliary dilatation: their treatment and long-term prognosis
- The treatment by regenerative medicine of air way malacia and stenosis
- Development of pediatric surgical models
- Association between pediatric surgical diseases and intestinal microbiota
- Assessment of pediatric surgical procedures using nation-wide data



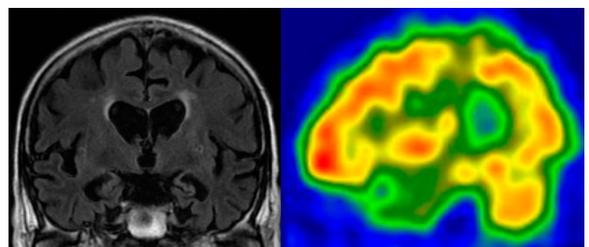
*EXIT(ex utero intrapartum treatment):  
Tracheostomy on a fetus with laryngeal atresia*

## Geriatric Medicine

The Department of Geriatric Medicine, established in 1962, is the first department of Geriatric Medicine in Japan. The staff physicians are highly trained and experienced in managing complex cares. Comprehensive cares including assessment and treatment of chronic diseases, geriatric conditions, and frailty are provided to ensure quality of life and health in older patients. Our research interests are as follows:

- Molecular mechanisms of vascular calcification
- Molecular mechanisms of sarcopenia
- Inhibition of cognitive decline using antihypertensive drugs
- Cares and burdens of family caregivers of patients with dementia
- Risk factors for adverse drug events
- Association of sex hormones and vitamins with geriatric conditions
- Novel gene responsible for locomotive syndrome, including osteoporosis
- Molecular mechanisms of vascular injury in sleep apnea syndrome
- Polypharmacy and frailty

<https://www.h.u-tokyo.ac.jp/patient/depts/rounen/>



*A typical brain MRI image and a brain perfusion SPECT image of an Alzheimer's disease patient*



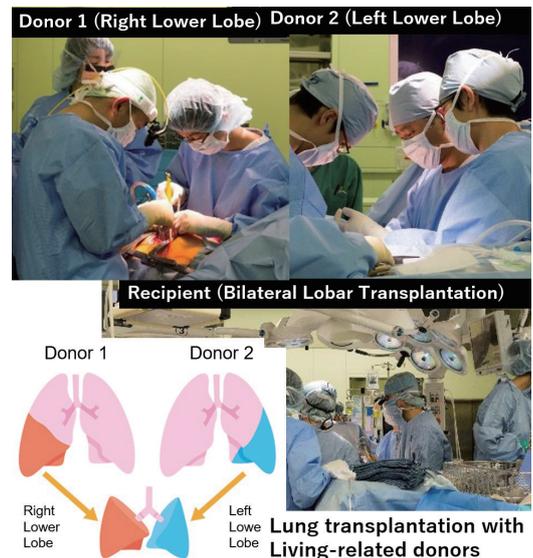
## Surgical Sciences

### Thoracic Surgery

<http://cts.m.u-Tokyo.ac.jp>

We specialize in surgical treatment and oncology for thoracic malignancies including primary lung cancer, pulmonary metastasis and mediastinal tumors. We are conducting a wide range of research from the development of cancer immunology to minimally invasive surgical methods such as thoracoscopic/robot-assisted surgery. Since 2014, The University of Tokyo Hospital has been certified as the sole lung transplant institute in Tokyo. Since 2020, the annual number of lung transplants performed has become the highest in Japan. We are conducting clinical research on lung transplantation and basic research using animal models.

- Minimally invasive therapeutics for chest malignancies
- Clinical and basic oncology of lung cancer and thymic epithelial neoplasms
- Clinical and basic research on lung transplantation



### Cardiovascular Surgery

<http://cts.m.u-tokyo.ac.jp/cardiac-surgery>

We are leading in Japan by annual surgery case volume of 400. New knowledge and techniques are actively applied clinically. We are aggressively performing ventricular assist device implantation and heart transplantation for end-stage heart failure, mitral valve plasty, valve-sparing aortic root replacement, curative surgery for active endocarditis, and surgery for complex congenital heart disease. Many clinical research projects are going on along with routine clinical activities. Our laboratories have been also carrying out a large variety of basic research.

- Clinical research
  - Improvement of long-term results of heart transplantation
  - ventricular assist device for end-stage heart failure
  - valve plasty and valve-sparing operation
  - Minimally invasive surgery
  - Treatment of complex congenital heart disease
- Basic and experimental research
  - Development of new control system for ventricular assist device
  - Development of myocardial regenerative therapy
  - Development of a new suture device under endoscopic environment



## Gastrointestinal Surgery

<http://gibes.m.u-tokyo.ac.jp/>

Our goal is to cure the cancer patients by much better surgery. The development of better surgical methods have the highest priority. Better surgery means radicality of the cancer, minimal invasiveness, and good QOL after surgery. Recently, robot assisted transmediastinal (non-transthoracic) radical esophagectomy has been developed, which shows less postoperative pulmonary complications and better QOL after surgery compared with conventional esophagectomy.

- Cure by much better surgery
  - Robot assisted transmediastinal esophagectomy for esophageal cancer
  - Robot assisted gastrectomy for gastric cancer
  - Laparoscopic endoscopic cooperative surgery (LECS) for gastric and duodenal tumor, non-exposed endoscopic wall-inversion surgery (NEWS) for gastric tumor
  - Laparoscopic gastrectomy for function preserving (proximal, distal and pylorus preserving gastrectomy)
- Research for carcinogenesis, progression, diagnosis and treatment
  - Inflammation and gastrointestinal carcinogenesis
  - Activatable fluorescence imaging probe for esophageal and gastric cancer
  - Oncolytic viral therapy for esophageal cancer
  - Genetics and epigenetics for esophageal and gastric cancer
  - Early detection of gastrointestinal cancer by new biomarkers
  - Immunotherapy based on intratumoral immune response in gastric cancer

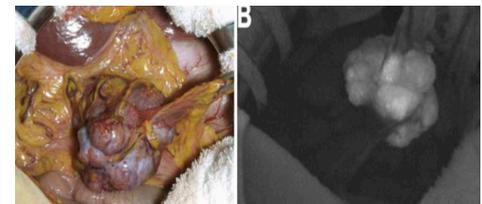


## Hepatobiliary Pancreatic Surgery

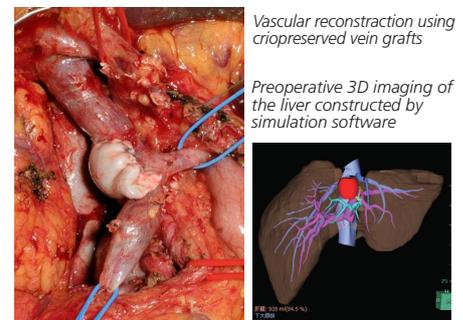
<http://www.u-tokyo-hbp-transplant-surgery.jp/>

We perform approximately 150 hepatectomies in patients with hepatobiliary malignancies and approximately 90 pancreatetectomies in patients with pancreatic neoplasms every year. The first priority is put on the safety of the patients undergoing surgery. In order to improve the surgical outcome for hepato-biliary-pancreatic diseases, we conduct wide variety of research including analysis of prognostic factors for liver malignancies, intraoperative diagnostic tools, liver ischemia/reperfusion injury, and liver regeneration.

- The analysis of genetic abnormalities in hepatocellular carcinoma
- Development of new methods for the evaluation of liver functional reserve
- The evaluation of hemodynamics in the congested liver using ultrasonography
- Navigation system during liver surgery
- Intraoperative diagnosis using ICG fluorescent imaging
- Clinical trials concerning perioperative chemotherapy in hepatic resection for colorectal liver metastasis
- Clinical trials addressing utility of preoperative drug therapy for hepatocellular carcinoma
- Vascular reconstruction using criopreserved vein grafts Evaluation of the anti-adhesion materials
- Development of new artificial vessels dedicated for HPB surgery
- Development of anti-adhesion materials



ICG fluorescent imaging for detecting tumors



Vascular reconstruction using criopreserved vein grafts

Preoperative 3D imaging of the liver constructed by simulation software

## Urology

<http://square.umin.ac.jp/UT-urology/>

We perform more than 1,500 urological surgeries every year, including nephrectomy, cystectomy and prostatectomy, with increasing trend of laparoscopic maneuvers. Robotic surgery was introduced in 2011. Surgical or non-surgical procedures are employed for non-cancer disease including chronic renal failure, urinary dysfunction, urinary incontinence and interstitial cystitis.

- Genome analysis of renal cancer, renal pelvic cancer, ureteral cancer and testicular cancer
- Genome analysis of Corticotropin-independent Cushing's syndrome
- Pathogenesis of interstitial cystitis
- A prospective randomized controlled study on the suppression of cancer
- Artificial urinary sphincter for male urinary incontinence
- Robot-assisted laparoscopic surgery (prostate, renal, and bladder cancer) (Fig. 1)
- Immune checkpoint inhibitor for metastatic renal cancer and bladder cancer
- Multidisciplinary treatment for locally advanced prostate cancer
- Site-directed therapy for oligometastasis of prostate cancer
- Salvage robot-assisted radical prostatectomy after radiotherapy
- Surgery for chronic renal failure (hemodialysis, peritoneal dialysis and renal transplantation)
- Urogynecology (pelvic organ prolapse)

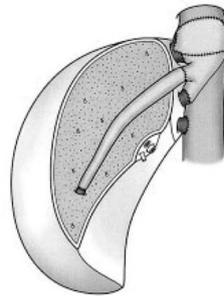


Fig. 1 Surgical scene of Robot-assisted laparoscopic radical prostatectomy

## Artificial Organ and Transplantation Division

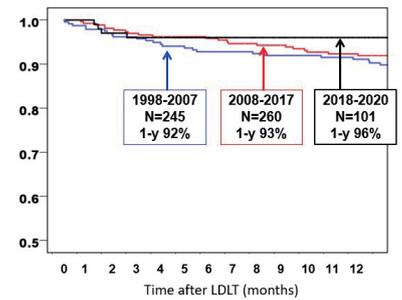
798 living donor liver transplantation and 64 deceased donor liver transplantation until Dec. 2022. The 5-year survival rate for adult case was 88%, which is significantly superior to that of the national data (73%).

- Surgical technique of liver transplantation: including right lateral sector graft, APOLT(Auxillary partial orthotopic liver transplantation)
- Hepatic vein reconstruction using criopreserved vein grafts
- Identification of veno-occlusive resions using ICG fluorescence imaging
- Antiviral treatment for hepatic C and B virus infection after liver transplantation
- Novel strategies in liver transplantation for PBC and PSC
- Expansion of liver transplant indication for HCC
- Diagnosis and treatment for acute rejection
- Diagnosis and treatment for postoperative infection

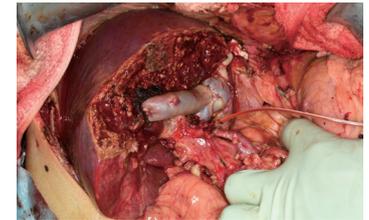


Hepatic vein reconstruction using criopreserved vein grafts

<http://plaza.umin.ac.jp/htokyostransplant/>



Overall survivals after living donor liver transplantation



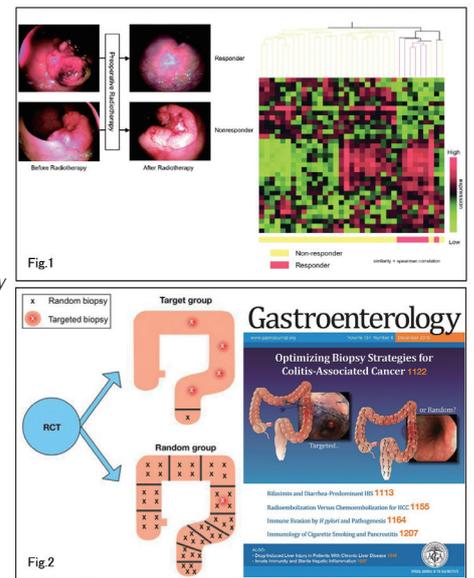
## Surgical Oncology

We have performed basic and clinical research mainly on colorectal cancer and inflammatory bowel disease. In basic research, we are studying biological phenomenon from various point of view such as carcinogenesis, cancer metastasis, and immunology. In clinical study, we are trying to identify the best way to treat each patient with the least surgical stress by minimally invasive surgery such as laparoscopic surgery and robotic surgery (da Vinci), and preoperative chemoradiation therapy for rectal cancer.

- Robot assisted surgery (da Vinci robotic surgery)
- Radiosensitivity and chemosensitivity of cancer
- Characterization of tumor vasculature and its therapeutic application
- Surveillance of ulcerative colitis
- Carcinogenesis in ulcerative colitis
- Cancer and autophagy
- Development of chemoradioimmunotherapy
- Genetic analysis of poorly differentiated colorectal cancer
- Intraperitoneal chemotherapy for peritoneal carcinomatosis

Fig.1 Prediction of chemoradiosensitivity in rectal cancer by DNA microarray

Fig.2 Targeted vs random biopsies for surveillance of ulcerative colitis-associated cancer



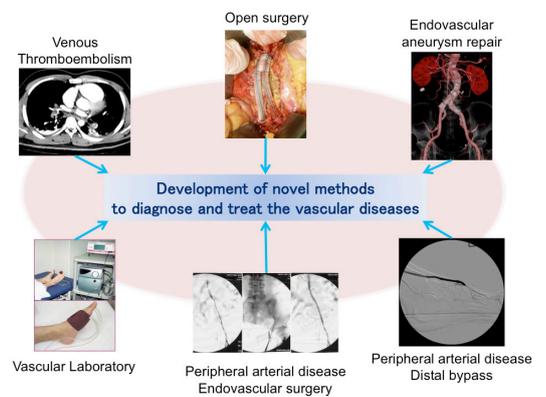
<http://all-1su.umin.jp/>

## Vascular Surgery

We have a great deal of experience in treating patients with various vascular diseases, and we have performed much research on atherosclerosis, angiogenesis and vascular regeneration. Based on the research results, we are trying to identify the best way to treat each patient with the least surgical stress.

Development of a novel method to diagnose and treat the vascular diseases.

- Vascular regeneration therapy for atherosclerotic obliterans
- Development of aortic aneurysm model and simulation
- Gene analysis of peripheral arterial disease
- Visualization of the atherosclerotic lesions with fluorescent probe
- Navigation system for less invasive vascular surgery
- Analysis of intermittent claudication with dynamic and mechanical model
- Dynamic and genetic mechanism of aortic aneurysm expansion
- Development of the new prosthesis with small diameter
- Hemodynamic analysis of aortic wall after endovascular aneurysm repair
- Drug delivery system for aortic aneurysm and peripheral arterial disease



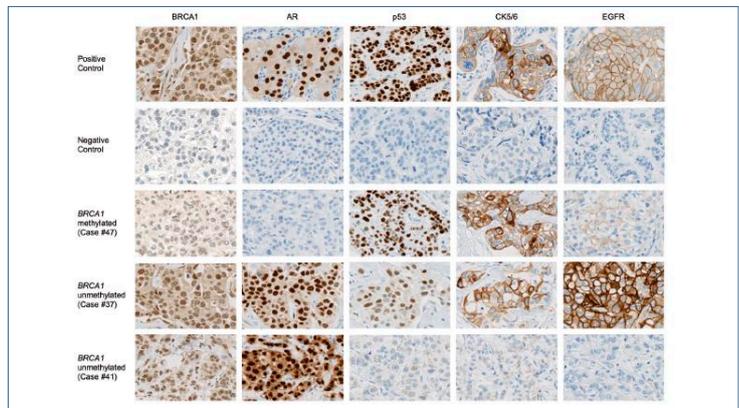
<http://vascular-1su.jp/en/>

## Breast and Endocrine Surgery

<http://todai3ge.umin.jp/>

Clinical activities in the department of breast and endocrine surgery widely range from diagnosis to surgical treatment for breast cancer, thyroid cancer, and benign tumors of breast, thyroid, and parathyroid. We also place importance on medical genetics including hereditary breast and ovarian cancer syndrome (HBOC) as well as precision medicine based on cancer genome information. Our goal and motivation of basic research are to eradicate metastatic breast cancer in which complete cure has yet to be realized.

- BRCAness in triple negative breast cancer
- Use of droplet digital PCR for quantitative and automatic analysis of the HER2 status
- Detection of the PIK3CA mutation in circulating tumor DNA in early-stage breast cancer
- Impact of CDK4/6 inhibitor palbociclib on activin-SMAD2 signaling in estrogen receptor-positive breast cancer
- Stem-like cells of breast cancer
- Epigenetic change which is critical for carcinogenesis of breast cancer
- Big data analysis in oncology



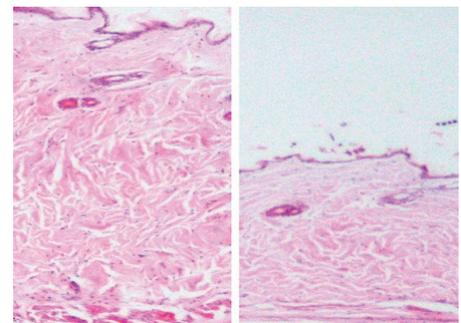
The immunohistochemical features of BRCA1, AR, p53, CK5/6 (One patient with a *BRCA1* promoter-methylated tumor and two patients with a *BRCA1* promoter-unmethylated tumor)

## Dermatology

<http://www.h.u-tokyo.ac.jp/der/>

Our department actively performs the following cutting-edge, multifaceted research projects that will be put into clinical practice in the future.

- Molecular mechanisms of immunological abnormalities and skin and lung fibrosis in systemic sclerosis
- Development of novel therapies to systemic sclerosis, including B cell depletion therapy
- Relative contribution of various cell adhesion molecules and chemokines to inflammatory conditions
- Identification of novel autoantibodies and their clinical significance in connective tissue diseases
- New roles of B lymphocytes, especially regulatory roles, in inflammatory disorders
- Immune-epidermal abnormalities in psoriasis and atopic dermatitis
- Epigenetic regulatory mechanisms in skin diseases
- Roles of chemokines and stimulatory molecules in cutaneous lymphoma
- Roles of lipid enzymes and receptors in immune-mediated skin diseases
- Largest clinical studies on systemic sclerosis in Japan

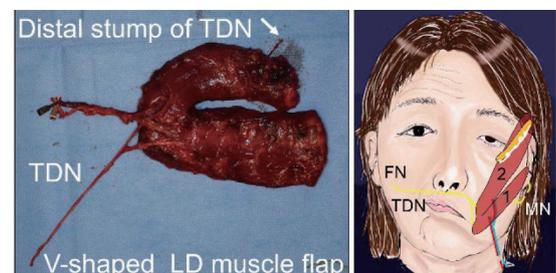


Skin fibrosis induced by bleomycin(left) is inhibited in CD19-deficient mice(right)

## Plastic and Reconstructive Surgery

We aim to develop innovative therapeutic interventions for the morbidities associated with plastic and reconstructive surgery. With a variety of state-of-the-art approaches such as gene therapy and microvascular surgery, we continuously work on the reconstruction of skin, fat, muscle and nerve to fight against the intractable diseases.

- Clinical Research
  - Development of a novel reconstruction method for facial nerve palsy and its optimization
  - Standardization of reconstruction method for eye closure in patients with facial nerve palsy by evaluation of blink function
  - Evaluation of effectiveness of lymphatico venous anastomosis in early stages of lymphedema
  - Research on dysphagia after tongue reconstruction after cancer resection
- Basic Research
  - Development of gene therapies for the intractable diseases in plastic surgery
  - Realization of the innovative therapies for cutaneous ulcers via direct cellular reprogramming
  - Development of the method for perfect tissue regeneration via tissue embryonization
  - Elucidation of pathology of vascular anomalies
  - Development of new therapeutic intervention for alopecia



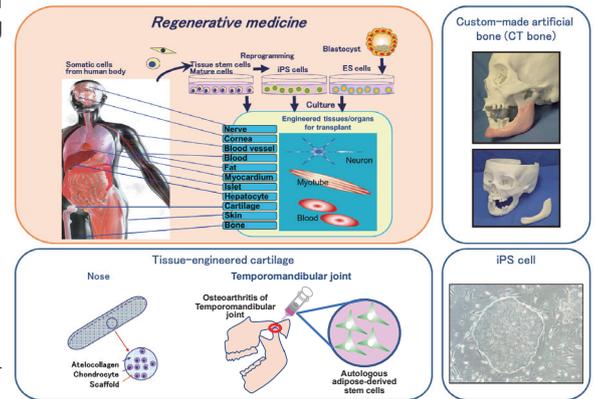
V-shaped long LD muscle transfer for smile reconstruction

## Oral and Maxillofacial Surgery

<http://plaza.umin.ac.jp/~oralsurg/>

Our laboratory has been performing a wide range of clinically oriented research in oral-maxillofacial disorders such as congenital diseases, jaw deformities and tumors in the oral region. Cartilage and bone regeneration using tissue engineering techniques is our main field of research.

- Clinical research:
  - Treatment of facial deformities and malocclusion in patients with cleft lip/palate
  - Research on facial growth in patients with craniofacial anomalies
  - Reconstruction of oral and maxillofacial area by custom-made artificial bone (CT bone) (clinical trial)
  - Transplantation of implant-type tissue-engineered cartilage for cleft lip-nose patients (clinical study)
  - QOL study of oral health care system in preoperative cancer patients
  - Overcoming eating loss (eat-loss)
  - The association between oral disorders and systemic diseases
  - Development of surgical assisted systems using artificial intelligence, computer vision, and augmented reality
  - Research on the treatment of temporomandibular joint disorder using autologous adipose-derived mesenchymal stem cells
- Basic and experimental research:
  - Regeneration of bone and cartilage with tissue-engineering approach
  - Molecular biology of cartilage repair and its application to cartilage regenerative medicine
  - Development of novel scaffolds for cartilage and bone regeneration
  - In vivo evaluation of tissue-engineered cartilage and bone
  - Study on the control of mesenchymal cell differentiation
  - Elucidation of epigenetic abnormalities in oral cancers and oral premalignant lesions
  - Functional analysis of microRNAs in human dental pulp stem cells
  - Study on the cleft lip and osteonecrosis of the jaw using animal models
  - Elucidation of mechanisms of tissue repair by adipose-derived stem cells and macrophages
  - Analysis of regulatory mechanisms of bone using a reconstitution system of the cellular network in bone metabolism



## Orthopaedic Surgery

<http://www.u-tokyo-ortho.jp/>

Our department was established in 1906 as the first department of orthopaedic surgery in Japan. Since then our efforts have been dedicated to responding to the needs of patients for orthopaedic care and to related research. Our department seeks to elucidate the molecular and genetic backgrounds of bone and cartilage disorders in order to develop groundbreaking treatments for these conditions. At the same time, we are attempting to establish various clinical devices.

- Systemic and comprehensive study for osteoarthritis
- Regulation of bone metabolism and Molecular mechanism of osteoclast differentiation
- Regenerative medicine of joint and nerve by adipose-derived stem cells and related technology
- Surgical navigation system with a three-dimensional display and navigation robot
- Long-life artificial joint by construction of a super-durable lubricious interface of MPC
- Prevention of adhesion after tendon repair by hydrogel technology
- Artificial Intelligence to predict bone mineral density through plain X-ray

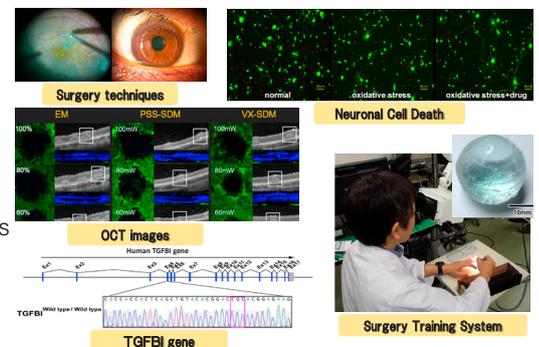


## Ophthalmology

<https://www.todaiganka.jp/>

Our department applies cutting-edge technologies and knowledge to diagnosis and treatment of eye diseases. We conduct basic researches involving multi-faculties with molecular biological, immunological, and pharmacological techniques, and clinical studies with epidemiology and biostatistics.

- Physiological studies on vision and eye movements
- Development and evaluation of new drug therapies and surgical techniques on glaucoma, or retinal, corneal, and uveal diseases.
- Development of diagnosis and treatment in glaucoma with functional and structural analysis.
- Study on mechanisms for maintaining intraocular pressure, and development of new drugs using clinical samples of glaucoma eyes and genetically modified animals.
- Further research in the mechanisms of neuronal death in retinal neurons and glial cells, and exploration of useful neuroprotective agents.
- Development and application of surgery training systems with bionic eyes.
- Improvements in corneal regeneration therapy and development of new therapies in hereditary corneal diseases.
- Study on corneal mechanisms to maintain clarity.
- Research on refractory uveitis and intraocular lymphoma.
- Comprehensive studies on multimodal imaging of structures and functions of macular diseases.

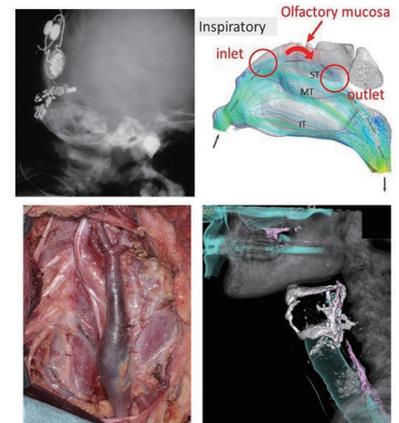


## Otolaryngology and Head and Neck Surgery

<http://utokyo-ent.org/>

Our research is composed of both clinical and basic research. Clinical research is conducted by specialized clinics in the hospital, which experience ear diseases and hearing disorders from neonates to adulthood, head and neck cancer, paranasal diseases, olfactory and disorders, vertigo and balance disorders and voice and swallowing disorders. Basic and experimental research into molecular biology, electrophysiology and morphology is conducted in our department's laboratories.

- Clinical research
  - Cochlear implantation in deaf children and their development of hearing, speech and language
  - Surgical correction of congenial microtia and atresia and postoperative radical ears to improve hearing
  - Quality of life in patients with head and neck cancer to restore speech and swallowing function
  - Vestibular research on the oculomotor and balance system and myogenic potential
  - Vestibular rehabilitation by electric stimulation
  - Survey of eosinophilic sinusitis and refractory allergic rhinitis
  - Survey and surgical treatment for swallowing disorders and esophageal motility disorders
  - Clinical sequencing for recurrent / metastatic head and neck cancer
  - Development of fluorescent probes for cancer cell imaging
- Basic and experimental research
  - Molecular biology of the inner ear
  - Molecular biology of pharyngeal cancer
  - Molecular biology of differentiation and development of inner ear and olfactory epithelium
  - Aging and regeneration of olfactory epithelium, pathogenesis of chronic sinusitis and allergic rhinitis
  - Physiology of vocal cord vibration, Molecular biology of recurrent laryngeal papillomatosis

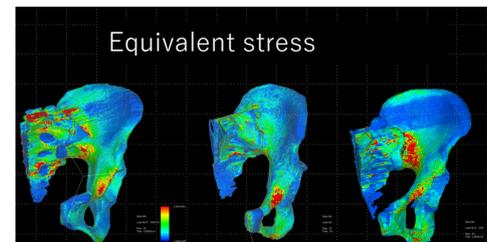


## Rehabilitation Medicine

Our research purpose is to elucidate the causalities between the pathology of diseases and the limitation of activities and social participation of the patients. The findings from that research would lead to the improvement of physical activities of people with disabilities.

### Topics

- Clinical research for congenital limb deficiency
- Health promotion for people with chronic disabilities
- Evaluation and intervention for dysphagia
- Image analysis for bone metastasis



swallowing videofluorography for cervical spondylosis

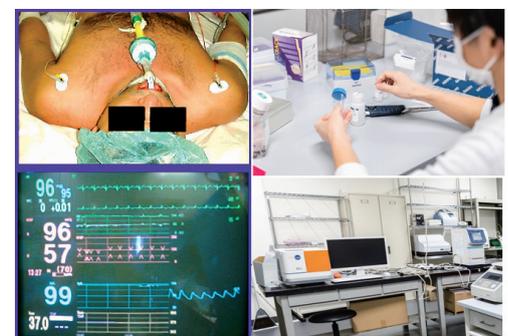


## Anesthesiology

<https://www.ut-anes.org/>

We have seven research groups and their fields include respiratory, cardiovascular, pain, nervous, and immune systems. Our ongoing and recent major research subjects are:

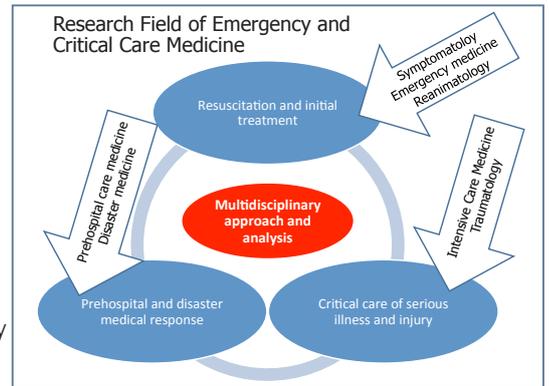
- Respiratory system – A role of cytokine signaling in acute lung injury; Transpulmonary pressure during mechanical ventilation; Exploring risk factors of perioperative exacerbation of interstitial lung disease;
- Immune system – Modification of immune system by anesthesia; Apoptotic signal transduction induced by sepsis or ischemia-reperfusion injury;
- Pain – A role of lipid mediators in the formation of hyperalgesia; A role of spinal microglial cells in the development of inflammation-mediated neuropathic pain; Cognitive-behavioral therapy on chronic pain;
- Nervous system – Analysis of electroencephalography during general anesthesia; Exploring relationship between postoperative delirium and blood-brain barrier dysfunction;
- Metabolism – Clinical significance of fatty acid metabolites in general anesthesia;
- Cardiovascular system – Retrospective analyses on perioperative management of left ventricular assisting device implantation or heart transplantation; Physiology and molecular biology of left/right heart failure of animal models;
- Medical device – Invention and validation of new anesthetic procedures with emerging technologies;
- Epidemiological survey and outcome study with large administrative database.

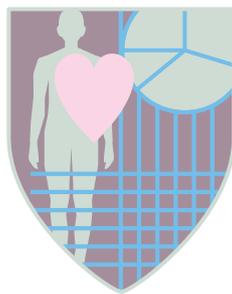


Clinical Practice and Research of Anesthesiology

Emergency and critical care medicine aims to develop diagnostics and therapeutics for acute and critical medical diseases. Its scope covers not only clinical medicine but also basic medicine and social medicine.

- Acuity of injury and illness related studies
  - Establishment of conception of "definitive acuity"
  - Acuity and severity scoring system
- Methodology of task switching in the setting of multitask at ER
- Improvement of outcome of emergency patients by mobile on-site physicians team
- Performance indicators of medical control for paramedics
- Performance indicators of regional emergency medical service system
- Critical care related studies
  - Relationship between biomarkers and severity of critically illness
  - Non invasive monitoring technology to predict circulatory shock status
- Versatile and durable WEB-based information sharing system for emergency medical service system and disaster medical response.
- Mass casualty incident and natural disaster medical response related studies
  - Investigation of regional disaster medical risk-resource-ratio (static approach)
  - Dynamic simulation model of necessity of regional medical resource in MCI and large scale natural disaster





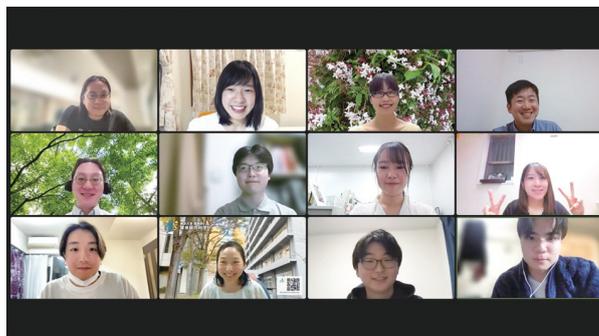
## Health Sciences and Nursing

### Mental Health / Psychiatric Nursing

<https://mhpn.m.u-tokyo.ac.jp/>

Our departments conduct research on mental health and psychosocial stress and provide education/training of professionals in related fields from global perspectives.

- Mental Health
  - Mental health epidemiology
  - Occupational mental health
  - Trauma-Informed Care
  - Perinatal Mental Health
  - Internet-based Cognitive Behavioral Therapy
  - Disaster and mental health
  - Global mental health
- Psychiatric Nursing
  - Supporting people living with mental health problems
  - Wellness self-management in mental health
  - Recovery for people with mental illness
  - Peer support

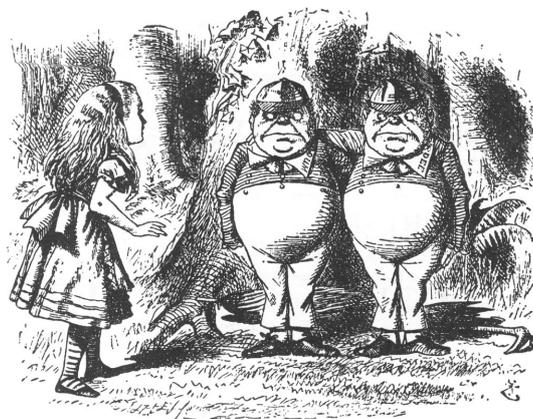


### Biostatistics / Epidemiology and Preventive Health Sciences

<http://www.epistat.m.u-tokyo.ac.jp/>

We are working on methodological researches of biostatistics and theoretical epidemiology, as well as consulting and supporting the conduct of epidemiologic/clinical studies. The followings are our important missions: statistics education for undergraduate and graduate students; the support of planning and analysis for clinical trials conducted in the University of Tokyo Hospital Clinical Research Promotion Center; and the support of resource development for academic biostatisticians.

- Methodology
  - Design and analysis of clinical trials/epidemiologic studies
  - Statistical analysis of real-world data
  - Causal inference, missing data analysis and meta-analysis
- Collaborative projects
  - Research for the Construction of Trial Ready Cohort on preclinical and prodromal dementia (J-TRC)
  - Individual patient data based meta-analyses for gastric cancer
  - Japan Environmental and Children's Study (JECS)



*What is a causal effect? Biostatistics provides the means to causal inference from observed data.*

## Nursing Administration / Advanced Clinical Nursing

<http://nurs-adm.umin.jp/>

We aim to identify mechanisms and methods to maximize the potential of people and organizations to bring happiness to all patients, nurses and other healthcare professionals, organizations, and society. With this aim, we try to develop new models and techniques of nursing care that support people's health, and to create better systems and environments as organizations and societies surrounding nursing.

- Visualization of nursing care using devices
- Clarifying the mechanisms underlying the rationale for care
- Social and organizational systems for sustainability of nursing organizations



## Family Nursing

<http://www.fn.m.u-tokyo.ac.jp/en/>

Changes in society, such as the declining birthrate, super-aging population, urbanization, globalization, and gender equality, have brought about changes in family forms and functions, and family problems and needs have become more diverse and complex. Therefore, family nursing research focusing on not only individual persons with a problem but also their family as one system is essential to increase the happiness and well-being of the whole family. Our department focuses on family nursing research to help families overcome the various challenges and problems they face and to make the whole family happier.

- Improvement of perinatal mental health and child abuse prevention with the perspective of attachment styles
- Development of Pediatric QOL Inventory for children with chronic illness and their parents
- Transitional care for children, adolescent and young adult with childhood-onset chronic diseases and their families
- Support for families suffering violence and prevention of the transmission of violence
- Multidisciplinary collaboration for families and communities
- Development of an inclusive educational program for preschool and elementary school children



## Community Health Nursing

<https://chiikikango.m.u-tokyo.ac.jp/en/>

The goal of our department is to continuously maintain and improve the health and quality of life of people regardless of their life stages and health statuses, by taking advantage of the characteristics of a target community or population and constructing the system. Also, we cover the research on skills of public health nurses who are the provider of community health care.

- Construction of community health care system
- Community health care for mothers and children, adults, older people, and mental disorders
- Community health nursing for disaster prevention and recovery
- Skills of public health nurses



*Assessing community's characteristics for Community Diagnoses*



*Health education program for older people*

## Gerontological Home Care and Long-term Care Nursing/ Palliative Care Nursing

Our research activities are related to nursing care of adults/older people with chronic conditions and their families. We hope to construct a culturally-sensitive knowledge base for the discipline of nursing.

<https://longtermcare.m.u-tokyo.ac.jp/>

- ① Balancing care staff wellbeing with quality assurance and improvement of care in long-term care facilities and at home
  - Development of quality indicators for quality of care,
  - Development of a system for managing quality of care
  - Case study
- ② Building new knowledge of care through case studies
- ③ New developments in nursing practice in a community-based society
  - Development of dementia-friendly community using Gamification and VR

### 質指標を用いた事業所へのフィードバック

VENUS質指標を基にした事業所ごとのフィードバックレポート (他事業所との比較 (利用者状況の調整済み)・経時的比較)



- ① Feedback report to facility using developed quality indicators for quality of care
- ② Online seminar of case studies

## Midwifery and Women's Health

<http://midwifery.m.u-tokyo.ac.jp/en/>

The physical and psychological changes that occur during the perinatal period have a critical influence on women's lifelong health. Additionally, this influence extends to their children, families, and communities. Our department specially focuses on the health of mothers and children in the perinatal period and mainly performs research in the following areas:

- Creating evidence of health guidance during pregnancy
  - Healthy lifestyle: adequate maternal nutrition, weight management, exercise, physical activity, sleep, and mental health
- Development of a support system for reliable childbirth
  - Midwifery care for positive childbirth experiences
  - Addressing 'Fear of childbirth' and psychosocial factors among pregnant Japanese women
  - Development of assessment methods of birth canal using transperineal ultrasonography
  - Development of the strategy for safe delivery in El Salvador
  - Evaluating care in-hospital midwife-led system and in-hospital midwifery clinic
  - Evaluation of learning efficacy of Virtual Reality on midwifery education: Collaborative research between Japan, Australia, and New Zealand
  - Development and effectiveness of an online Japanese version of mindfulness-based childbirth and parenting program
- Development of a support system for postpartum body management
  - Pelvic floor disorders among postpartum women
- Development of a support system for women's health
  - Support for health of working mothers and women
  - Support for breastfeeding mothers and babies
- Creative evidence of health guidance for neonatal skin care
  - Development of an effective skin care intervention to prevent neonatal skin problems
  - Changes in neonatal skin barrier function and skin resident microflora by skin care



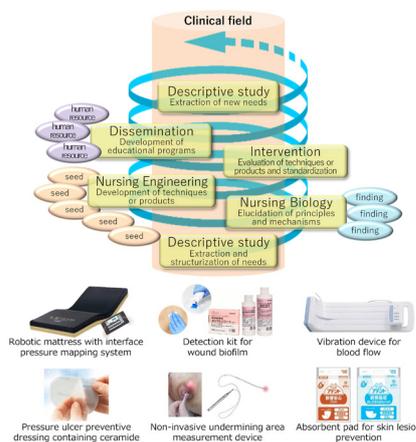
Drawing / Shoichi Sakamoto

## Gerontological Nursing / Wound Care Management

<http://www.rounenkango.m.u-tokyo.ac.jp/index-e.html>

With the aim of creating a society in which people feel that growing old is not a bad thing, the mission of our department is to (1) realize a care situation that does not force people to suffer, and (2) establish new nursing care technologies for medical patients who are unable to express their suffering. Our research is based on the method of reverse translational research, in which the mechanisms of clinical issues to be addressed by nursing science are investigated through basic research, devices are developed to intervene in the identified targets (e.g., engineering), and the technologies and systems are evaluated in clinical practice to identify new issues. Based on these methods, we are implementing "nursing science and engineering" to develop and disseminate non-invasive, non-constraining, real-time nursing technologies and devices.

- Elucidation of the pathogenesis of hard-to-heal wounds and development of management technologies
- Search for biomarkers that reflect skin conditions
- Development of technology for early detection and prevention of extravascular leakage of intravenous fluids
- Development of a device to promote healing of diabetic foot ulcers by a novel mechanism to accelerate glucose metabolism
- Development of a new pad to prevent incontinence-associated dermatitis
- Development of advanced nursing skills transfer method using VR/AR/MR



Products developed through reverse translational research

## Health Sciences and Nursing

**Health Sociology** *See* **Health and Social Behavior**(p52)

**Health Education** *See* **Health and Social Behavior**(p52)

**Biomedical Ethics** *See* **Biomedical Ethics**(p52)



## International Health

### Global Health Policy

<http://www.ghp.m.u-tokyo.ac.jp>

Our mission is to improve the health and well-being of people and the planet through excellence in research, education, training, and service. We generate new knowledge and innovations through research, enhance the capacity for global and planetary health research, and support advocacy and implementation of health policies, especially in resource-limited settings.

The priority areas of research are:

- Air Pollution and Health
- Climate Change and Human Health
- Domestic Health Policy Reform
- Extreme Events and Severe Environmental Exposures
- Global Burden of Disease
- Global Health Governance
- Health Emergencies and Disaster Risk Management
- Infectious Diseases in Changing Environment
- Nutrition Science and Policy
- Urban Health



### Community and Global Health

<http://www.ich.m.u-tokyo.ac.jp/en/index.html>

Global health is about achieving equity, social justice, and narrowing unacceptable health gaps globally. To achieve this, all countries and people should share their experience and wisdom to help people have control over and improve their health and well-being. In other words, ending global health itself is the goal of global health. Our department conducts research in the following areas:

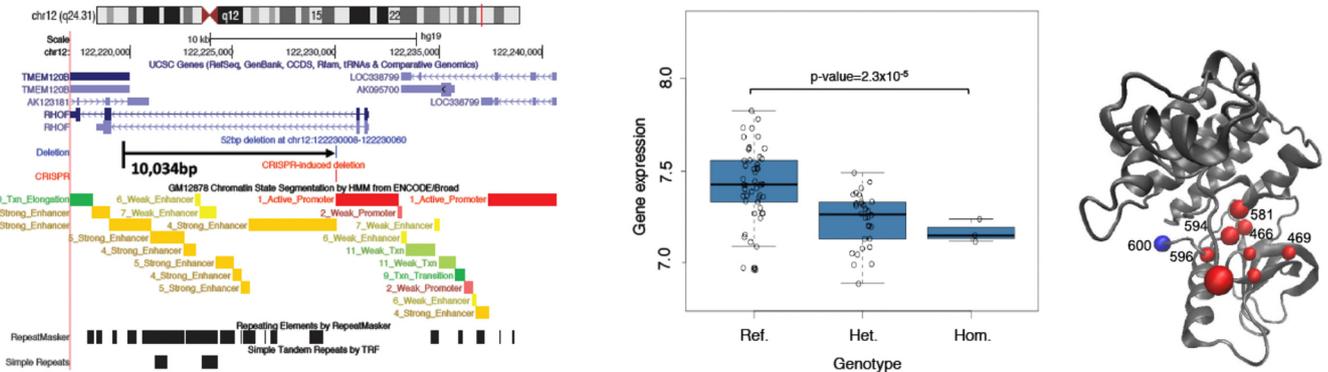
- Health, nutrition, and development
- Health, human rights, and human security
- Infectious disease control (malaria, TB, HIV, NTDs, etc.)
- Health promotion (in particular, health literacy)
- Disaster and health
- Human resources for health
- Maternal, newborn, and child health
- Implementation research
- Positive deviance approach



## Human Genetics

<http://www.humgenet.m.u-tokyo.ac.jp/index.en.html>

Human Genetics is a field focusing on the diversity of the human genome, and can include studies into the molecular mechanisms of genetics, evolutionary history of homo sapiens, cancer genome, as well as susceptibility genes for common and rare diseases. The findings of such genetic studies have proven useful in many applications, from supporting clinical diagnosis of diseases to drug development and therapy. Recent advancements in genomic analyses have allowed us to obtain enormous amounts of genetic and transcriptomic data. Such data will continue to grow in size and utilization in society, reflecting the increasing importance of the field of human genetics.

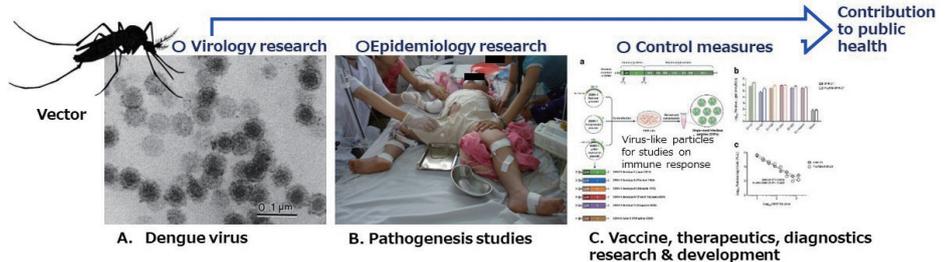


## Developmental Medical Sciences

<http://www.development.m.u-tokyo.ac.jp>

Our department conducts studies on emerging and re-emerging viral infectious diseases of public health importance with aims on to develop better control measures for these diseases. Viruses of public health importance includes Dengue, Zika, Japanese encephalitis, SARS-CoV-2 and other pathogenic viruses. We aim to contribute to the overall community health by using a combination of traditional and cutting-edge approaches across different specialty fields including virology, immunity, genetics, clinical and field work.

- Epidemiology, virological and molecular studies of the pathogenesis of tropical and emerging viruses
- Development of diagnostic tools and bioinformatics methods to analyze viruses of regional concern
- Host immune response during infection and elucidation of pathogenesis during viral infection
- Vaccine and therapeutics development
- Infectious disease in developmental biology and public health



Each research topic is designed to answer global challenges in controlling infectious diseases, through innovative approaches and novel solutions and, in collaboration with our national and global counterparts.

## Human Ecology

<http://www.humeco.m.u-tokyo.ac.jp/en/>

The field of human ecology encompasses a wide range of perspectives in an effort to understand human health in relation to adaptation to physical and social environments. To this end, we use methodologies developed in human biology, nutritional sciences, anthropology, demography, environmental health, and urban ecology. The major topics of our studies include:

- Health impact of exposure to heavy metals, air pollution, unhealthy urban structures, and ecosystem degradation;
- The roles of gut microbiota in nutritional adaptation and the evolution of human populations;
- Mitigation of the health impacts of aging and depopulation at community/national scales;
- Biological and behavioral explanations of low fertility and fecundity during the post-demographic transition period;
- Interaction among subsistence, nutrition and health; and
- Medical anthropology; ecological anthropology.



A community in Laos.

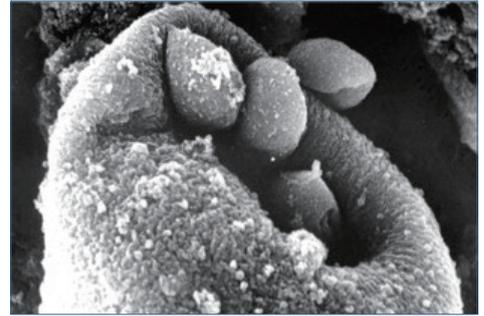


Rice terraces in West Java, Indonesia.

## Biomedical Chemistry

Our major research interests include virulence mechanisms and metabolism of protozoa, particularly *Plasmodium* spp. causing malaria and *Entamoeba histolytica* causing amebic dysentery. We mainly focus on vesicular trafficking, phagocytosis, autophagy, proteases, amino acid metabolisms, RNA maturation, translation, drug development, and organellogenesis. Our research approaches are very robust, and include biochemistry, molecular and cell biology, live imaging, multi-omics including metabolomics, and reverse genetics. Our present research themes include:

- Molecular elucidation of pathogenesis of parasites
- Biochemical and biological analyses of metabolism and organelles unique to parasites
- Analysis of vesicular traffic, protein secretion, and phagocytosis/trogocytosis in parasites
- Genome wide analysis and comparison of parasite strains
- Drug discovery and development against protozoan infections such as malaria and amebiasis
- Elucidation of divergence of RNA maturation and translation



*Entamoeba histolytica* eating human cells

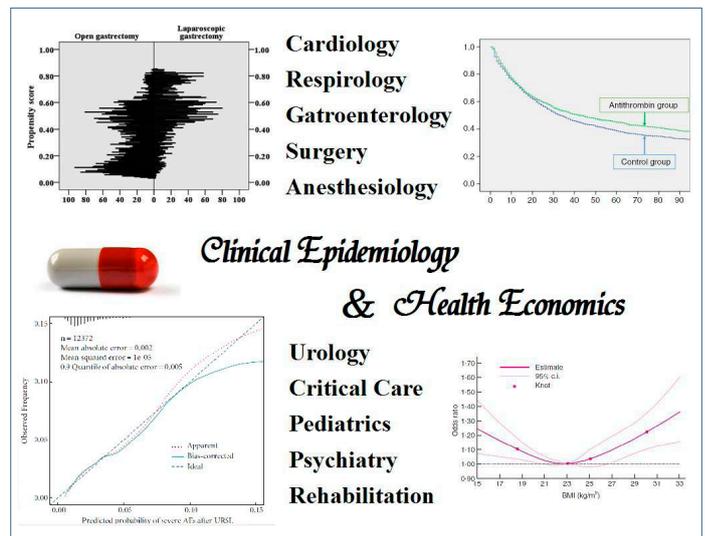


# School of Public Health

## Clinical Epidemiology and Health Economics

Through the cooperation with the specialists of epidemiology, statistics, clinical medicine, and economics, we implement multidisciplinary studies on clinical epidemiology, health economics, health technology assessment and health policy using large healthcare databases.

- Clinical epidemiological studies using the Diagnosis Procedure Combination database
- Health economics and policy studies using the governmental statistics
- Application of statistical methods for observational studies
- Integration of multiple databases



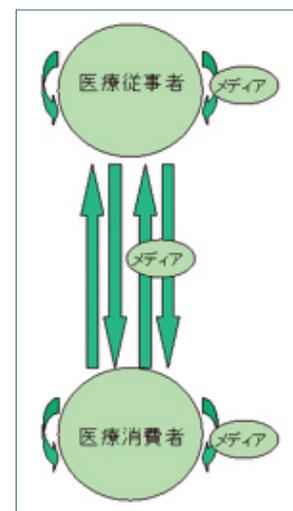
## Health Communication

We are developing empirical research on a wide range of communication types at various levels in the field of health communication studies. These range from interpersonal communication to media communication. Among laboratories in Japan focused on health communication studies, we have the most publications, research funds, faculty members, and graduate students.

Our research areas include:

- Communication for supporting health-care consumers' behavioral change
- Decision-making by health-care consumers
- Media information's impact on health-care consumers
- Online health information
- Health literacy
- Patient-provider communication

<https://www.umin.ac.jp/hc/index.html>



## Mental Health

<https://mhpn.m.u-tokyo.ac.jp/>

The Department of Mental Health has engaged in education and research on a wide range of topics related to mental health, such as social determinants of stress and mental health. The Department provides classes of Mental Health I (epidemiology and countermeasures in mental health) and Mental Health II (Trauma-Informed Care, Perinatal Mental Health, and Occupational Mental Health).

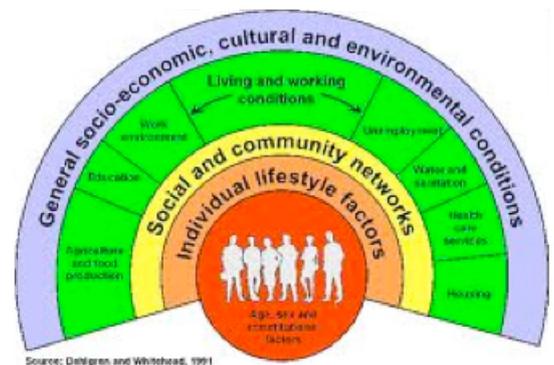
- Community-based mental health epidemiology
- Occupational mental health
- Internet-based Cognitive Behavioral Therapy
- Perinatal Mental Health
- Trauma-Informed Care
- Disaster and mental health
- Global mental health



## Health and Social Behavior

The unit follows the legend of former departments of health sociology, health education, and social gerontology, and extends its academic endeavor to empirically reveal complex mechanisms between social structure/relationship and individual health/behavior. Through interdisciplinary and global communication with social science and health science, the unit aims at exploring research and education on social determinants of health, such as;

- Trans-generational health impact of socioeconomic status
- Health impact of retirement and social participation among the elderly
- Policy intervention design to alleviate social exclusion
- The impact of healthcare systems for health equity
- Social experiences of chronically ill and their health



## Biomedical Ethics

<http://www.ethps.m.u-tokyo.ac.jp/>

The Department of Biomedical Ethics conducts both theoretical and empirical studies in the fields of biomedical ethics, research ethics and clinical ethics. Research topics include ethical theories, public health ethics, informed consent, ethics committees and organ transplantation. The Bioethics Collaborative Research Organization was recently set up as an adjunct to the Department of Biomedical Ethics. (<https://bicrou-tokyo.ac.jp/>)

- Study of the functions and responsibilities of ethics committees in Japan
- Study of the methods for the formation of social consensus related to advanced medical technology
- Comparative study of clinical ethics in the Asian region
- Study of ethical aspects in neuroscience researches
- Ethics in Public Health Emergencies
- Psychosocial and ethical aspects of living related organ transplantation



Researchers from all over the world frequently visit our center for joint researches and active discussions.

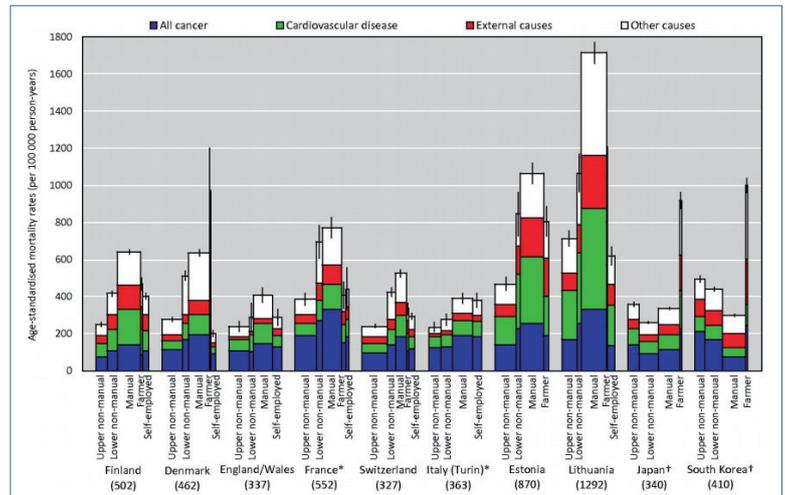
## Health Policy

<https://plaza.umin.ac.jp/publichealth/>

The Department of Health Policy addresses society's current health and healthcare problems. Our research identifies problems through discussions with various stakeholders, including policymakers, clinicians, patients, and community residents. We emphasize both research and practice.

The Department is concurrently operated with the Department of Public Health.

- Quality of health care
- Disease control activities
- Healthcare resource allocation
- Injury prevention



International comparison of age-standardized cause-specific mortality rate by occupational class among men aged 35-64

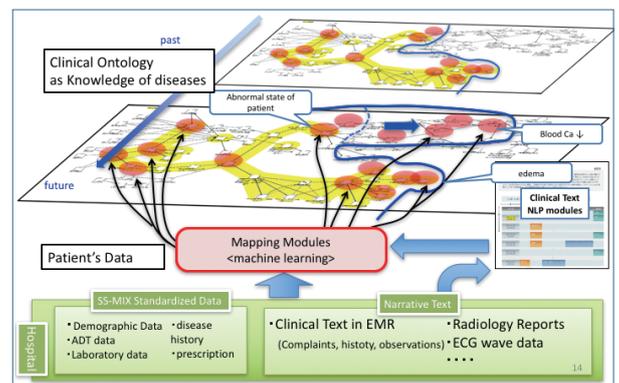
## Healthcare Informatics

<http://www.m.u-tokyo.ac.jp/medinfo/>

The Department of Biomedical Informatics aims to reform medical systems and make social contribution by applying information technology to medical and clinical field including hospital information management. The department develops innovative methods that are applicable to medical information systems in the boundary area of healthcare and information science, establishes infrastructures for information environment, and applies knowledge and technique acquired through these efforts to medical and healthcare field.

The main keywords of the target domain are medical and clinical information systems, next-generation electronic health record systems, virtual health care environment, mobile health, and AI including natural language processing as well as machine learning.

- Development and application of clinical ontology
- Research for sharing healthcare data among medical institutions and hospitals, and the application for clinical epidemiology
- Extraction of medical knowledge from electronic medical record database using natural language processing
- Development of knowledge-driven real time alerting system in clinical practice
- R&D of medical artificial Intelligence and mobile healthcare system



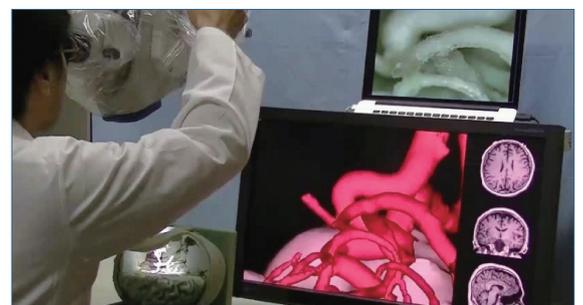
Automatic Mapping from Clinical Case Data to Knowledge of Disease Transition

## Clinical Information Engineering

<http://webpark1893.sakura.ne.jp/wp/researches/>

Clinical Information Engineering focuses on computer applications that address biomedical data (collection, analysis, representation). It is a combination of information science, computer science, and clinical science designed to assist in the management and processing of data, information and knowledge to support the practice and delivery of clinical care and public health.

- ClinVR: Clinical Interactive 3D Computer Graphics & Virtual reality
- PHI: Social information engineering for Public Health (Public Health Informatics: GIS for Health Science etc.)
- Elucidation of the medical effects of virtual experiences on the human body (VR medicine)



## Forensic Medicine and Medical Law

<http://ut-forensic.jp>

We conduct autopsies, and various examinations including histology, biochemistry, radiology, toxicology, and genetics as usual practices. We also perform the following research with other institutes and departments including Education and Research Center of Legal Medicine, Chiba University, and Department of Forensic Medicine, School of Medicine, International University of Health and Welfare.

- Application of imaging modalities such as CT and MRI for death investigation
- Age and stature estimation and sex determination using CT
- Biomechanical properties of human tissue
- Diagnosis of drowning
- Research for infectivity of SARS-CoV-2 in decedents
- Analysis and pathophysiology of illegal drugs including new psychoactive substances
- Application of relatively new DNA testing method for practice of forensic medicine



CT room



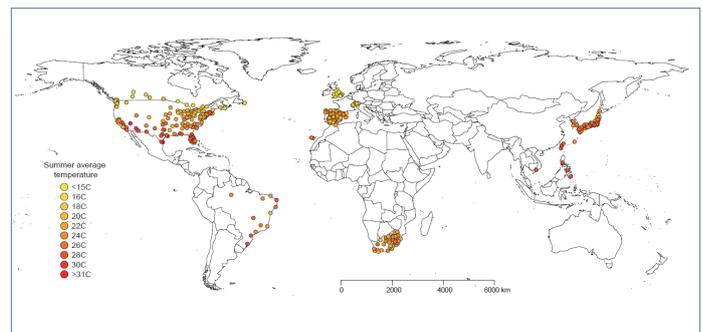
Forensic autopsy room

## Global Environmental Health

<https://sites.google.com/m.u-tokyo.ac.jp/envhealth>

The Department of Global Environmental Health (GEH) aims to study the relationships between the environment and human health and to produce well-educated professionals with the ability to undertake epidemiological research. Our research interest includes climate change and variability, air pollution, and human health across multiple countries in environmental epidemiology. We address the scientific questions about how the environmental stressors are associated with health outcomes and potential socio-economic determinants that modify the exposure-response associations. The GEH provides two courses, 1) Environmental Health and 2) Methods for Environmental Health Research.

- Health risk assessment of climate change and air pollution
- Seasonality of suicide and the short-term associations between suicide and atmospheric environmental factors based on a large-scale database of the multi-city multi-country (MCC) network
- Development of a statistical prediction model for malaria early warning systems in Southern Africa



Geographical distribution of the MCC network for the suicide-temperature association study

## School of Public Health

**Biostatistics** See **Biostatistics / Epidemiology and Preventive Health Sciences**(p44)

**Health Sociology and Health Education** See **Health and Social Behavior**(p52)



## Center for Disease Biology and Integrative Medicine

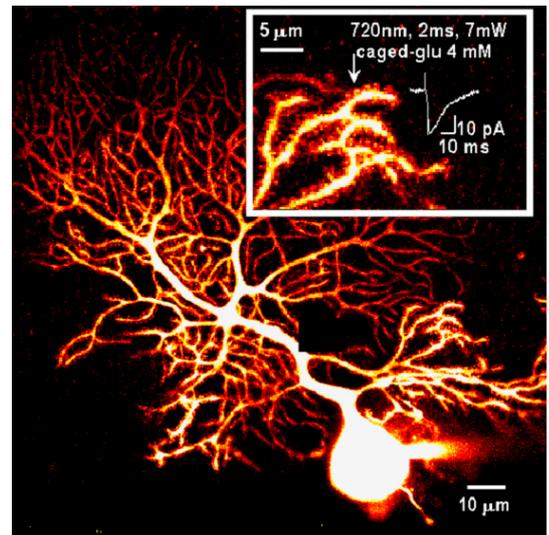
### Structual Physiology

We have been exploring two-photon excitation microscopy, which utilizes an infrared femtosecond-pulsed laser as a light source, to visualize and stimulate intact tissues at the cellular and molecular levels. We focus on the functions and disorders of the brain.

- The dynamics of synapses in the cerebral cortex and striatum, in relation to memory, cognitive processes and mental disorders

*Fine structure and function of a central neuron studied with two-photon excitation imaging and uncaging*

<http://www.bm2.m.u-tokyo.ac.jp/index-e.html>

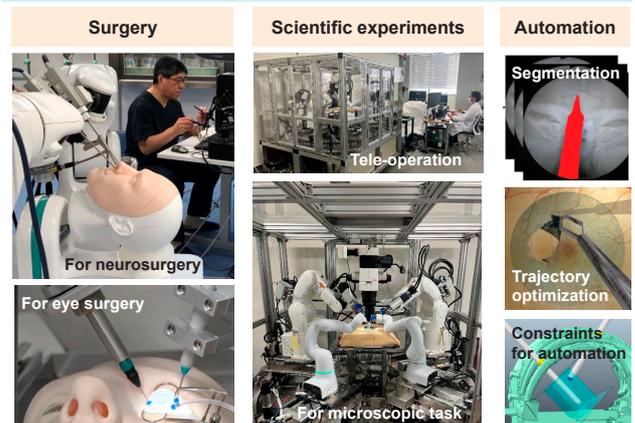


### Biomedical Equipment and Biomaterials

The aim of our research is to contribute to the development of innovative biomedical equipment and biomaterials for clinical applications. Our approach is multidisciplinary, integrating principles from basic and clinical medicine with bioengineering, in particular mechanical engineering. Research efforts are focused on exploring the potential of advanced robotic technologies and VR simulation to aid surgical procedures and scientific experiments, with a particular emphasis on automation capabilities.

<http://www.cdbim.m.u-tokyo.ac.jp/>

#### Robots for biomedical applications (Biomedical Equipment)

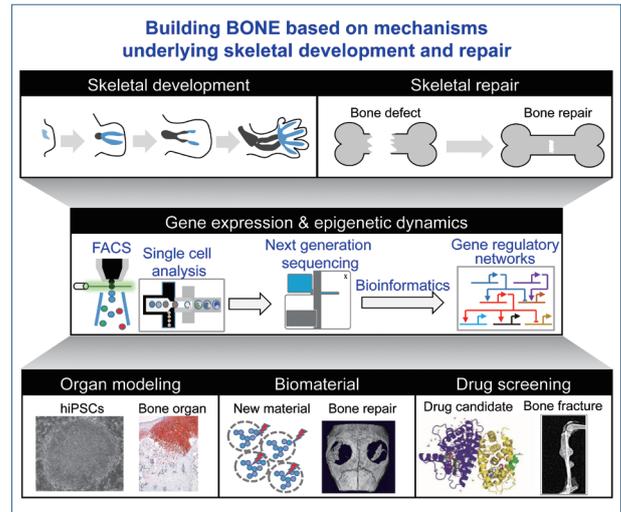


## Clinical Biotechnology

<https://grn.tokyo/med/en/>

Our mission is to establish therapeutic strategies for skeletal disorders based on understanding of mechanisms underlying skeletal development, skeletal metabolism and pathology of skeletal disorders. We explore data-driven studies by omics analysis focusing on epigenome. By integrating with bioengineering, we apply the study for modeling of tissue development, establishment of platform for drug discovery and achievement of regenerative medicine.

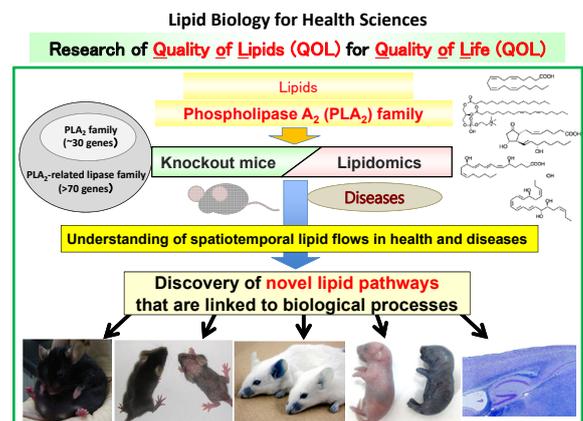
- Identifying dynamics of epigenome and gene regulation in skeletal development and repair by utilizing omics analysis and bioinformatics
- Development of screening tools for identifying mechanisms underlying skeletal development and pathology of skeletal tissues.
- Modeling human skeletal development of disorders by utilizing pluripotent stem cells
- Development of implant devices for tissue regeneration by integrating high-performance biomaterials and signaling molecules stimulating tissue repairing processes.



## Microenvironmental and Metabolic Health Sciences

<https://mmhs.m.u-tokyo.ac.jp>

Lipids serve as the largest energy source, cell membrane components, and bioactive mediators. Lipids are major environmental substances supplied as nutrients and spatiotemporally regulate a variety of biological responses in response to given microenvironmental cues within tissues. Our research focuses on the regulation of biological networks driven by lipids and their metabolites. By taking advantages of an array of gene-manipulated mice for lipid-metabolizing enzymes and receptors, we aim to clarify novel lipid-orchestrated mechanisms underlying various diseases such as metabolic and immune disorders. Knowledge obtained from these approaches will be translated to humans toward discovery of new biomarkers or druggable targets.



## Animal Resources / Research Resources and Support - Animal Research

Our laboratory focuses on understanding the molecular mechanisms which underlie the brain function and cancer metastasis. We also try to establish animal models for human psychiatric disorders by generating KO mice and marmosets. We also manage the animal facilities, provide reproductive technology service, advice on animal experiments, and give lectures on laboratory animals so that animal experiments are carried out in accordance with animal welfare.

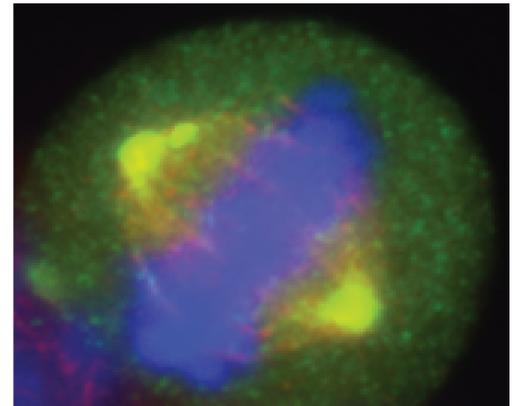
- Molecular analysis of brain function and cancer using genetically modified mice
- Development of new model animals for psychiatric disorders
- Development of gene targeting animals using CRISPR/Cas system



*A mutant mouse lacking metabotropic glutamate receptor subtype-1 (mGluR1)*

We are investigating the molecular mechanisms of DNA double-strand break repair as the scientific basis of radiation therapy and chemotherapy in medical oncology. We also promote the basic research that contributes to the development of a novel therapeutic strategy by examining a link of the DNA metabolic network including DNA replication and cell cycle control with chromosome instability.

- Molecular mechanisms of homologous recombinational repair
- Mechanisms of the choice between homologous recombination and non-homologous end-joining
- Molecular mechanisms of DNA rereplication
- Mechanisms of the genesis of aneuploidy
- Functional analysis of meiotic recombination genes



*Centrosome fragmentation which may lead to aneuploidy*

## Biomedical Informatics

The department conducts researches on the development of medical artificial intelligence systems and their application to clinical practice (i.e., clinical decision support, knowledge discovery from big data, and so on), utilizing the combined approach of medical knowledge representation, logical reasoning, and machine learning techniques. We actively collaborates with the department of Medical informatics, Graduate School of medicine, and the department of Planning, Information and Management in the University of Tokyo Hopital, to conduct those researches using clinical information. Our activities also include the practical management of information infrastructure to support medical researches.

- Development and application of clinical ontology
- Development of clinical decision support systems using logical reasoning and machine learning
- Clinical text analysis and knowledge extraction using natural language processing
- Development of next-generation EHR system



*Computer System for Biomedical Research*



## The International Research Center for Medical Education

### Department of Medical Education Studies

The mission of the Department of Medical Education Studies includes the promotion of medical education not only in the Faculty of Medicine, the University of Tokyo but also in the whole country. This department works on activities of educational practice or improvement and promotes research related to the medical education field. In the university, this department offers educational activities such as clinical clerkship, PBL (problem-based learning), clinical skill practical training, and the conduction of OSCE (objective structured clinical examination). Simulation-based training is also offered at the Clinical Simulation Center, The University of Tokyo Hospital.

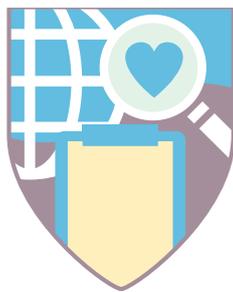


*Clinical Simulation Center*

### International Cooperation for Medical Education

This is a department that disseminates basic theory on medical/ health professions education domestically and internationally, thereby improving health care in a broader sense. In particular, our strengths include learner assessment, program evaluation, clinical reasoning/ clinical decision making, general practice/ family medicine/ primary care, health communication, and patient-health-provider relationship. In addition, we are involved in human resource development in the field of health care and its international cooperation, and support projects related to medical/ health professions education in Japan and overseas.





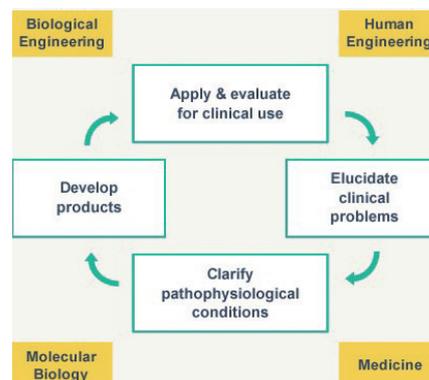
# Global Nursing Research Center

## Division of Care Innovation

<http://gnrc.m.u-tokyo.ac.jp/en/>

With a falling birthrate and a super-aging society, Japan is in need of a paradigm shift that will move it away from a 'medical care that cures' toward a 'Medical and nursing care that supports.' In such a situation, nursing science that plays a key role of 'care' is expected to foster different field interdisciplinary research / educational environment aiming to nurture young nursing researchers who can lead care innovation. In our department, with bio-scientist/engineering researchers and companies, we aim to develop and care products that reduce inconvenience of daily life due to the health impairment of each person, accept young researchers and establish an innovative nursing research fields based on transdisciplinary integration.

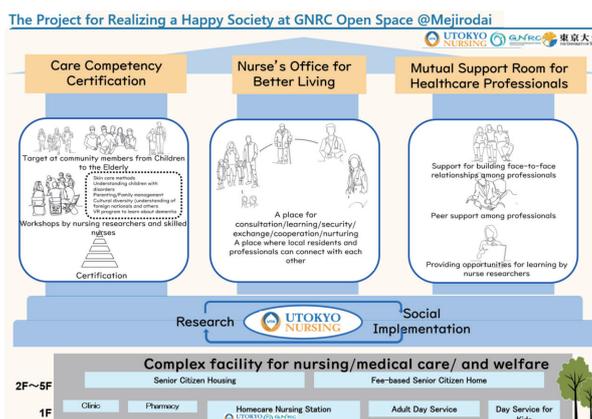
- Data collection and development of AI prediction models for health conditions based on sensor data
- Development of AI-based care recommendation application that visualizes disease states and presents appropriate care methods
- Application of AI/AR to support self-learning of nursing skills
- Development of educational program for visualization techniques using ultrasonography
- Development of AI-based image evaluation support tools
- Creation of animal models of skin diseases and wounds and elucidation of their mechanisms
- Development of non-invasive physical condition assessment methods using skin / wound blotting techniques



## Division of Care Systems

Our goal is to foster research activities that promote person-centered care, tailored to meet the unique needs of individuals and their families, and to develop a community that thrives through nursing practices rooted in culture and society. We aim to create a care system that engages the community and involves collaboration with various specialized fields, such as information technology, policy science, educational psychology, and philosophy.

- Person Centered Care Development
  - Development of care practices with a focus on the well-being of both care providers and care receivers
  - Innovative research with evaluation by care receivers as an outcome
  - Creation of a new continuous quality improvement system
- Community Symbiosis Development
  - Construction of "Dementia Friendly Community"
  - Development and implementation of educational programs to enhance care competency of community individuals
  - Our goal is to create a supportive environment where community members can rely on one another and cultivate strong relationships within the healthcare community
  - Establishment of support systems for health and social care professionals





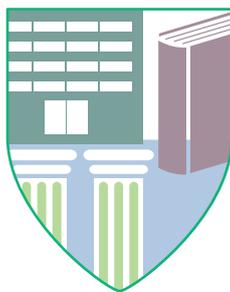
# Center for Diversity in Medical Education and Research

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## Center for Diversity in Medical Education and Research

Patients and people with disabilities are the best designers of health care services. If people with disabilities are able to be providers of medical care based on their own experiences, it will lead to the realization of patient-centered medical care. The Center for Diversity in Medical Education and Research aims to improve the quality of medical services through the dissemination and implementation of team medicine that is inclusive of medical staff with disabilities by integrating medicine, social welfare and disability studies.

- Education
  - Introduction of Diversity Education in the Graduate School of Medicine and the Faculty of Medicine
  - Development of a barrier-free system for faculty of the Graduate School of Medicine, the Faculty of Medicine, and the University of Tokyo Hospital
  - Development of a training system for medical staff with disabilities
  - Improvement of the educational environment for students with disabilities enrolled in the Graduate School of Medicine and the Faculty of Medicine
  - Training of peer support workers
- Research
  - Identification of barriers on the social side by analyzing and creating a database of hospital duties, research activities, and other tasks
  - Reform of technical standards and examination of appropriate reasonable accommodations
  - Examination of the quality of medical care provided by medical personnel with disabilities or with the same attributes
  - Examining the impact of diversity education for medical students and residents on reducing stigma and improving the quality of medical care



## Institution

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### Medical Library

The University of Tokyo Medical Library was opened in 1961 as a model of the Japanese modern medical library. The view makes it a perfect place to concentrate on study.

The library has adopted an open stack system so that users can have direct access to almost all the materials.

- Holdings (as of March 31 2022) :  
Books(number of volumes) : 270,572 (Japanese 113,706 Foreign 156,866)  
Periodicals(number of titles) : 3,547 (Japanese 1,706 Foreign 1,841)
- Visitors (2021): 4,560\*
- Borrowed Books (2021): 12,584

\*To deal with COVID-19, our library had restricted use in 2021.

<https://www.lib.m.u-tokyo.ac.jp>



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### Office of International Academic Affairs

The Office of International Academic Affairs (OIAA) is under the direct authority of the Dean of the Graduate School of Medicine. The Committee on International Academic Affairs defines the most important responsibilities of the OIAA as (1) promoting and facilitating international educational exchange, (2) fostering international exchange among researchers, (3) helping young researchers excel as scientists and educators, and (4) offering classes on medical English to, and developing educational materials for, medical students.

<http://koryu.m.u-tokyo.ac.jp/>

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## Medical Scientist Training Program

<http://www.ut-mdres.umin.jp/>

Medical Scientist Training Program was launched in 2008, aiming medical students have the opportunity to experience basic research in their early years and learn the attitude of a researcher. Students taking this program will attend extracurricular activities such as journal clubs and English courses of Medical Research Communications as well as their own research in labs, retreat and the defense of research honors theses. Students are also expected to build up a network among medical students who intend to be a researcher through the program support, such as the short term stay at labs abroad, participations to the symposium, and the excursion with other universities.



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## Museum of Health and Medicine

<http://mhm.m.u-tokyo.ac.jp/>

Museum of Health and Medicine was planned as part of commemorative projects to celebrate the anniversary of the founding of the Graduate School of Medicine and the University of Tokyo Hospital. Our Museum was opened on Jan. 20th, 2011 and is located in the South Clinical Research Bldg.

The permanent exhibition is a display medical archives and instruments from the early era, such as Ishihara's Color Blind Test Charts and the gastrocamera developed at the University. Special exhibitions is planned to promote understanding among the regarding advances in medical science and health.



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## Office for Human Research Studies

Office for Human Research Studies (OHRS) aims to protect the rights, health, and dignity of research participants. Based on this principle, OHRS supports researchers at the Graduate School of Medicine, the Faculty of Medicine and the University Hospital to perform their studies in an ethical manner. Our primary task is the management of the Ethics Committee secretariats. Additionally, we provide ethics education to researchers through research ethics seminars, ethics consultations through support of overall medical writing, and then externally dispatch information on research ethics.

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## Life Sciences Core Facility

Life Sciences Core Facility provides researchers at the graduate school of medicine and the faculty of medicine access and technical assistance to specialized instruments including mass spectrometers, cell sorters, flow cytometers and a state-of-the-art fluorescent microscope.

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## The Office for Clinical Practice and Medical Education

The Office for Clinical Practice and Medical Education was established in April 2015 to promote medical education, especially clinical training for the 5th- and 6th-year medical students.

We facilitate the clinical clerkship program and establish liaison between students, faculty and other medical institutions, as well as enhance the clerkship curriculum and evaluation methods.

For individual students, we provide extended support by collaborating with the student support office and the educational office of the faculty of medicine.

With the International Research Center for Medical Education and other medical faculties, we also conduct research on medical education, particularly on the relationship between high-stakes examination and important educational outcomes, and the relationship between the scores and daily life.

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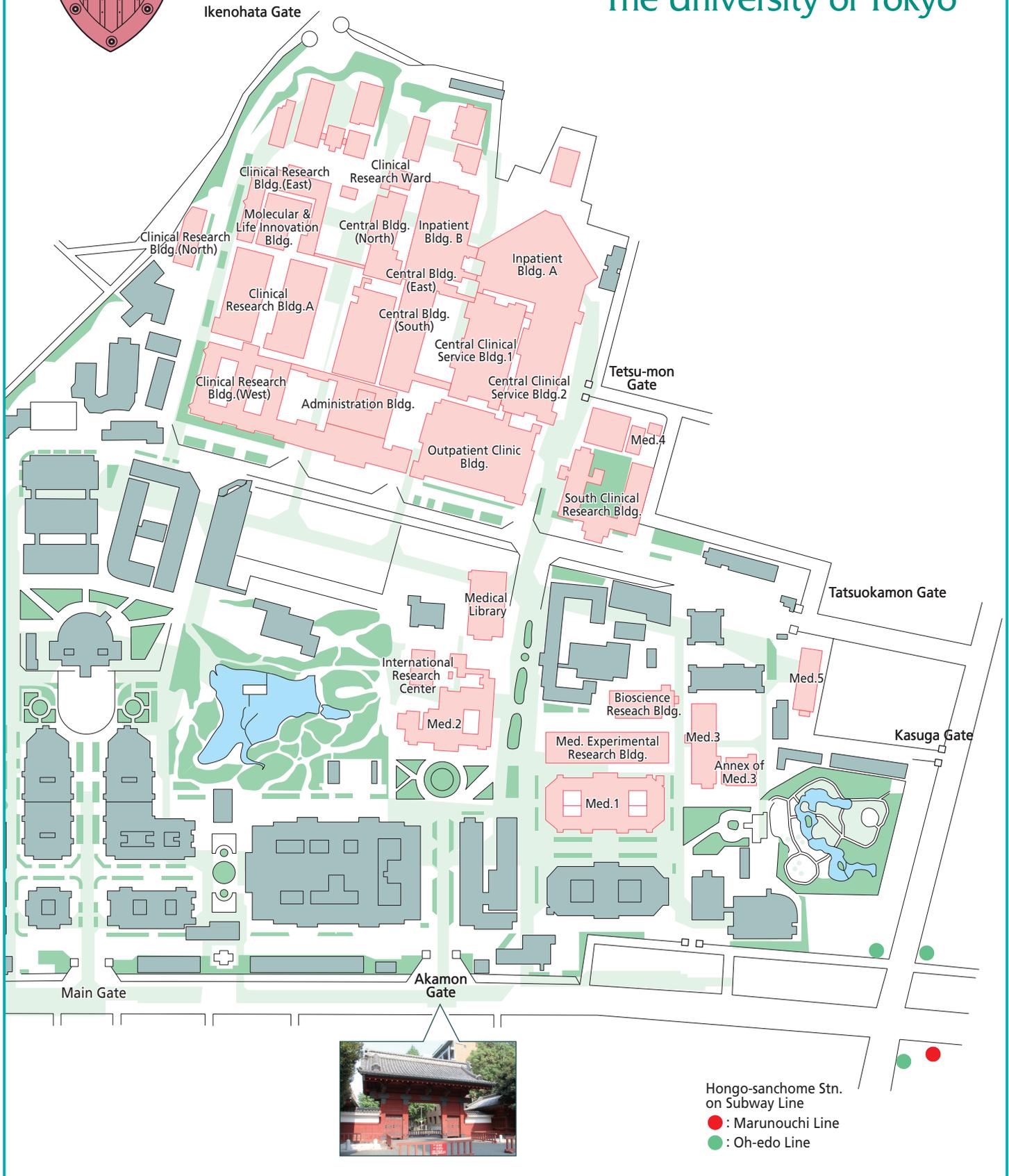
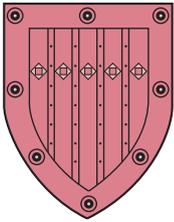
## Advisory Office for Conflict of Interest

Advisory Office for Conflict of Interest implements for medical research (including clinical research) conducted in Graduate School of Medicine, Faculty of Medicine and The University of Tokyo Hospital, as well as for full-time and part-time researchers involved in research. It serves as the secretariat for the conflict of interest committee. It also engages in activities to enhance the risk management and legal management systems both inside and outside the medical school, such as providing consultation on risk management and compliance, responding to inquiries from researchers and related departments inside and outside the medical school, and engaging in activities to improve literacy through training, etc.

Its main duties are as follows:

- Conflict of interest management for medical research involving human subjects (including clinical research)
- Conflict of interest management for medical research for which the MHLW and AMED serve as funding allocation agencies
- Conflict of interest management as a Tokyo University staff member
- Other activities related to risk management and legal affairs, such as responding to consultations from within the university regarding industry-academia collaboration, contracts, university-originated startups, research data utilization, and personnel management.

# Graduate School of Medicine Faculty of Medicine The University of Tokyo



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