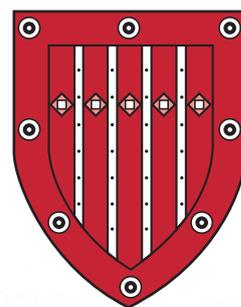
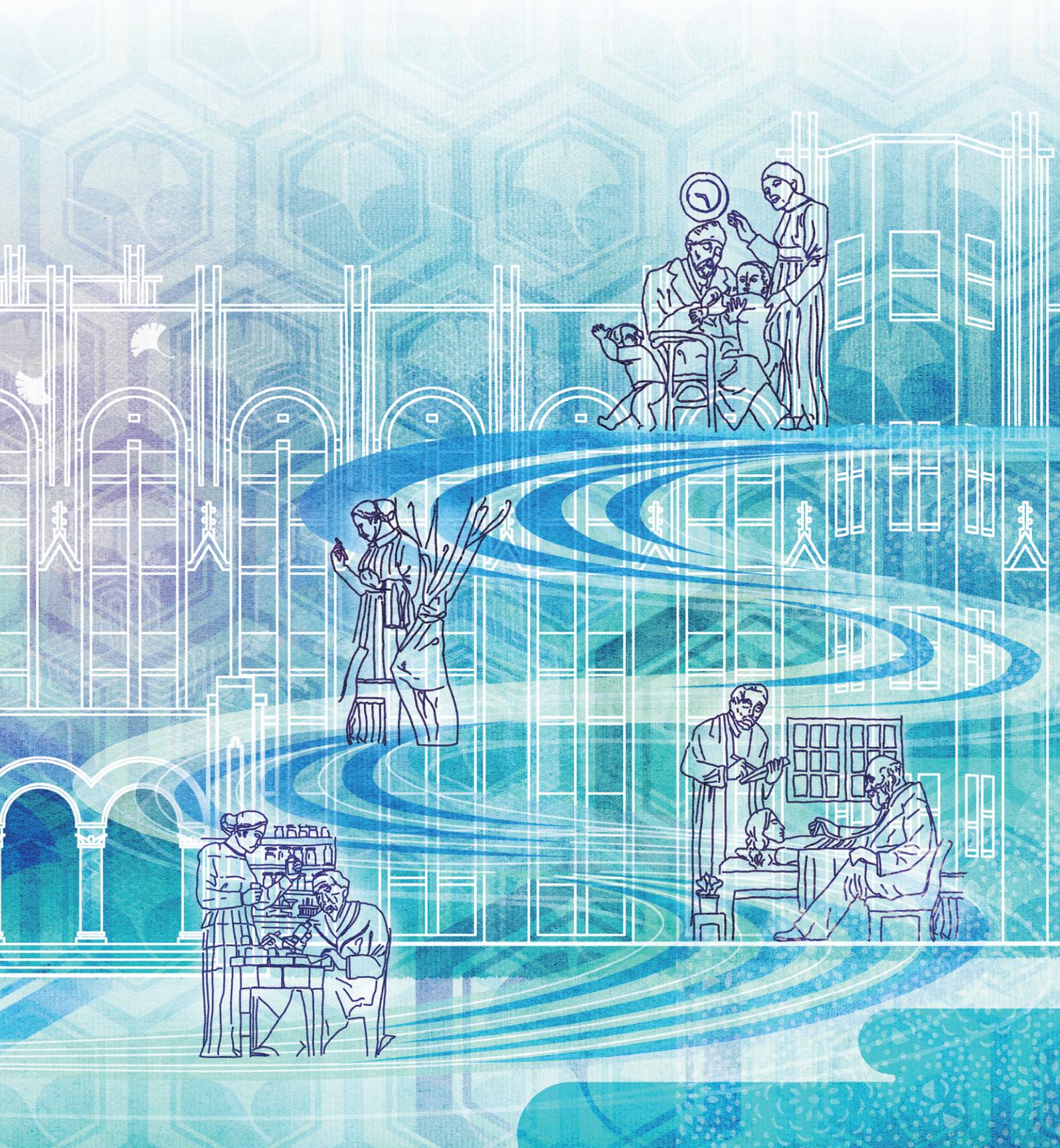


The University of Tokyo
Faculty of Medicine
Graduate School of Medicine



PROSPECTUS 2021-2022





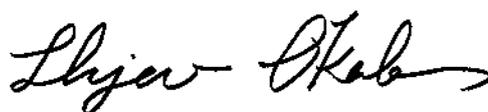
A Message From the Dean of Faculty of Medicine and Graduate School of Medicine, the University of Tokyo

The mission of a medical school is to develop human resources in the life and health sciences and promote outstanding research in those fields. 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 have consistently produced leading medical research that has yielded exciting discoveries in biological phenomena, clarified the mechanisms of disease, and led to new technologies in medical diagnosis and treatment. 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 now open for promoting joint research with other faculties, including the Graduate School of Engineering and Graduate School of Science. Clinical Research Center Building A has been completed and will function as a core clinical research facility. The South Research Building has been renovated and 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 support of the Graduate School of Medicine, the IRCN has initiated research programs that will improve our understanding of the origin of human intelligence. A new cryo-electron microscopy facility has been opened as a shared facility that will allow 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.

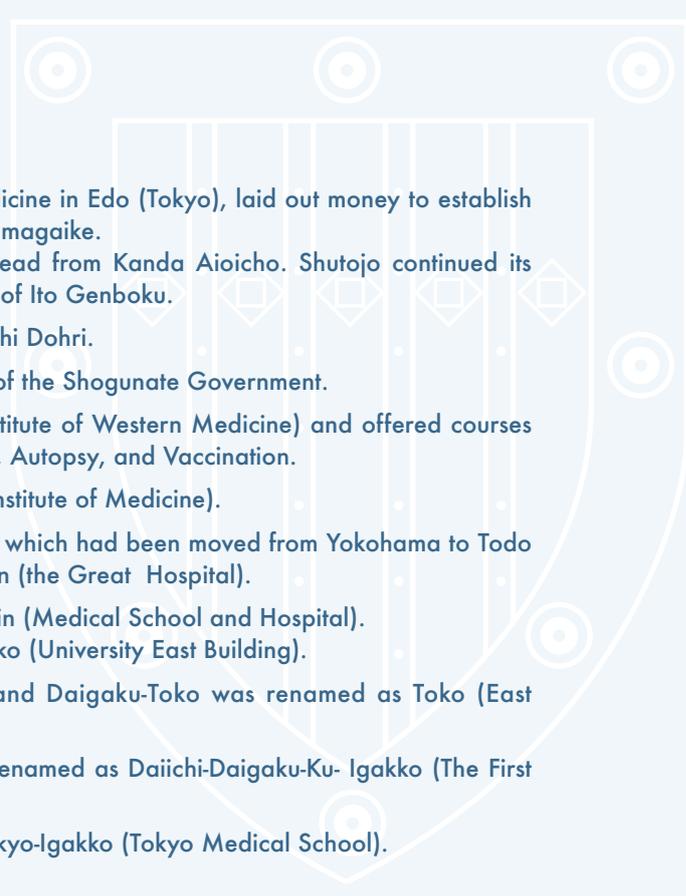
Many principal investigators in the Graduate School are internationally recognized leaders in the life sciences and medicine, and all our laboratories provide young researchers and students with a state-of-the-art research environment. Moreover, we promote an atmosphere of inquiry in which students and 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 bioresources 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.



Shigeo Okabe, 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 Mitamagaiké.
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 Seiyō Igaku-Shō (Institute of Western Medicine) and offered courses of Western Medicine in the fields of Education, Autopsy, and Vaccination.
- 1863 Feb. Seiyō Igaku-Shō was renamed as Igaku-Shō (Institute of Medicine).
- 1868 Jul. Igaku-Shō, affiliated with the Military Hospital which had been moved from Yokohama to Todo residence in Shitaya, was renamed as Daibyōin (the Great Hospital).
- 1869 Feb. The Daibyōin was renamed as Igakko-Ken-Byōin (Medical School and Hospital).
Dec. Igakko-Ken-Byōin 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.
- 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 Shigeo Okabe



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Molecular Cell Biology

Cell Biology and Anatomy

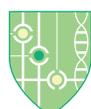
Cell Biology	Professor	Yasushi Okada
Structural Biology	Professor	Masahide Kikkawa
Structural Cell Biology		
Cellular Neurobiology	Professor	Shigeo Okabe

Biochemistry and Molecular Biology

Molecular Biology	Professor	Noboru Mizushima
	Project Associate Professor	Chieko Saito
Cellular Signaling	Professor	Makoto Murakami
Physiological Chemistry and Metabolism	Professor	Hiroki Kurihara
Advanced Structural Biology	Professor	Radostin Danev

*Collaborative Department

Clinical Genome Informatics / Lipid Science



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Functional Biology

Physiology

Integrative Physiology	Professor	Kenichi Ohki
Cellular and Molecular Physiology	Professor	Masanori Matsuzaki
Neurophysiology	Professor	Masanobu Kano

Pharmacology

Cellular and Molecular Pharmacology	Professor	Kenzo Hirose
Systems Pharmacology	Professor	Hiroki Ueda
	Project Associate Professor	Yoichi Minami



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Pathology, Immunology and Microbiology

Pathology

Pathology and Diagnostic Pathology	Professor	Tetsuo Ushiku
Molecular Pathology	Professor	Kohei Miyazono
	Associate Professor	Daizo Koinuma

Microbiology

Microbiology	Professor	Masanori Hatakeyama
Infection Control and Prevention	Professor	Kyoji Moriya

Immunology

Immunology	Professor	Hiroshi Takayanagi
	Associate Professor	Takeshi Nitta

*Collaborative Department

Tumor Pathology / Infection Pathology / Molecular Oncology



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Radiology and Biomedical Engineering

Radiology

Diagnostic Radiology	Professor	Osamu Abe
	Associate Professor	Takeyuki Watadani
Radiotherapy	Associate Professor	Hideomi Yamashita
Nuclear Medicine	Associate Professor	Hidemasa Takao

Biomedical Engineering

System Physiology	Professor	Kiyoshi Miyagawa
	Associate Professor	Kimiko Yamamoto
Chemical Biology and Molecular Imaging	Professor	Yasuteru Urano
	Associate Professor	Mako Kamiya
Biosystem Construction and Control		
Integrative Genomics	Professor	Katsutoshi Oda
	Associate Professor	Aya Ushiku



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Neuroscience

Basic Neuroscience

Neuropathology	Professor	Takeshi Iwatsubo
Neurochemistry	Professor	Haruhiko Bito
Neurobiology		

Integrative Medical Neuroscience

Developmental Neuroscience		
Cognitive Neuroscience		
Systems Medical Neuroscience		
Child Neuropsychiatry	Associate Professor	Yukiko Kano

Clinical Neuroscience	Neuropsychiatry	Professor	Kiyoto Kasai
		Associate Professor	Seiichi Jinde
	Neurology	Professor	Tatsushi Toda
		Associate Professor	Wataru Satake
	Neurosurgery	Professor	Nobuhito Saito
*Collaborative Department	Biomedical Neural Dynamics		



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Social Medicine			
Occupational, Environmental and Preventive Medicine	Preventive Medicine	Professor	Shumpei Ishikawa
		Associate Professor	Hiroto Katoh
	Public Health	Professor	Yasuki Kobayashi
		Associate Professor	Satoshi Toyokawa
Forensic Medicine, and Medical Informatics and Economics	Forensic Medicine	Professor	Hirotarō Iwase
		Associate Professor	Yohsuke Makino
	Biomedical Informatics	Professor	Kazuhiko Ohe
		Associate Professor	Kayo Waki
*Collaborative Department	Cancer Health Services Research		



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Internal Medicine			
Medicine I	Cardiovascular Medicine	Professor	Issei Komuro
	Respiratory Medicine	Professor	Takahide Nagase
	Gastroenterology		
	Nephrology	Professor	Masaomi Nangaku
		Associate Professor	Tetsuhiro Tanaka
Medicine II	Endocrinology	Professor	Masaomi Nangaku
		Associate Professor	Noriko Makita
	Nutrition and Metabolism	Professor	Toshimasa Yamauchi
		Associate Professor	Hironori Waki
	Hematology and Oncology	Professor	Mineo Kurokawa
	Allergy and Rheumatology	Professor	Keishi Fujio
	Infectious Diseases	Professor	Kyoji Moriya
		Associate Professor	Syu Okugawa
	Stress Science and Psychosomatic Medicine	Associate Professor	Kazuhiro Yoshiuchi
Clinical Laboratory Medicine and Pathology	Clinical Laboratory Medicine	Professor	Yutaka Yatomi
		Associate Professor	Makoto Kurano
	Transfusion Medicine	Professor	Hitoshi Okazaki
*Collaborative Department	Molecular Diabetology		



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Reproductive, Development and Aging Sciences			
Obstetrics and Gynecology	Reproductive Endocrinology	Associate Professor	Takeshi Nagamatsu
	Gynecological Oncology	Associate Professor	Yasushi Hirota
	Perinatal Medicine	Associate Professor	Kaori Koga
	Molecular Cellular Reproductive Medicine	Professor	Yutaka Osuga
		Associate Professor	Osamu Hiraike
Pediatric Sciences	Pediatrics	Professor	Motohiro Kato
		Associate Professor	Yutaka Harita
	Developmental Pediatrics		
	Pediatric Surgery	Professor	Jun Fujishiro
	Pediatric Oncology		
Aging Sciences	Geriatric Medicine	Professor	Masahiro Akishita
		Associate Professor	Sumito Ogawa
	Aging Research	Professor	Masahiro Akishita
*Collaborative Department	Health Policy for Children and Families		



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Surgical Sciences

Surgery

Thoracic Surgery	Professor	Jun Nakajima
Cardiovascular Surgery	Professor	Minoru Ono
	Associate Professor	Yasutaka Hirata
Gastrointestinal Surgery	Professor	Yasuyuki Seto
	Associate Professor	Sachiyo Nomura
Hepatobiliary Pancreatic Surgery	Professor	Kiyoshi Hasegawa
	Associate Professor	Junichi Arita
Urology	Professor	Haruki Kume
Artificial Organ and Transplantation Division		
Surgical Oncology	Professor	Soichiro Ishihara
	Associate Professor	Hiroaki Nozawa
	Associate Professor	Kazushige Kawai
Vascular Surgery	Professor	Soichiro Ishihara
	Associate Professor	Katsuyuki Hoshina
Breast and Endocrine Surgery	Associate Professor	Masahiko Tanabe
Dermatology	Professor	Shinichi Sato
	Associate Professor	Yoshihide Asano
Plastic and Reconstructive Surgery	Professor	Mutsumi Okazaki
	Associate Professor	Takuya Iida
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	Satoshi Kato
	Associate Professor	Megumi Honjo
Otolaryngology and Head and Neck Surgery	Professor	Tatsuya Yamasoba
	Associate Professor	Kenji Kondo
Rehabilitation Medicine		
Anesthesiology	Professor	Kanji Uchida
Acute Medicine	Associate Professor	Kent Doi

Sensory and Motor System Medicine

Vital Care Medicine



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Health Sciences and Nursing

Health Sciences

Health Sociology		
Mental Health	Professor	Norito Kawakami
	Associate Professor	Daisuke Nishi
Epidemiology and Preventive Health	Professor	Yutaka Matsuyama
	Associate Professor	Koji Oba
Biostatistics	Professor	Yutaka Matsuyama
	Associate Professor	Koji Oba
Health Education		
Health Promotion Sciences		
Biomedical Ethics	Professor	Akira Akabayashi
	Associate Professor	Yoshiyuki Takimoto
Advanced Clinical Nursing	Associate Professor	Yukie Takemura
Nursing Administration	Associate Professor	Yukie Takemura
Family Nursing		
Community Health Nursing	Professor	Noriko Yamamoto-Mitani
Public Health Nursing		

Preventive and Administrative Nursing

Clinical 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	Norito Kawakami
		Associate Professor	Yuki Miyamoto
	Gerontological Nursing	Professor	Hiromi Sanada
Associate Professor		Gojiro Nakagami	
	Wound Care Management	Professor	Hiromi Sanada
*Collaborative Department	Public Mental Health Policy		



International Health

International Social Medicine	Global Health Policy	Professor	Masahiro Hashizume
	Community and Global Health	Professor	Masamine Jimba
International Biomedical Sciences	Human Genetics	Professor	Akihiro Fujimoto
	Developmental Medical Sciences	Associate Professor	Teruyuki Tanaka
	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

Epidemiology and Health Sciences	Biostatistics	Professor	Yutaka Matsuyama
	Social and Preventive Epidemiology	Professor	Satoshi Sasaki
	Clonical Epidemiology and Health Economics	Professor	Hideo Yasunaga
	Health Communication	Professor	Takahiro Kiuchi
Associate Professor		Tsuyoshi Okuhara	
Behavioral Health Sciences	Mental Health	Professor	Norito Kawakami
		Associate Professor	Daisuke Nishi
	Health Sociology and Health Education		
	Health and Social Behavior	Professor	Hideki Hashimoto
	Health Promotion Sciences		
Health Services Sciences	Health Policy	Professor	Yasuki Kobayashi
		Associate Professor	Satoshi Toyokawa
	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	Yoonhee Kim
*Collaborative Department	Public Health Science		

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Center for Disease Biology and Integrative Medicine

Director Masanobu Kano

Laboratory of Molecular Biomedicine for Pathogenesis	Professor	Toru Miyazaki
	Associate Professor	Satoko Arai
Laboratory of Structural Physiology	Professor	Haruo Kasai
Laboratory of Biomedical Equipment and Biomaterial	Professor	Taichi Ito
	Associate Professor	Kanako Harada
Laboratory of Clinical Biotechnology	Associate Professor	Hironori Hojo
Laboratory of Environmental and Metabolic Health Sciences	Professor	Makoto Murakami
	Associate Professor	Seiichiroh Ohsako
Laboratory of Animal Resources	Professor	Atsu Aiba
	Associate Professor	Hidetoshi Kassai
Laboratory of Molecular Radiology	Professor	Kiyoshi Miyagawa
	Associate Professor	Noriko Hosoya
Biomedical Infomatics	Associate Professor	Takeshi Imai

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The International Research Center for Medical Education Director Tatsuya Yamasoba

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



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Global Nursing Research Center Director Hiromi Sanada

Division of Care Innovation	Professor	Hiromi Sanada
	Associate Professor	Gojiro Nakagami
	Project Associate Professor	Takeo Minematsu
	Project Associate Professor	Nao Tamai
	Project Associate Professor	Ryoko Murayama
Division of Nursing System	Professor	Noriko Yamamoto-Mitani
	Professor	Megumi Haruna
	Associate Professor	Yukie Takemura
	Associate Professor	Yuki Miyamoto
	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

The Office of International Academic Affairs	Head	Shinichi Sato
Medical Scientist Training Program	Head	Kenzo Hirose
Office for Research Ethics Support	Director	Masaomi Nangaku
Life Sciences Core Facility	Head	Yoshihiro Kita
The Office for Clinical Practice and Medical Education	Head	Masato Eto
Medical Library	Head	Hideo Yasunaga
Museum of Health and Medicine	Head	Kazuhiko Ohe

Endowed Department

Department of Bone & Cartilage Regenerative Medicine	Project Associate Professor	Fumiko Yano
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	Naoto Hayashi
	Project Associate Professor	Takeharu Yoshikawa
Clinical Trial Data Management		
Ubiquitous Preventive Medicine	Project Associate Professor	Yuichi Ikeda
Science for Joint reconstruction	Project Professor	Toru Moro
Department of Therapeutic Strategy for Heart Failure	Project Associate Professor	Masaru Hatano
Department of Molecular Structure and Dynamics		
Department of Advanced Translational Research and Medicine in Management of Pulmonary Hypertension	Project Associate Professor	Haruhiro Toko
Department of medical research and management for musculoskeletal pain	Project Professor	Ko Matsudaira
	Project Associate Professor	Hiroyuki Oka
Department of Osteoimmunology	Project Associate Professor	Kazuo Okamoto
Health Economy and Society Policy	Project Professor	Tomoyuki Takura
Department of medical and pharmaceutical community healthcare	Project Professor	Hirohisa Imai
Department of Molecular Neurology	Project Professor	Shoji Tsuji
	Project Associate Professor	Jun Mitsui
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 Associate Professor	Takashi Yamanaka
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

Social Cooperation Program

Department of Lipidomics	Project Professor	Yoshiya Oda
Advanced Nursing Technology	Project Associate Professor	Ryoko Murayama
Department of Health Services Research	Project Associate Professor	Taisuke Jo
Skincare Science	Project Associate Professor	Takeo Minematsu
Department of Healthcare Quality Assessment	Project Professor	Hiroaki Miyata
	Project Associate Professor	Hiraku Kumamaru
Imaging Nursing Science	Project Associate Professor	Nao Tamai
Department of Innovative Dementia Prevention	Project Associate Professor	Tadafumi Hashimoto
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 Next Generation Locomotive Imaging System	Project Associate Professor	Yuki Taniguchi
Department of Preventive Medicine for Locomotive Organ	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

Faculty of Medicine

Dean **Shigeo Okabe**

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



Clinical Division

Department of Internal Medicine

General Medicine	Professor	Masahiro Akishita
Cardiovascular Medicine	Professor	Issei Komuro
Respiratory Medicine	Professor	Takahide Nagase
Gastroenterology		
Nephrology and Endocrinology	Professor	Masaomi Nangaku
	Associate Professor	Tetsuhiro Tanaka
	Associate Professor	Noriko Makita
Diabetes and Metabolic Diseases	Professor	Toshimasa Yamauchi
	Associate Professor	Hironori Waki
Hematology and Oncology	Professor	Mineo Kurokawa
Allergy and Rheumatology	Professor	Keishi Fujio
Infectious Diseases	Professor	Kyoji Moriya
	Associate Professor	Syu 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	Hiroaki Nozawa
	Associate Professor	Kazushige Kawai
Hepatobiliary Pancreatic Surgery	Professor	Kiyoshi Hasegawa
	Associate Professor	Junichi Arita
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	Junichi Arita
Cardiovascular Surgery	Professor	Minoru Ono
	Associate Professor	Yasutaka Hirata
Thoracic Surgery	Professor	Jun Nakajima
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	Yasushi Hirota

Department of Sensory and Motor System Medicine

Dermatology	Professor	Shinichi Sato
	Associate Professor	Yoshihide Asano
Ophthalmology	Professor	Makoto Aihara
	Associate Professor	Satoshi Kato
	Associate Professor	Megumi Honjo
Orthopaedic Surgery and Spinal Surgery	Professor	Sakae Tanaka
	Associate Professor	Taku Saito
	Associate Professor	Yasushi Oshima
Otolaryngology and Head and Neck Surgery	Professor	Tatsuya Yamasoba
	Associate Professor	Kenji Kondo
Rehabilitation Medicine	Associate Professor	Toru Ogata
Plastic, Reconstructive and Aesthetic Surgery	Professor	Mutsumi Okazaki
	Associate Professor	Takuya Iida
Oral-Maxillofacial Surgery and Orthodontics	Professor	Kazuto Hoshi
	Associate Professor	Hideto Saijo

Department of Pediatrics, Perinatal and Women's Medicine	Pediatrics	Professor	Motohiro Kato
		Associate Professor	Yutaka Harita
	Pediatric Surgery	Professor	Jun Fujishiro
	Obstetrics and Gynecology	Professor	Yutaka Osuga
		Associate Professor	Kaori Koga
		Associate Professor	Takeshi Nagamatsu
Associate Professor		Osamu Hiraike	
Department of Neuropsychiatry	Neuropsychiatry	Professor	Kiyoto Kasai
		Associate Professor	Seiichiro Jinde
		Associate Professor	Shuntaro Ando
Department of Radiology	Radiology	Professor	Osamu Abe
		Associate Professor	Hideomi Yamashita
		Associate Professor	Hidemasa Takao
		Associate Professor	Takeyuki Watadani
Acute Medicine	Acute Medicine	Associate Professor	Kent Doi

Central Clinical Facilities

Pharmaceutical Department	Professor	Hiroshi Suzuki
Nursing Department		
Administration Department		
Legal and Compliance Office	Professor	Sakae Tanaka
Department of Clinical Laboratory	Professor	Yutaka Yatomi
Surgical Center	Professor	Kazuhiko Fukatsu
Radiology Center	Professor	Osamu Abe
Department of Blood Transfusion	Professor	Hitoshi Okazaki
Perinatal Center	Professor	Yutaka Osuga
	Associate Professor	Miyuki Harada
Rehabilitation Center	Associate Professor	Toru Ogata
Department of Medical Engineering	Associate Professor	Kent Doi
Central Supply Service	Professor	Kazuhiko Fukatsu
Intensive Care Unit	Associate Professor	Kent Doi
Pathology	Professor	Tetsuo Ushiku
Department of Corneal Transplantation	Professor	Makoto Aihara
Department of Cell Therapy and Transplantation Medicine	Professor	Mineo Kurokawa
Department of Endoscopy and Endoscopic Surgery	Associate Professor	Yosuke Nakai
Department of Hemodialysis and Apheresis	Professor	Masaomi Nangaku
Infection Control and Prevention Service	Professor	Kyoji Moriya
Department of Healthcare Information Management	Professor	Kazuhiko Ohe
University Hospital Medical Information Network Center	Professor	Takahiro Kiuchi
	Associate Professor	Tsuyoshi Okuhara
Organ Transplantation Center	Professor	Jun Nakajima
	Associate Professor	Masaaki Sato
Labor Safety and Health Management Office	Associate Professor	Tomotaka Yamamoto
Staff Wellness Consulting Room	Professor	Kiyoto Kasai
Child Psychiatry	Associate Professor	Yukiko Kano
Tissue Bank	Associate Professor	Sumihito Tamura
Center for Epidemiology and Preventive Medicine	Associate Professor	Nobutake Yamamichi
Center for International Preventive Medicine		
Center for Liaison and Public Relations	Professor	Yutaka Osuga
Datebase Center of the National University Hospitals		
Department of Chemotherapy	Professor	Kiyoshi Miyagawa
	Associate Professor	Hironori Ishigami
Department of Medical Record Management	Professor	Kazuhiko Ohe
Critical Care and Emergency Medical Center/Emergency Room	Associate Professor	Kent Doi
Department of Pain and Palliative Medicine	Associate Professor	Masahiko Sumitani
Children's Medical Center	Professor	Motohiro Kato
Department of Disaster Medical Management	Associate Professor	Kent Doi
International Medical Center	Associate Professor	Sumihito Tamura

Clinical Nutrition Center	Professor	Kazuhiko Fukatsu
	Associate Professor	Naoto Kubota
Department of Pediatric and Neonatal Intensive Care	Professor	Naoto Takahashi
Department of Clinical Genomics	Professor	Katsutoshi Oda
BioResource Center	Professor	Tetsuo Ushiku

Clinical Research Division

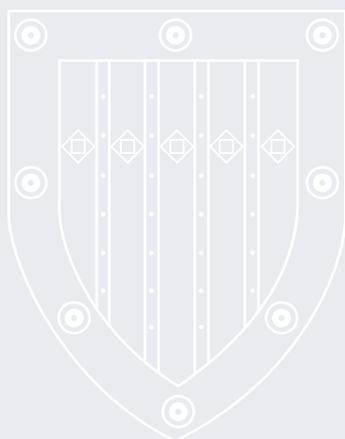
Clinical Research Promotion Center	Professor	Takashi Moritoyo
	Associate Professor	Tatsuya Maruyama
22nd Century Medical and Research Center	Professor	Yutaka Osuga
Department of Tissue Engineering	Professor	Kazuto Hoshi
Cooperative Unit of Medicine and Engineering Research	Professor	Minoru Ono
Translational Research Center	Professor	Issei Komuro
Genomic Research Support Center	Professor	Yutaka Osuga
Unit for Early and Exploratory Clinical Development	Professor	Takeshi Iwatsubo

Organization of Clinical Management Support

Department of Personnel Administration and Human Resource Management	Professor	Yutaka Yatomi
Medical Specialists Training Center		
Medical Support Center	Professor	Sakae Tanaka
Department of Performance Monitoring and Risk Management	Professor	Sakae Tanaka
Office of Performance Monitoring	Associate Professor	Tomotaka Yamamoto
Medical Safety Management Center	Associate Professor	Tomotaka Yamamoto
Infection Control Center	Professor	Kyoji Moriya
Department of Highly Advanced Novel Medical Technologies Evaluation	Professor	Jun Nakajima
Department of Unapproved New Drugs and Medical Devices Evaluation	Professor	Kanji Uchida
Department of Education and Staff Development	Professor	Tatsuya Yamasoba
General Education Center	Professor	Masato Eto
Hospitality Center		
Department of Hospital Planning and Management	Professor	Jun Nakajima
Department of Research Support	Professor	Yutaka Osuga
Department of Clinical Research Governance	Project Professor	Junji Moriya

Organization of Clinical Management

Inpatient Services Administration	Professor	Haruki Kume
Admission and Discharge Center		
Cancer Board	Professor	Kiyoshi Miyagawa
Outpatient Services Administration	Professor	Kiyoshi Miyagawa
Central Clinical Services Administration	Associate Professor	Masahiko Sumitani
Advanced Medical Center for Heart Failure	Project Associate Professor	Masaru Hatano
Vascular Board	Associate Professor	Katsuyuk Hoshina
Perioperative Assessment Center	Professor	Kanji Uchida
Swallowing Center	Associate Professor	Rumi Ueha
Epilepsy Center		
Immune-Mediated Diseases Therapy Center	Associate Professor	Hiroko Kanda
SSc Center	Associate Professor	Yoshihide Asano
Osteoporosis Center	Associate Professor	Taku Saito
Center for Female Pelvic Medicine and Reconstructive Surgery	Professor	Yutaka Osuga
Spine Center	Associate Professor	Yasushi Oshima
Hip Fracture Board		
Palliative Care Consultation Team	Associate Professor	Masahiko Sumitani
Nutrition Support Team	Professor	Kazuhiko Fukatsu
Division of patient support	Professor	Yutaka Osuga
Division of patient support services		
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



Faculty of Medicine Graduate School of Medicine The University of Tokyo

Graduate School of Medicine

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 Medical Scientist Training Program
 Office for Human Research Studies
 Life Sciences Core Facility
 The Office for Clinical Practice and Medical Education
 Medical Library
 Museum of Health and Medicine

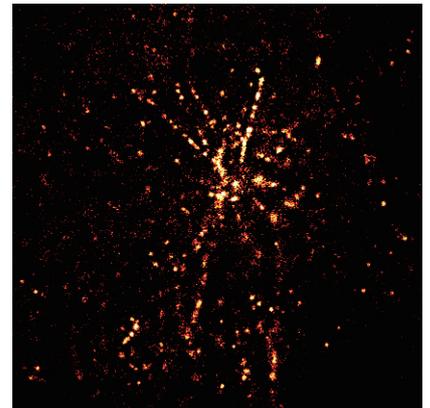


Molecular Cell Biology

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 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

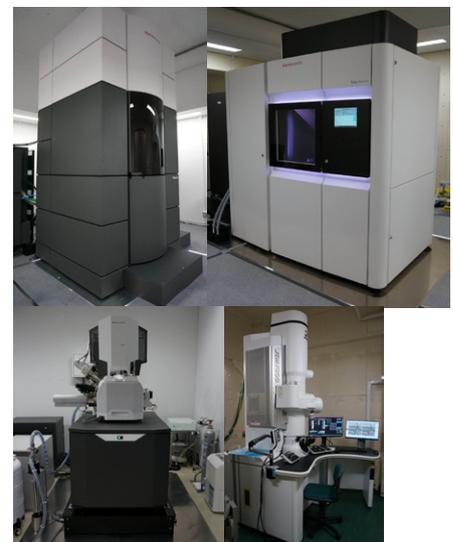
Kikkawa lab is interested in eukaryotic flagella/cilia, which works as a propeller and a sensor of cells. We study regulatory mechanisms of flagella/cilia beating by combining cryo-electron microscopy, optical microscopy with high-speed camera, cell biology, and genetics. We also provide cryo-electron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

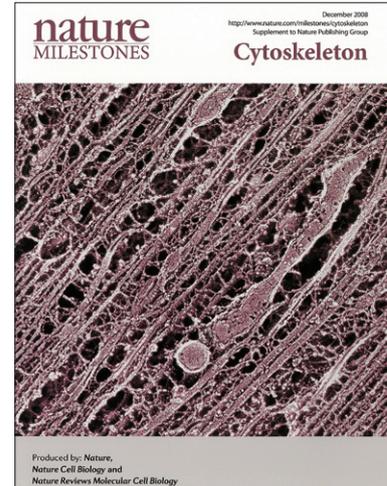
<http://structure.m.u-tokyo.ac.jp/>



Structural Cell Biology

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

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.

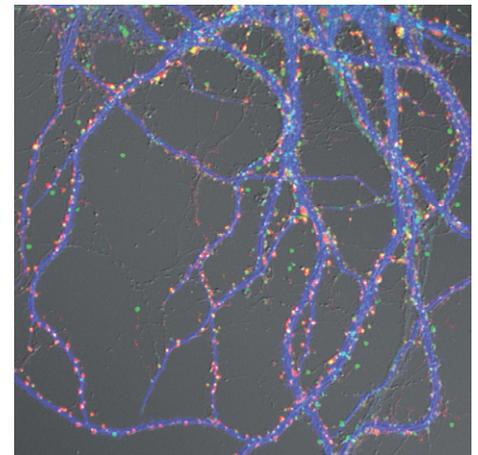


The neuronal cytoskeleton and its associated organelles
(From Nature Milestones 2008)

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



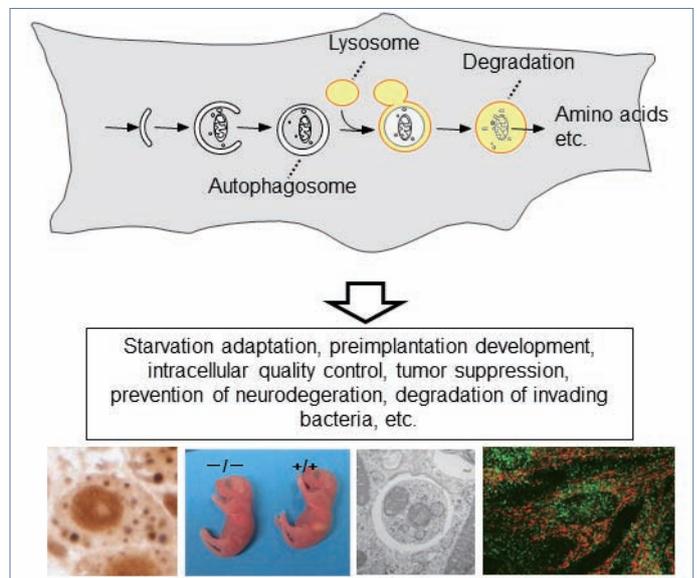
Quantitative fluorescence imaging of cultured hippocampal neurons (green: postsynaptic protein and calibrated fluorescent microspheres, red: presynaptic protein, blue: microtubule-associated protein)

Molecular Biology

<https://molbiol.t.u-tokyo.ac.jp/en/>

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.

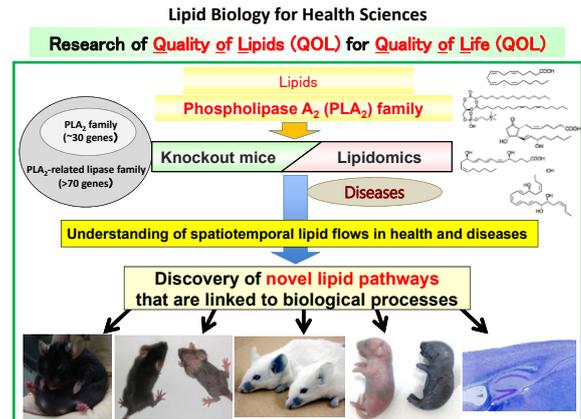
- Molecular mechanism of autophagy (membrane dynamism, lysosomal degradation, selectivity, etc.)
- Physiological and pathophysiological roles of autophagy
- Development of new methods for monitoring and modulating autophagy
- Autophagy-independent mechanisms of intracellular degradation



Cellular Signaling

<https://lmmhs.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.

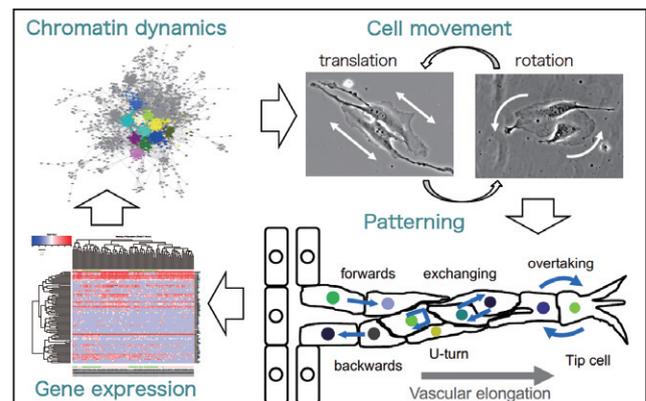


Physiological Chemistry and Metabolism

<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

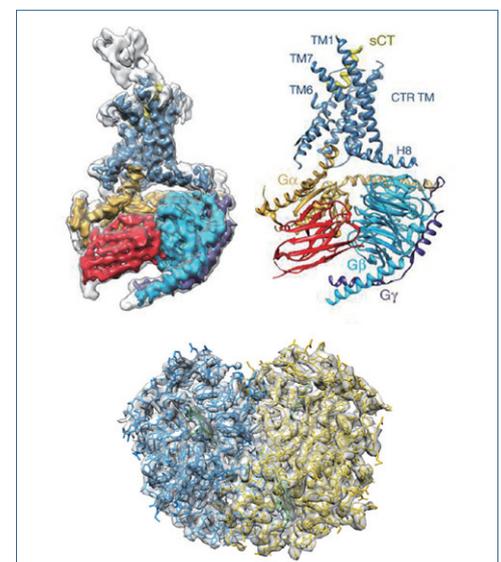


Understanding morphogenesis and organogenesis based on collective cell movement

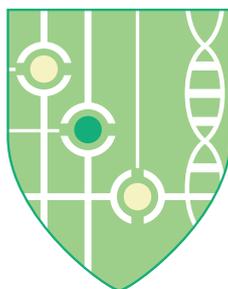
Advanced Structural Biology

<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

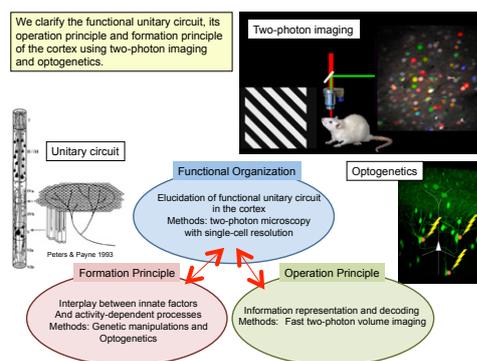


Functional Biology

Integrative Physiology

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

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 nerve cells 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.



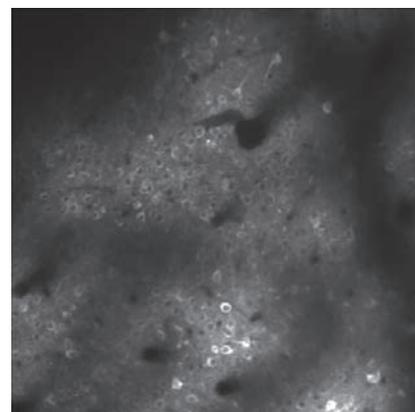
- Functional organization in the visual cortex
- Development of neural circuits in the visual cortex
- Information representation in the visual cortex
- Roles of each cell-type in the processing of visual information

Cellular and Molecular Physiology

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

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.



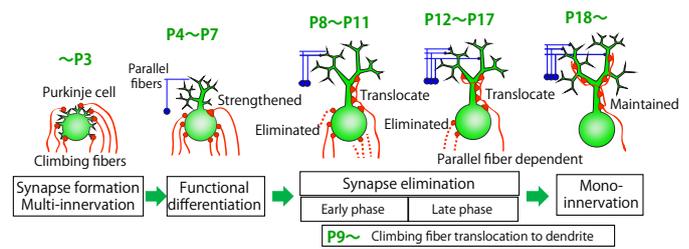
Two-photon image of the mouse motor cortical neurons

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

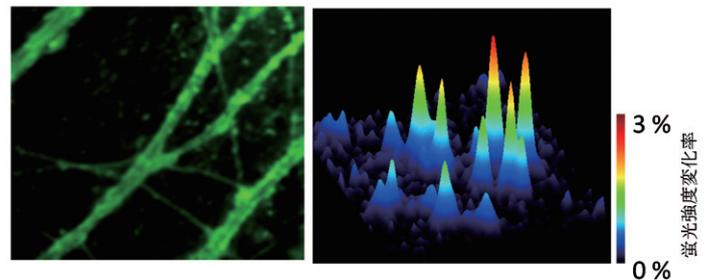


Postnatal development of cerebellar climbing fiber to Purkinje cell synapses

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.

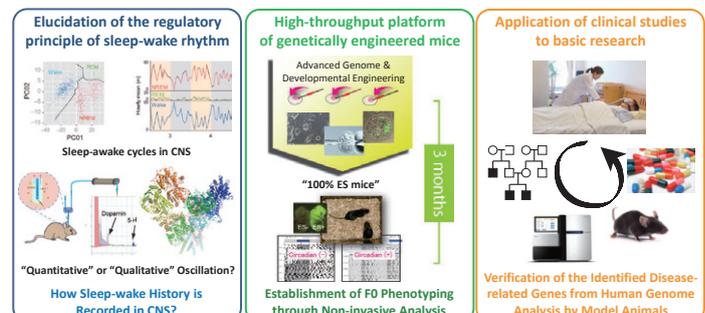


Systems Pharmacology

We are aiming at understanding of how multi-stability and homeo-dynamics in sleep-wake systems, as a model system, can be achieved through negative feedback regulation of membrane potential in neurons, 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 clinical studies.

- Elucidation of the regulatory principle of sleep-wake rhythm
- High-throughput production platform of genetically engineered mice
- Application of human genome analysis from clinical 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.

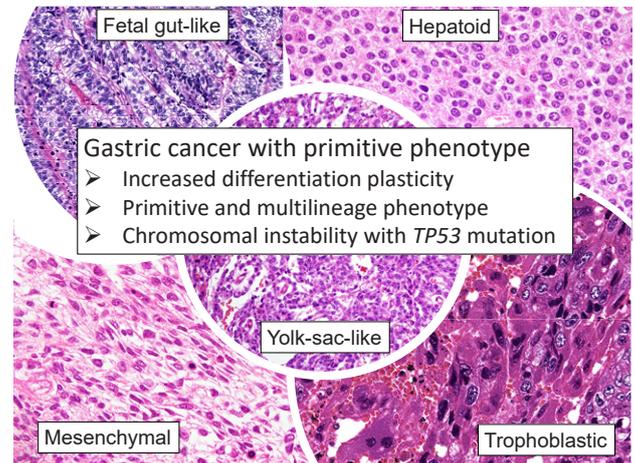


Pathology, Immunology and Microbiology

Pathology and Diagnostic Pathology

http://pathol.umin.ac.jp/index_e.htm

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.

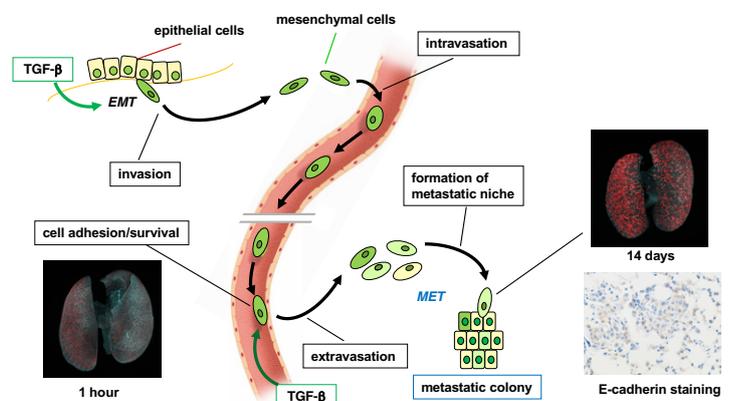


- Pathology Research
 - Gastrointestinal cancers and others
 - Primitive phenotypic transformation of cancer cell
 - Inflammatory conditions of gastrointestinal tract
 - Neurodegenerative diseases
 - Others
- Next generation Diagnostic Pathology
 - Application of machine learning technology
 - Cancer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

Molecular Pathology

<http://beta-lab.umin.ac.jp/index.htm>

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



Multiple functions of TGF- β on metastatic colony formation

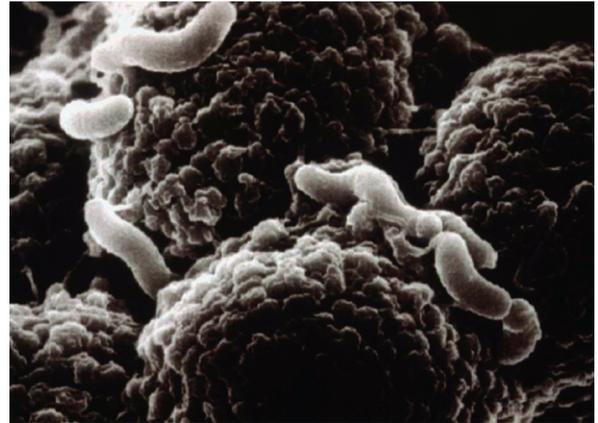
- Dynamic changes in the transcriptional machinery regulated by TGF- β
- Roles of TGF- β in epithelial-mesenchymal transition (EMT)
- Roles of tumor microenvironment - approach by orthotopic transplantation models
- Analysis of cancer metastasis by tissue-clearing methods

Microbiology

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

Our major objective is to elucidate molecular mechanisms underlying development of gastric carcinoma triggered by infection with *Helicobacter pylori*. Based on the results obtained from these studies, we are also developing new strategies for prevention and treatment of infection/inflammation-associated cancers, which account for ~50% of entire human malignancies.

- Structural biological analysis of *H. pylori* oncoprotein CagA
- Intracellular signaling pathways targeted by CagA
- Mouse genetic studies on gastric carcinogenesis
- Host genetic factors determining gastric cancer susceptibility
- Molecular mechanisms linking inflammation and cancer



H. pylori - gastric epithelial cell interaction

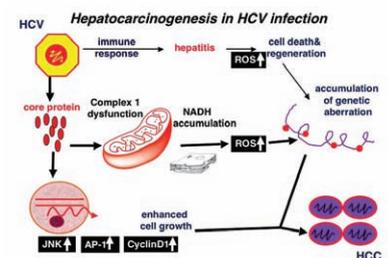
Infection Control and Prevention

We are engaged in education of medical staff as well as in daily clinical activities on the prevention of healthcare-associated infection (HAI). Research activities on the pathogenesis of infection with hepatitis viruses and HIV, in particular, on the mechanism of hepatocarcinogenesis in HCV infection are also our mission.

- Development of preemptive strategies for the control of healthcare-associated infection
- Development of new methods in infection control and treatment of viral hepatitis
- Molecular pathogenesis of hepatocellular carcinoma in HCV infection
- Pathogenesis of progression of HIV infection
- Molecular pathogenesis of the mitochondrial disturbances in viral infections
- Molecular pathogenesis of hepatitis B viral infection
- Host defences to microorganisms
- Molecular analysis of innate immunity in microorganism infection
- New detection method and pathogenesis of opportunistic cytomegaloviral infection
- Mechanism of multi-drug resistant microorganisms
- Molecular epidemiology of *Clostridium difficile*



Infection control team rounds



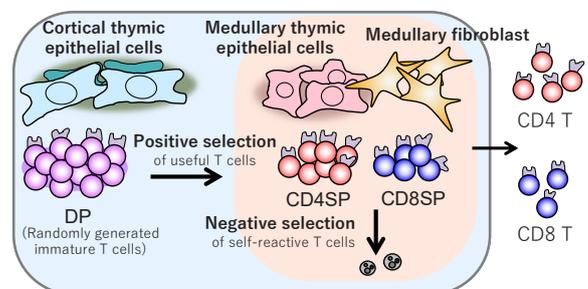
Immunology

<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.

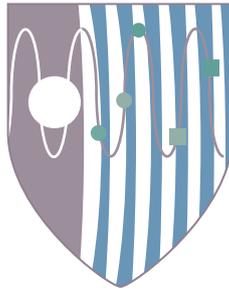
- Animal models for studying immune cells by genome engineering technology
- Molecular mechanisms of immune cell development
- Role of immune tissue microenvironment in immune cell regulation
- Mechanisms and pathogenesis of autoimmune diseases
- Regulation of bone metabolism by the immune system
- Regulation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

T cell repertoire selection in the thymus



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



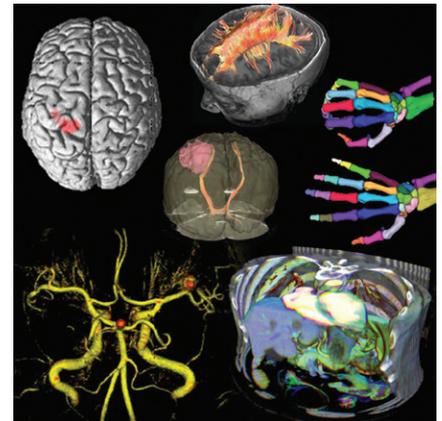
Radiology and Biomedical Engineering

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



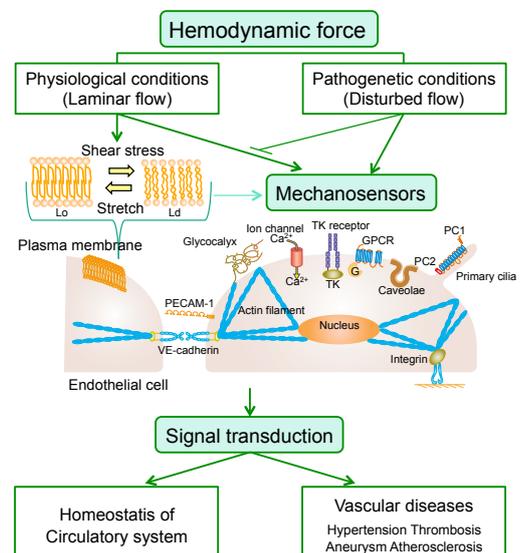
Representative images analyzed with computer-assisted technology

System Physiology

http://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 hypertensive 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



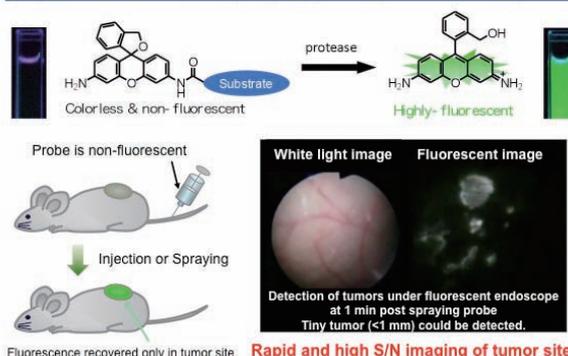
Chemical Biology and Molecular Imaging

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

Our research field is so-called chemical biology. 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.

- Establishment of rational design strategies for various small molecular chemical probes
- Development of novel fluorescence probes, photosensitizer, caged compounds, and Raman probes
- Biological applications of developed photo-functional chemical probes in living biological samples; for example, in vivo/ex vivo detection and therapy of tumors in mice models and clinical specimens.

Rapid detection of tumors by originally developed fluorescence probes

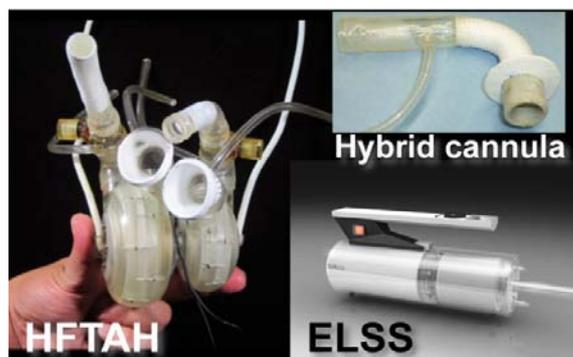


Biosystem Construction and Control

http://www.bme.gr.jp/bme_E/

Our research fields include medical engineering technologies represented by the artificial organs. Especially in the research of the artificial heart, the goat whose heart was replaced with the new type of the total artificial heart survived for more than three months. To rescue the life of cardiopulmonary arrest patients, the compact emergency life support system has been developed. Other than these, researchs and developments of bio-compatible materials, sensors, new diagnostic devices and an implantable artificial kidney have been performed.

- Artificial heart
- Emergency life support system
- Hybrid technology of biological and artificial materials
- New blood pumps
- Implantable pressure sensor
- Implantable artificial kidney



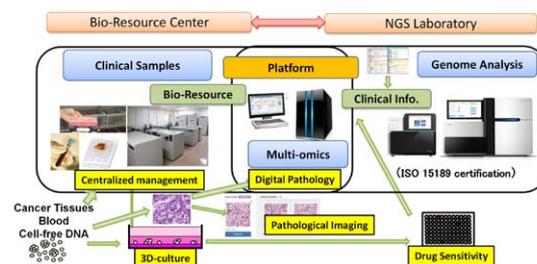
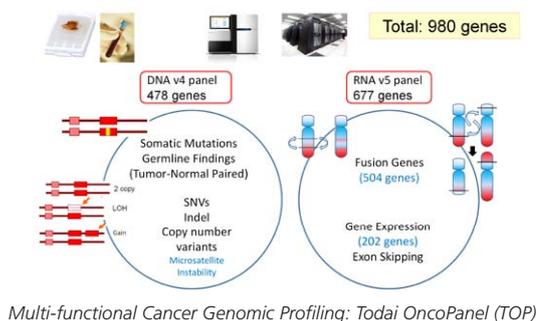
Helical flow total artificial heart (HFTA), hybrid cannula and compact emergency life support system (ELSS)

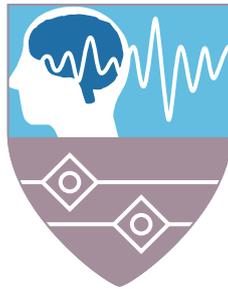
Integrative Genomics

<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 Today 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



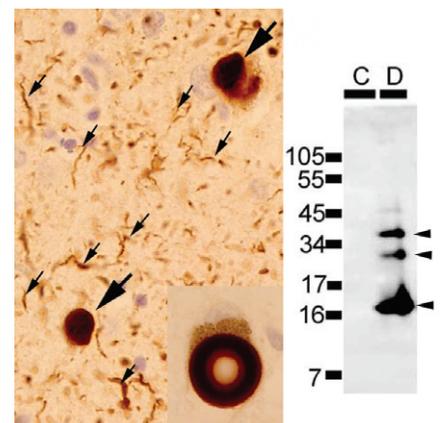


Neuroscience

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 β production, aggregation and clearance
- Function of β -amyloid binding proteins (e.g., CLAC)
- Mechanism of aggregation and neurotoxicity of α -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



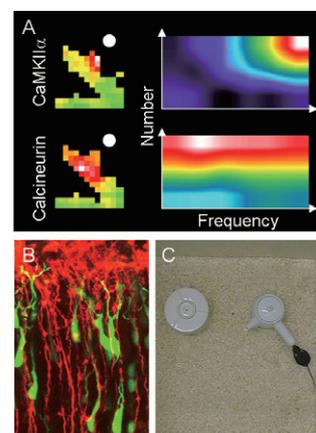
Phosphorylated α -synuclein deposited in Lewy bodies of Parkinson's disease and Lewy body disease

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/>

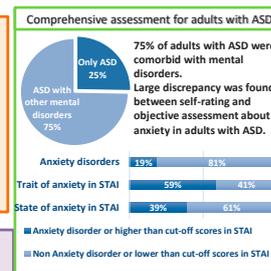
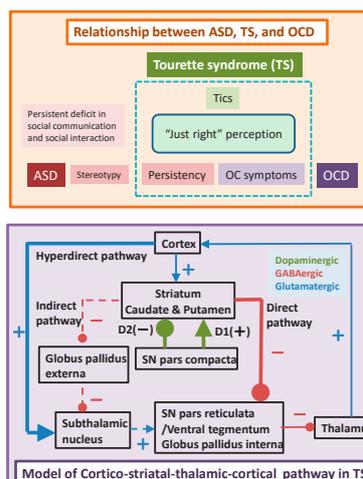


A. Single-synapse imaging (left) and frequency-number response profile (right) of CaMKII α and calcineurin
 B. Visualization of migrating neurons (green) and radial glial fibers (red) during corticogenesis
 C. Novel object recognition task

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
- Development of predictor of parent training for ADHD
- Effectiveness study of early intervention for autistic preschoolers and group cognitive behavior therapy for adults with ASD
- Investigation on clinical evaluation and psychological education for adults with developmental disorders



Correlation between Obsessive-Compulsive (OC) Symptoms, Tics, and Global Functioning

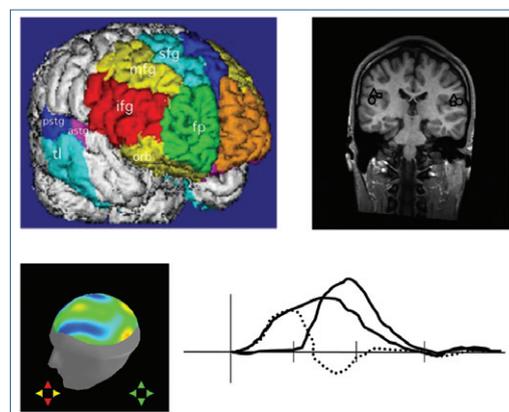
OC Symptom Dimensions	Tic Symptoms (YGTSS total tics)	Global Functioning (GAF)
Aggression	0.318 *	-0.297 *
Sexual/Religious	0.368 **	-0.225
Symmetry	0.356 **	-0.218
Contamination	0.189	-0.254†
Hoarding	0.177	-0.075
Miscellaneous	0.212	-0.239†

Neuropsychiatry

Our department mainly investigates schizophrenia and autistic spectrum disorders not only by biological approaches which integrate neuroimaging, genetic and animal studies, but also by psycho-social approaches. We also promote the systematic clinical research training programs and the cooperation with the basic neuroscience research.

- Comprehensive research for AYA (Adolescent and Young Adult) for better mental health Care project (CAYAC project)
- Prospective population-based birth cohort study aimed at investigating physiological and psychological development, including self-regulation, during adolescence (The Tokyo Teen Cohort study: TTC)
- Research for psychosocial support of AYA generation with 22q11.2 deletion syndrome

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



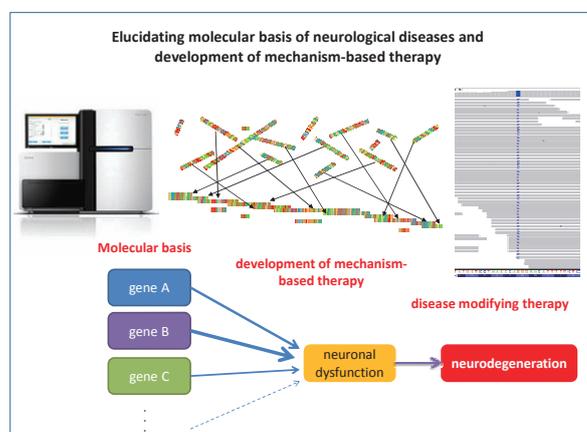
Multi-modality neuroimaging in neuropsychiatry using a combination of high-resolution MRI, EEG, MEG, NIRS, and PET

Neurology

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.

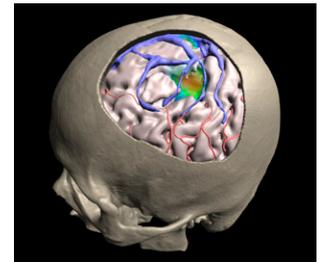
- Molecular Genetics (identification of disease genes and development of therapeutic approaches)
- Molecular pathophysiology of neurological diseases (protein structures and functions)
- Immune-mediated diseases (autoantibodies)
- Neurophysiology and cognitive neuroscience (magnetic stimulation, NIRS,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

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

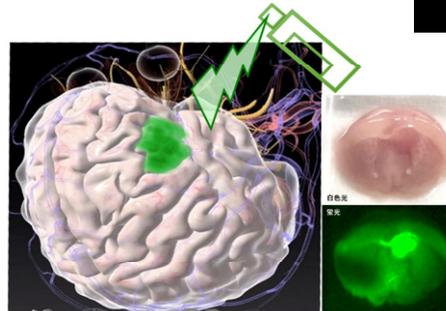


The 21st century has been designated as "The Century of the Brain". To lead Japanese surgical neuroscience, we have devoted our activities to the following: advanced clinical neurosurgery, neuroscience research and graduate and postgraduate education.

- 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



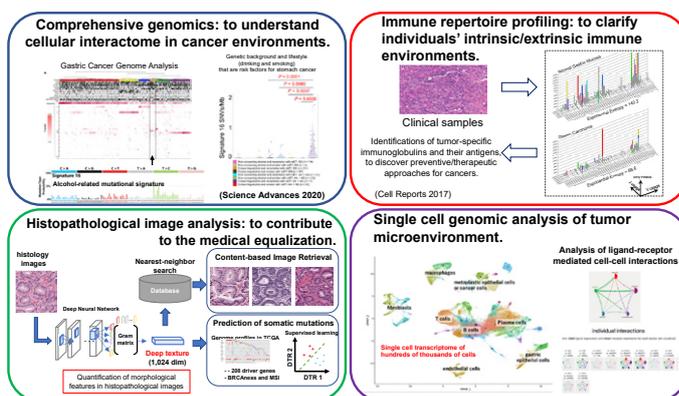
Social Medicine

Preventive Medicine

Our goal is to discover appropriate intervention points for the prevention and therapeutics for issues in health care and hygiene, with special focuses on malignant tumors, from the viewpoints of genomic and information sciences. Based on bioinformatics for such complex ecosystems of wide varieties of cells, such as large-scale genomic information at single cell resolution and multi-dimensional histological image information, we are exploring preventive / therapeutic targets or biomarkers, and also analyzing their biological significance in diseases.

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

- Comprehensive genomics; to understand cellular interactome in cancer environments.
- Immune repertoire profiling; to clarify individuals' intrinsic / extrinsic immune environments.
- Histopathological image analysis; to contribute to the medical equalization.
- Single cell genomic analysis of tumor microenvironment.



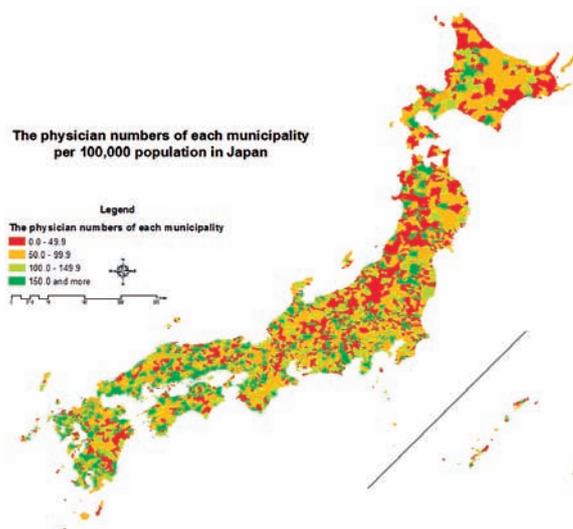
Exploration of preventive/therapeutic interventions for diseases by genomics & informatics

Public Health

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

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.

- Efficiency and equity issues of health systems
- Health manpower policy
- Occupational and environmental health
- Health services research



Physician distribution by municipality in Japan

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



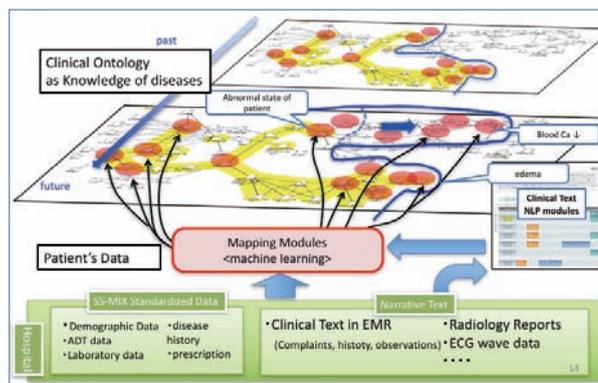
Forensic autopsy room

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 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.



Automatic Mapping from Clinical Case Data to Knowledge of Disease Transition

- 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



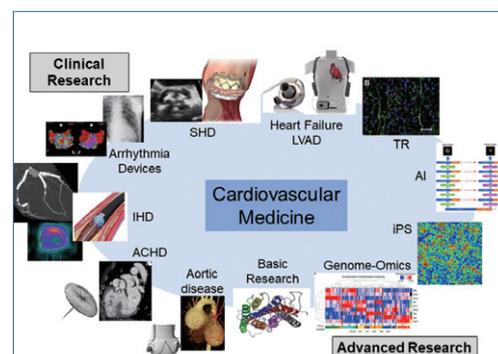
Internal Medicine

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

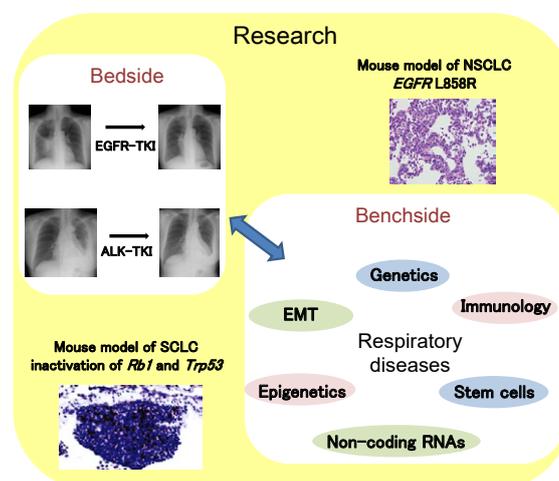


Respiratory Medicine

<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.



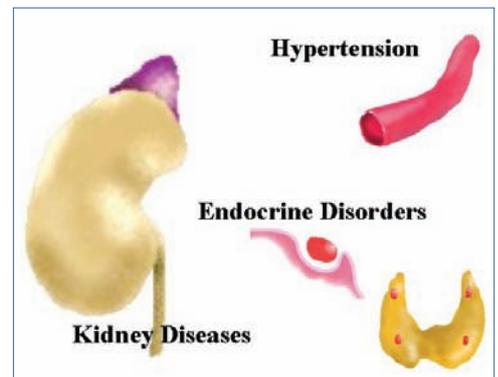
- Development of better therapeutic strategy for hepatitis B and C
- Elucidation of hepatocarcinogenesis mechanism in viral hepatitis
- Development of a better therapeutic modality for hepatocellular carcinoma & metastatic liver tumor
- Elucidation of gastric injury mechanisms by *Helicobacter pylori*
- 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.

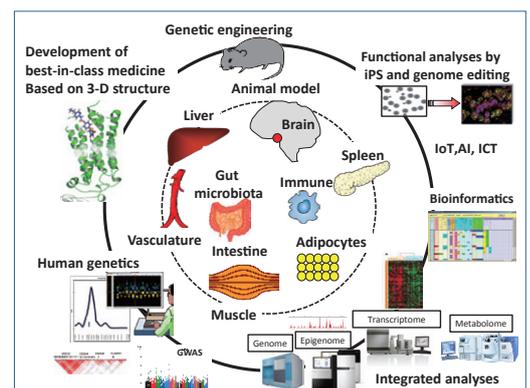
- Analysis of pathophysiology and development of therapy of chronic kidney disease
- Abnormal oxygen metabolism of kidney disease
- Epigenetic changes in CKD
- Development of biomarkers and therapy of acute kidney injury
- Renal physiology and morphology
- G protein signaling in health and disease
-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



Nutrition and Metabolism

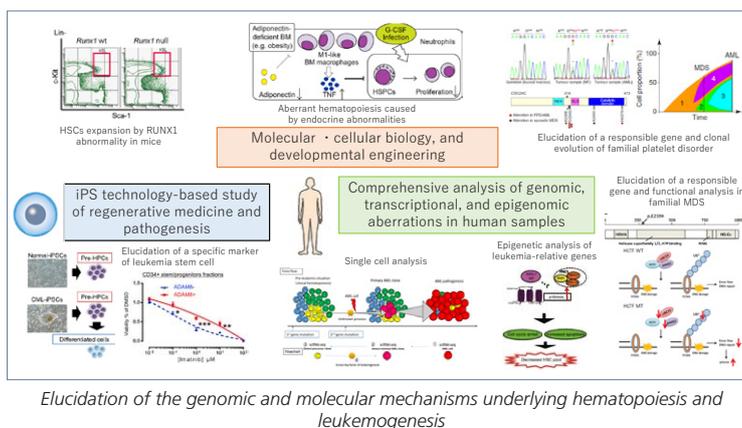
We are investigating to reveal the molecular mechanisms underlying the development of metabolic diseases (diabetes mellitus, lipid metabolic disorders, obesity disease, sarcopenia, metabolic syndrome and atherosclerosis) using interdisciplinary approaches and state-of-the-art technology including genetically 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.

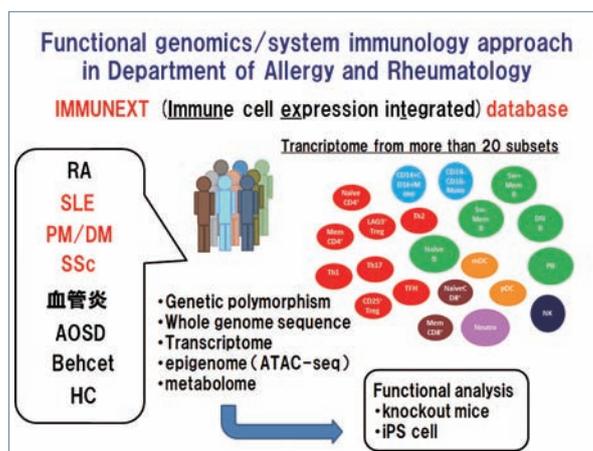
- Mechanisms in the regulation of self renewal and differentiation in hematopoietic stem cells
- Comprehensive genomic and epigenetic analysis of hematological malignancies
- Elucidation of the molecular mechanisms underlying the pathogenesis of leukemia
- Development and analysis of mouse models of 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



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). We think research of human immunology in collaboration with patients is the key to overcome rheumatic disease.

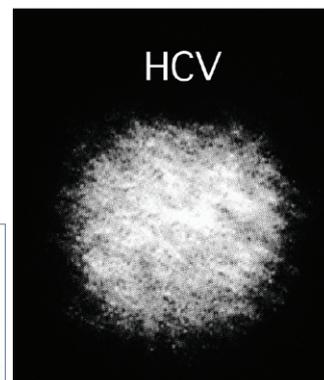
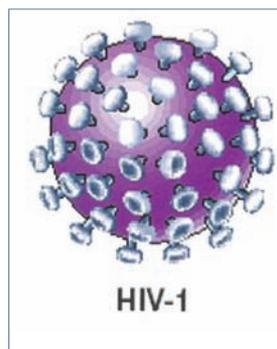
- Genome/transcriptome analysis of immunological diseases
- Disease classification and diagnosis with genome/transcriptome of immunological diseases
- Identification of molecular pathway related to prognosis in SLE
- Identification of molecular pathway related to prognosis in polymyositis/dematomyositis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



Infectious Diseases

We are investigating both clinical and basic aspects in infectious diseases, in particular, on HIV infection and hepatitis viral infections, the latter of which is the major cause of liver disease worldwide. Our research topics cover the wide areas in microbiology, immunology and pathobiology of infectious diseases, including viral and bacterial infections.

- Clinical studies of HIV infection
- Treatment and prevention of viral hepatitis
- Molecular pathogenesis of hepatocellular carcinoma in HCV infection
- Pathogenesis of extrahepatic manifestations and its control in HCV infection
- Molecular pathogenesis of hepatocellular carcinoma in HBV 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

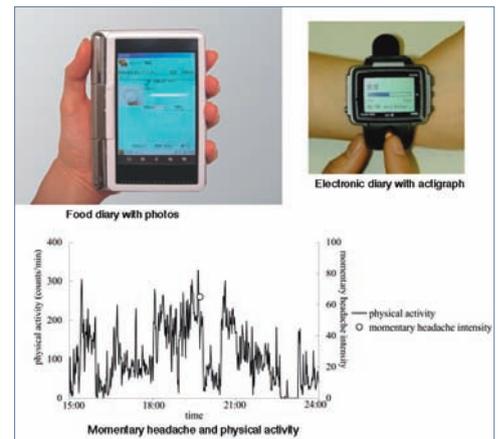


Stress Sciences and Psychosomatic Medicine

<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), biochemical assessment of eating-related molecules, 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.
- 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.

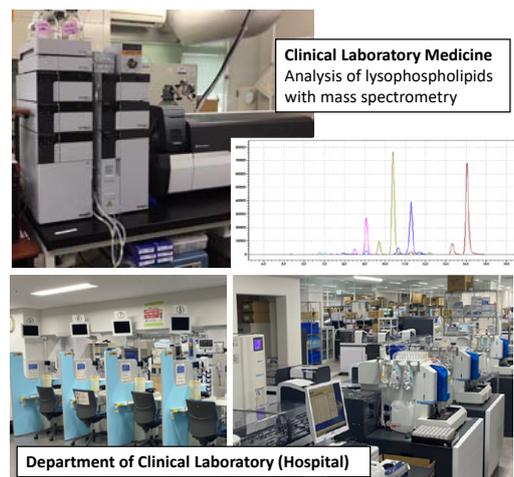


Clinical Laboratory Medicine

<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
- Platelet biology, Development of laboratory diagnosis in thrombosis and hemostasis
- Echocardiographic studies of the pathophysiology of valvular heart disease and the hemodynamics
- Cancer genomic medicine using next generation sequencing
- Clinical introduction of the assay of oxidized/reduced albumin
- Neuroscience research using magnetoencephalography and non-invasive brain stimulation
- Promotion of medical-science-engineering cooperation



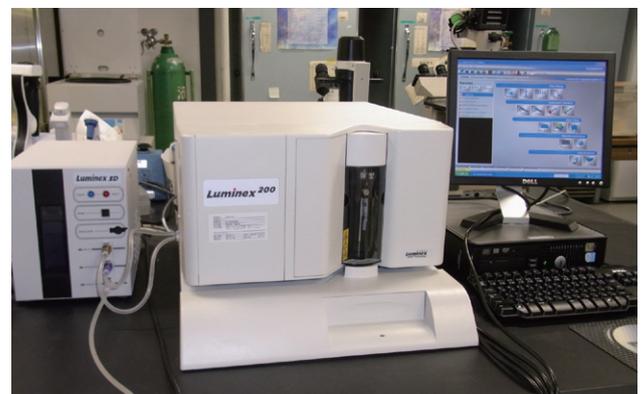
Transfusion Medicine

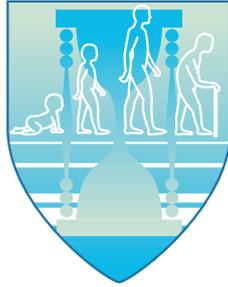
<http://square.umin.ac.jp/traf-tyk/>

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
- Development of new anti-angiogenic strategies for the treatment of solid tumors
- Investigation on the pathophysiology of the immunological adverse effects of transfusion
- Clinical study for the safety of autologous blood donation



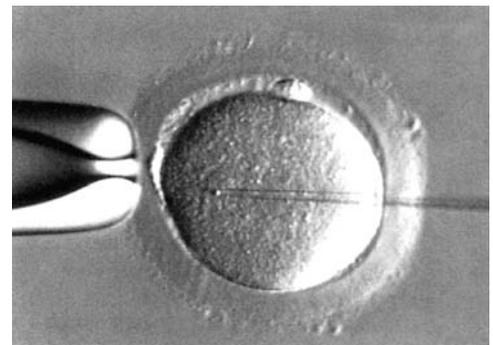


Reproductive, Developmental and Aging Sciences

Reproductive Endocrinology

http://www.h.u-tokyo.ac.jp/patient/depts/a_joseika01/index.html

We manage women's reproductive health comprehensively throughout their respective life stages (adolescence, reproductive ages, menopause, and post-menopause). We also aim to develop advanced reproductive techniques, which could be practiced with higher success rates and improved safety, based on experimental and clinical research.



ICSI (intracytoplasmic sperm injection)

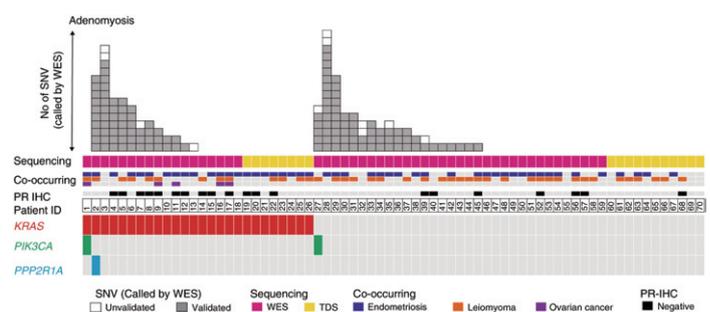
- Establishment of effective and low-risk treatment for infertility
- Development of assisted reproductive technology
- Understanding of interaction between the endometrium and embryo during the implantation period
- Study of pathophysiology of endometriosis / adenomyosis
- Understanding of local regulation of folliculogenesis
- Technical development of advanced endoscopic / minimally invasive surgery
- Development of hormone replacement therapy for perimenopausal / postmenopausal women
- Health care for women
- Development of oncofertility

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



Perinatal Medicine

http://www.h.u-tokyo.ac.jp/patient/depts/a_joseika03/index.html#ninpu

The researches are on going for development of precise prenatal diagnosis on the fetal status using ultrasonography and for better understanding on pathology of perinatal diseases. We are also focusing on the immunological aspects and inflammation in patho- physiology of pregnancy. Our goal is to develop the therapy and prevention methods for recurrent pregnancy loss, pregnancy induced hypertension, preterm labor, and cerebral palsy.

- Prenatal diagnosis of abnormal fetuses using three dimensional ultrasonography
- Management of recurrent pregnancy loss
- Management of complicated pregnancy
- Management of preterm labor
- Prevention of cerebral palsy of the newborn
- Development of novel therapy for hypertensive disorders of pregnancy.



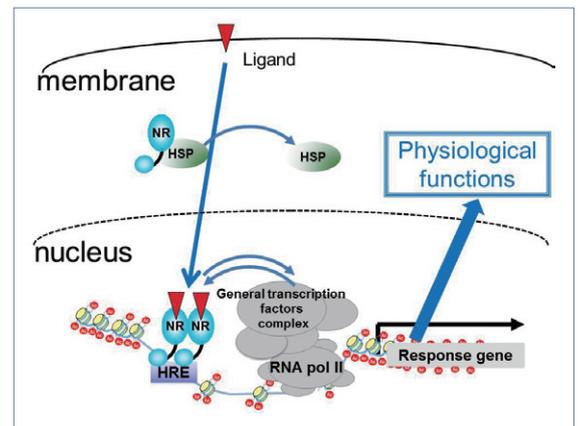
Three dimensional ultrasonography of fetus

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

Pediatrics / Developmental Pediatrics

<http://square.umin.ac.jp/ped/>

We are studying all aspects concerning the health of infants, children and adolescents.

We have achieved very important contributions to clarify the molecular pathogenesis of pediatric disorders.

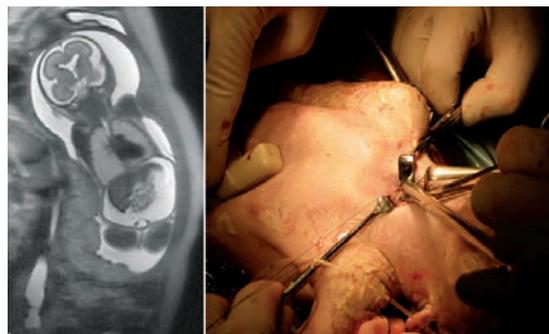
- Molecular diagnosis and analyses of hematological malignancies and solid tumors
- Multi-institutional comparative clinical studies on leukemia and solid tumors
- Molecular diagnosis, analysis and collaborative treatment of pediatric renal diseases
- Molecular analysis and diagnosis and collaborative 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

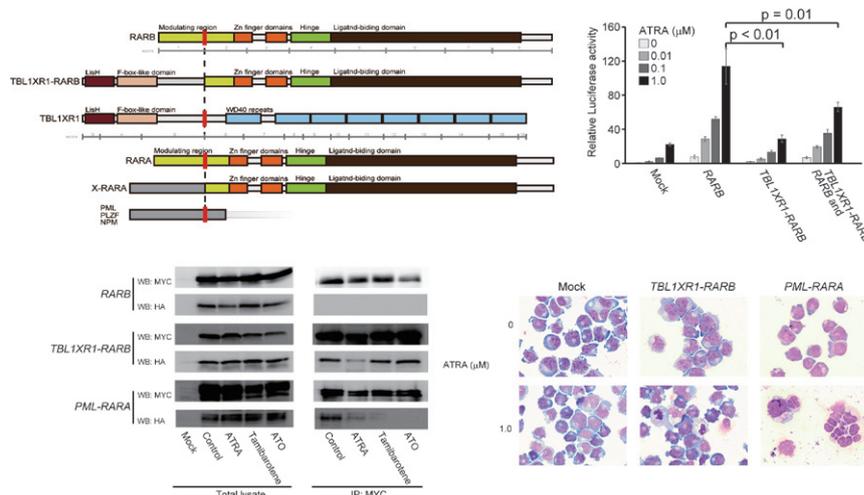


EXIT(ex utero intrapartum treatment):
Tracheostomy on a fetus with laryngeal atresia

Pediatric Oncology

We investigate the molecular pathogenesis in the field of pediatric hematology and oncology. Using comprehensive genomic analysis technology, we focus on not only somatic genomic alterations, but also germline background underlying onset and development of pediatric hematologic/oncologic diseases. Through collaboration with related fields, we aim to reveal etiology of pediatric diseases.

- Genomic research for pediatric leukemia
- Genomic research for pediatric solid tumor
- Germline genomics for pediatric cancer
- Pharmacogenomics for pediatric cancer



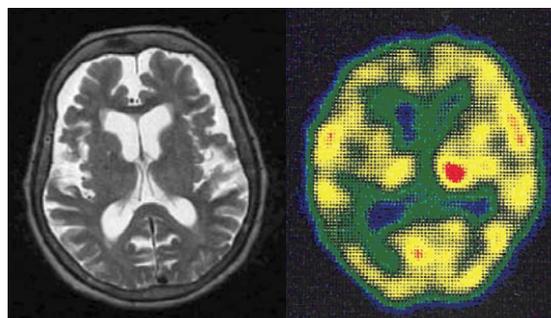
Effect of novel RARB-fusion detected in atypical acute promyelocytic leukemia

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 elderly 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



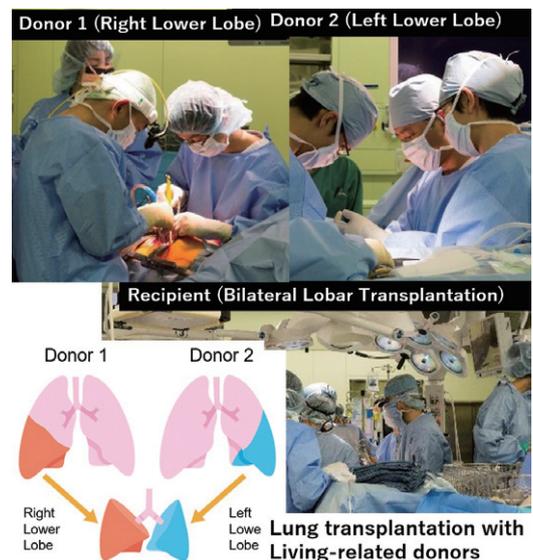
Surgical Sciences

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. In 2020, the number of lung transplants performed became 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. 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



Ventricular assist devices clinically available in Japan

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

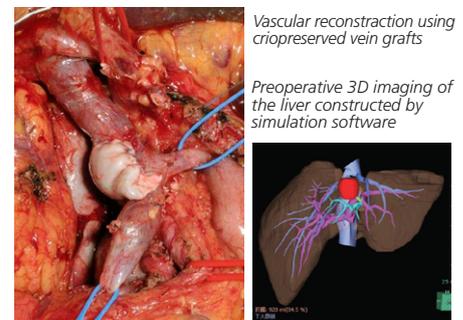
<http://www.u-tokyo-hbp-transplant-surgery.jp/>

We perform nearly 150 hepatectomies in patients with hepatobiliary malignancies and nearly 90 pancreatectomies 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 hepatobiliary-pancreatic malignancies, we conduct wide areas of research such as 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



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)

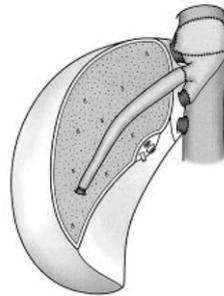


Fig. 1 Surgical scene of Robot-assisted laparoscopic radical prostatectomy

Artificial Organ and Transplantation Division

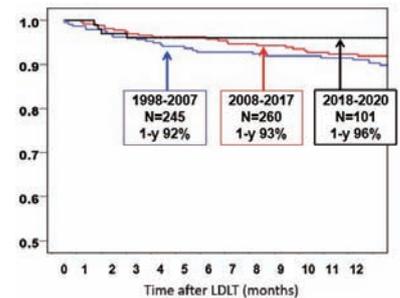
685 living donor liver transplantation and 47 deceased donor liver transplantation until Dec. 2020. The 5-year survival rate for adult case was 87%, which is significantly superior to that of the national data (73%).

- 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/htokyo transplant/>



Overall survivals after living donor liver transplantation



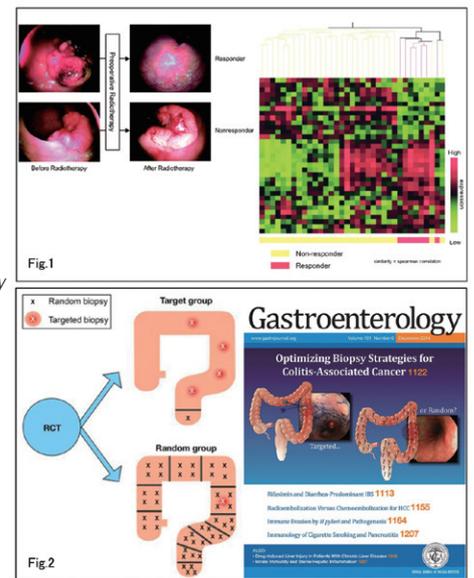
Surgical Oncology

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



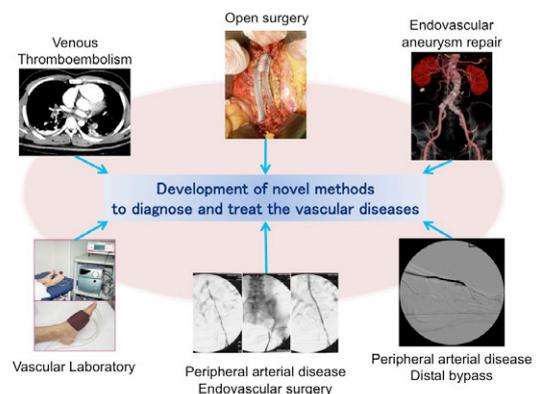
<http://all-1su.umin.jp/>

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



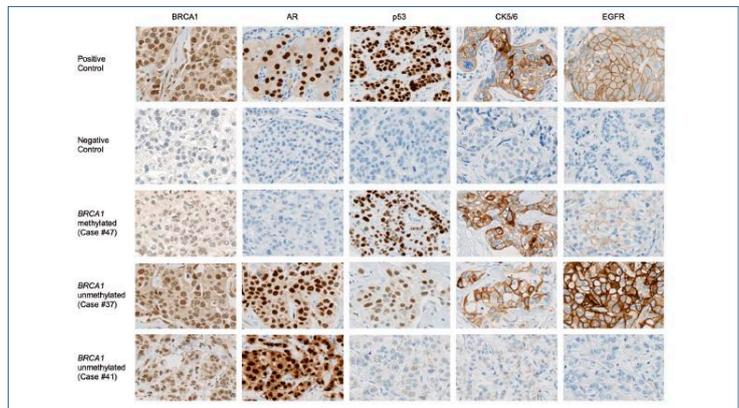
<http://all-1su.umin.jp/>

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



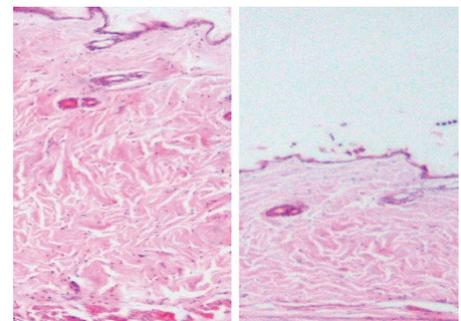
The immunohistochemical features of BRCA1, AR, p53, CK5/6 (One patient with a BRCA1 promoter-methylated tumor and two patients with a BRCA1 promoter-unmethylated tumor)

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
- Pivotal roles of Fli1 in systemic sclerosis
- 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

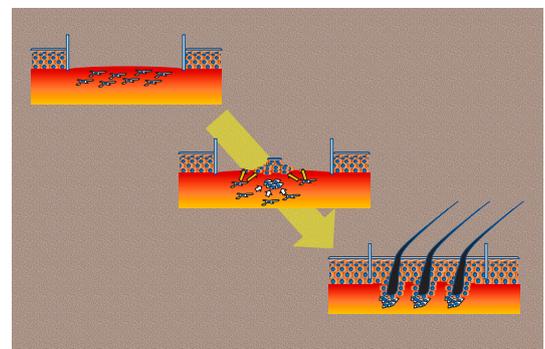


Skin fibrosis induced by bleomycin(left) is inhibited in CD19-deficient mice(right)

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.

- 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
- 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
 - Development of tissue perfusion monitoring system using flexible electronic devices



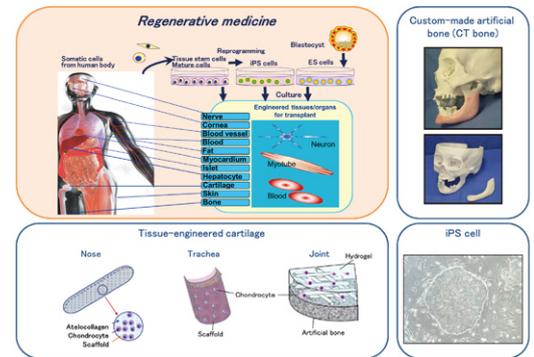
Aiming at perfect tissue regeneration through tissue embryonization

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.

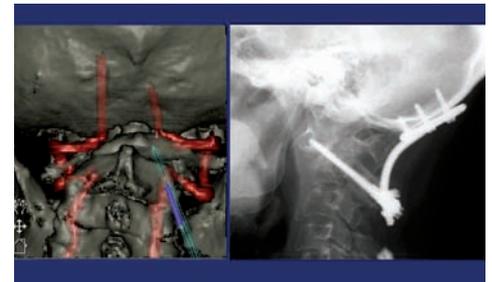
- Clinical research:
 - Treatment of facial deformities and malocclusion in patients with cleft lip/palate
 - Research on facial growth in patients with craniofacial anomalies
 - Reconstruction of oral and maxillofacial area by custom-made artificial bone (CT bone) (clinical trial)
 - Transplantation 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.



Surgical navigation system

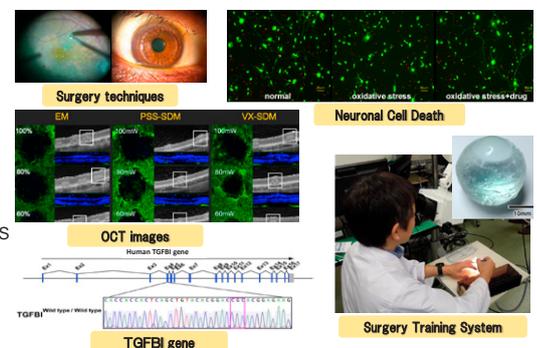
- Systemic and comprehensive study for osteoarthritis
- Regulation of bone metabolism and Molecular mechanism of osteoclast differentiation
- Regenerative medicine of joint and nerve by adipose-derived stem cells and related technology
- Surgical navigation system with a three-dimensional display and 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

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.

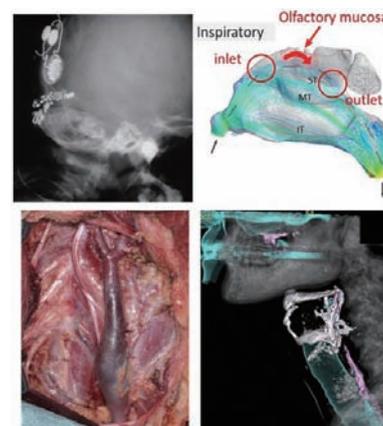


Otolaryngology and Head and Neck Surgery

<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 congenital 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
 - Origins of vestibular myogenic potential
 - Aging and regeneration of olfactory epithelium, pathogenesis of chronic sinusitis and allergic rhinitis
 - Physiology of vocal cord vibration, Molecular biology of recurrent laryngeal papillomatosis

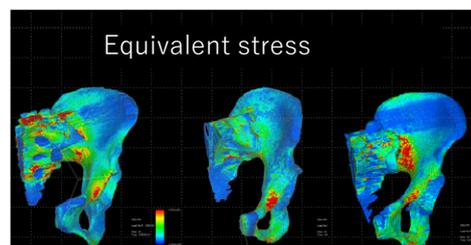


Rehabilitation Medicine

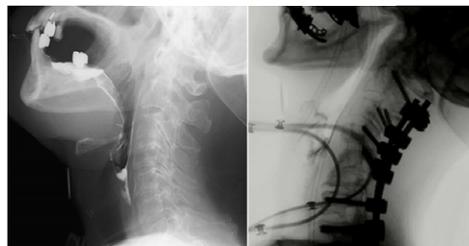
Our research purpose is to elucidate the causalities between the pathology of diseases and the limitation of activities and social participation of the patients. The findings from that research would lead to the improvement of physical activities of people with disabilities.

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

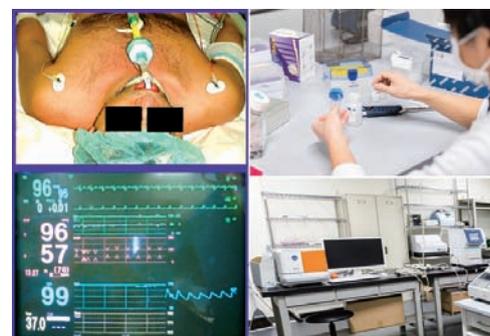


Anesthesiology

<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:

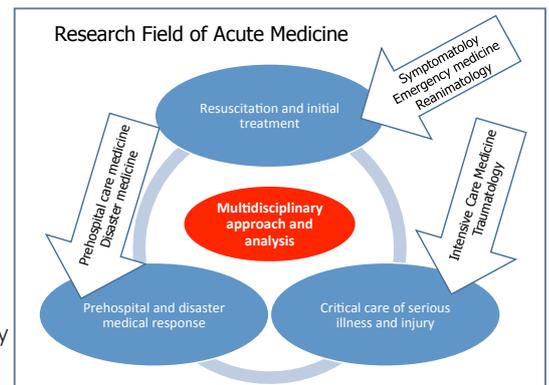
- Respiratory system – A role of cytokine signaling in acute lung injury; Transpulmonary pressure during mechanical ventilation; Exploring risk factors of perioperative exacerbation of interstitial lung disease;
- Immune system – Modification of immune system by anesthesia; Apoptotic signal transduction 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.

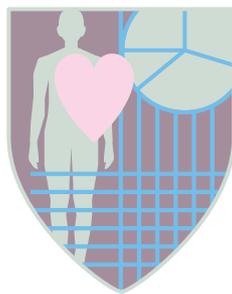


Clinical Practice and Research of Anesthesiology

We, acute care physicians, have a role to treat the patients with sudden and unexpected illness and injury, and our specialties are very wide in the settings of prehospital, disaster, ER (emergency room), and critical care. Acute Medicine is the science of these fields. Main studies of our department are as follows.

- 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

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

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

- Mental Health
 - Mental health epidemiology
 - Occupational mental health/Occupational health psychology
 - Internet-based Cognitive Behavioral Therapy
 - Perinatal Mental Health
 - 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

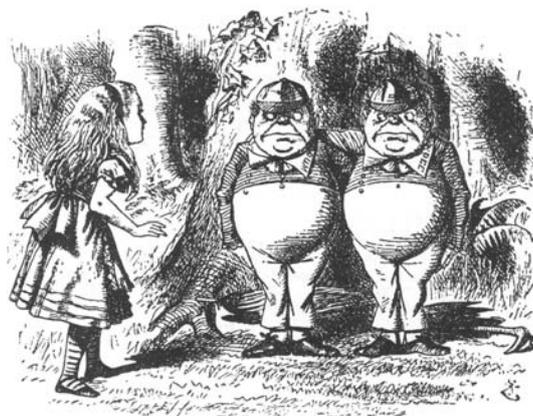


Biostatistics / Epidemiology and Preventive Health Sciences

<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)
 - Global Advanced/Adjuvant Stomach Tumor Research through International Collaboration (GASTRIC): 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 develop systems and methodology to bring out the potential of nursing and healthcare organizations to contribute well-being of not only patients, but also workers and institutes, and society. With this aim, we try to elucidate complex organizational phenomena, and to find keys to effective organizational development, while tackling to develop the methodology for organizational researches.

- Organizational process/management process
- Work environment
- Methodology for understanding phenomena in nursing organization



Family Nursing

Hand-in-hand with the seismic social changes occurring nationally and worldwide -- including declining birthrates and a growing proportion of elderly people, vulnerability of regional networks, and movement toward a gender-equal society -- the form and function of the family unit are also changing. Current Japanese society expects not only a client-centered perspective, but also a perspective of the family as 'client' in nursing research. Within this context, our research focuses especially on child-rearing issues and on caring for children with illness.

- Postnatal depression, difficulties in child rearing, child abuse and neglect
- 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 survivors of childhood cancer including caring of their late effects, special needs education, school reentry and working
- Multidisciplinary collaboration for families and communities
- Burden borne by caregivers of children with medical complexity, and their utilization of respite care services
- Care for dying patients and their families (QOL, family function)



Community Health Nursing

<http://park.itc.u-tokyo.ac.jp/chn/english/index.html>

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

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

Our research activities are targeted at quality assurance/improvement of long-term nursing care for clients and their family members. We also aim at advancing knowledge grounded at nursing activities in Japan. 1) Developing theoretical frameworks that guide nursing care by explaining the nature of illness/aging experience and experience of taking care of others. 2) Developing quality improvement systems for nursing/healthcare in hospitals, long-term care facilities, outpatients, and home care.

- Quality assurance/improvement of care in the long-term care system
- Development of clinically derived theories through case studies and phenomenological approach
- Development of a community care system and nursing role
- Development of quality indicators for long-term care
- Development of IT-based nursing care/educational programs



Hosted workshops for community-building using a gaming tool

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 of a support system for postpartum body management
 - Pelvic floor disorders among postpartum women
 - Risk factors of mastitis and breast abscess among postpartum women
- Development of a support system for women's health
 - Support for health of working mothers and women
 - Preconception care
- 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



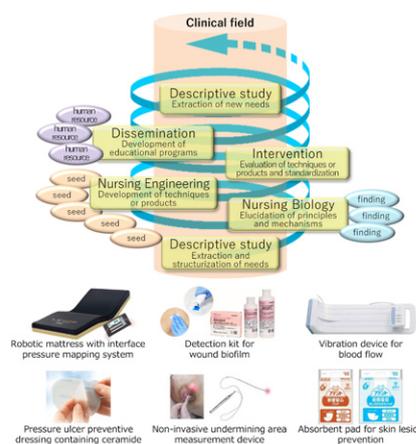
Drawing / Shoichi Sakamoto

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 (e.g., biological science), 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
- Development of next-generation nursing care using artificial intelligence
- Search for biomarkers that reflect skin conditions
- Verification of effectiveness regarding the use of robot technology for home visit services
- Development of technology for early detection and prevention of extravascular leakage of intravenous fluids
- Utilization of ultrasound technology to support feeding, swallowing, and elimination



Products developed through reverse translational research

Health Sciences and Nursing

Health Sociology *See* **Health and Social Behavior**(p50)

Health Education *See* **Health and Social Behavior**(p50)

Biomedical Ethics *See* **Biomedical Ethics**(p51)



International Health

Global Health Policy

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

Our mission is to improve population health by enhancing accountability and improving the evidence base of global (both domestic and international) health programs through the provision of the best possible information and rigorous monitoring and evaluation. The department's members generate knowledge and ideas through their research with high social and academic impacts, strengthen technical and leadership skills through educational programs, and enhance national capacities through collaborative projects, especially in the developing world.

The priority areas of research are:

- Global Burden of Disease (GBD)
- Health System Performance Assessment
- Domestic Health Policy Reform
- Inequality and Inequity in Health
- Health impact of climate change
- Environmental epidemiology
- Health Technology Assessment and Health Innovations
- Radiation Exposure and Health in Fukushima



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:

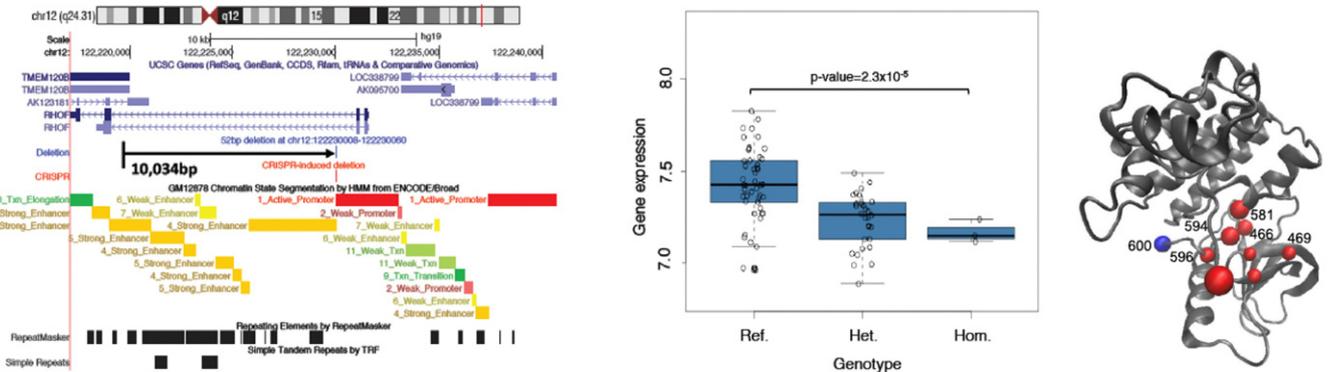
- Health, nutrition, and development
- Health, human rights, and human security
- Infectious disease control (malaria, TB, HIV, NTDs, etc.)
- Health promotion (in particular, health literacy)
- Disaster and health
- Human resources for health
- Maternal, newborn, and child health
- Implementation research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

Founded in 1966 as the Department of Maternal and Child Health, this department has devoted itself to the research and education on the maintenance and promotion of mothers' and children's health. At present, the main research activities are experimental and epidemiological studies on the etiology (genetic and environmental factors), pathogenesis, prevention and treatment of viral infections and childhood brain disorders (congenital and acquired) that cause mental and motor disabilities and epilepsy, from the standpoints of international health science, virology and developmental neuroscience.

- Molecular epidemiology of infectious diseases
 - Diarrhea viruses
 - Herpesviruses
 - Dengue virus
 - Zika virus
- Studies on developmental brain disorders using genetically engineered mice
 - CDKL5 (Cyclin-dependent kinase-like 5) deficiency disorder (developmental epileptic encephalopathy): elucidate molecular pathomechanisms and therapeutics
 - Cure neurodevelopmental disorders by inducing brain plasticity
 - Tuberous Sclerosis
- Epidemiological and clinical studies on maternal and child health
 - CDKL5 deficiency disorder: brain functional connectivity
 - Neonatal care

To Combat Health Burden on Children: Infectious Diseases and Neurodevelopmental Disorders

Norovirus

Acute encephalopathy with biphasic seizures and late reduced diffusion (AESD)

CDKL5 kinase-dead knock-in mouse brain : functional connectivity map

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.

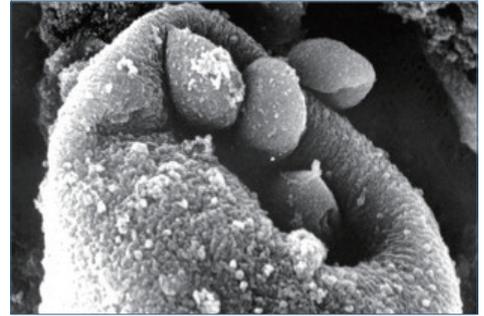


Rice terraces in West Java, Indonesia.

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

Biostatistics See **Biostatistics / Epidemiology and Preventive Health Sciences**(p42)

Health Sociology and Health Education See **Health and Social Behavior**(p50)



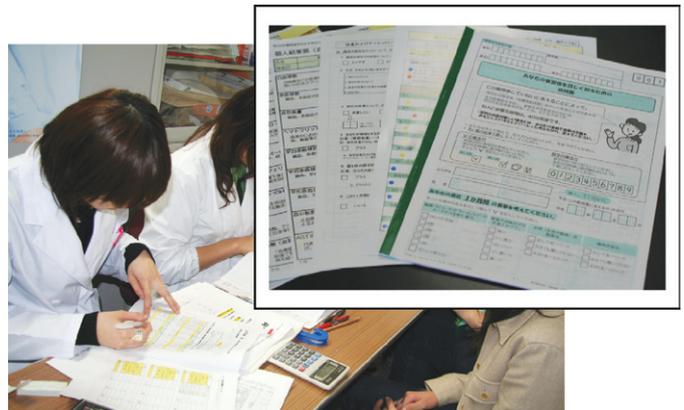
School of Public Health

Social and Preventive Epidemiology

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

Our main research field is preventive epidemiology on lifestyle-related diseases. This department is unique in Japan since our core research field is "nutritional epidemiology", which epidemiologically examines the roles of diets for disease prevention and control.

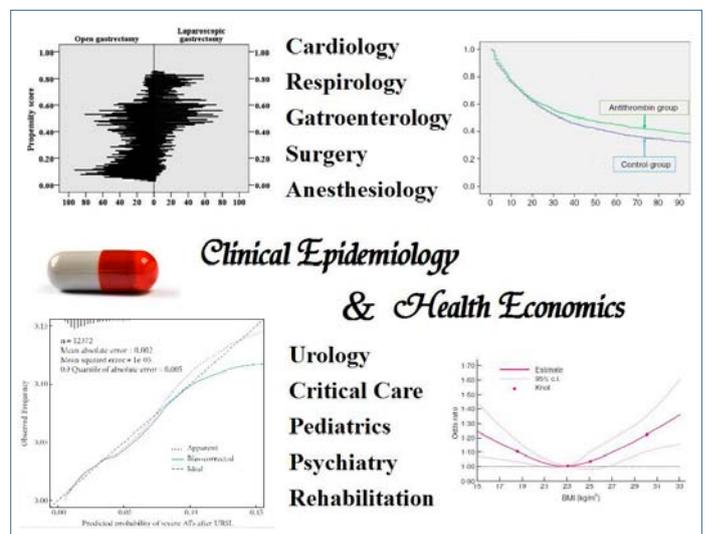
- Methodological studies on dietary assessments
- Nutritional epidemiologic studies on nutrient intakes/ dietary behaviors and health status
- Studies on development of dietary promotion methods and evaluation of their effectiveness
- Establishment of literature database for "epidemiologic studies on diets and health"
- Collaborative studies on nutrition with local governments, research groups on public health, those on clinical researches, and others.



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



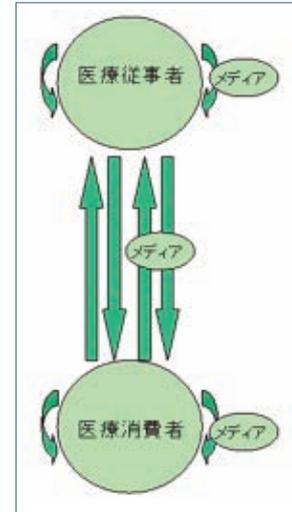
Health Communication

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

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



Mental Health

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

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 (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

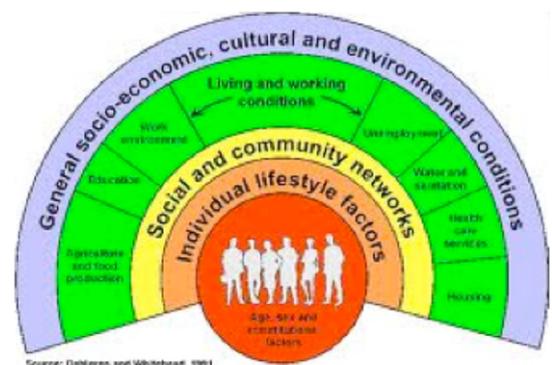


The UNU-IIGH/UNDESA/the University of Tokyo Expert Meeting on Mental Well-being, Disability, and Development in Kuala Lumpur, Malaysia, April 2013

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, 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://bicro.u-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



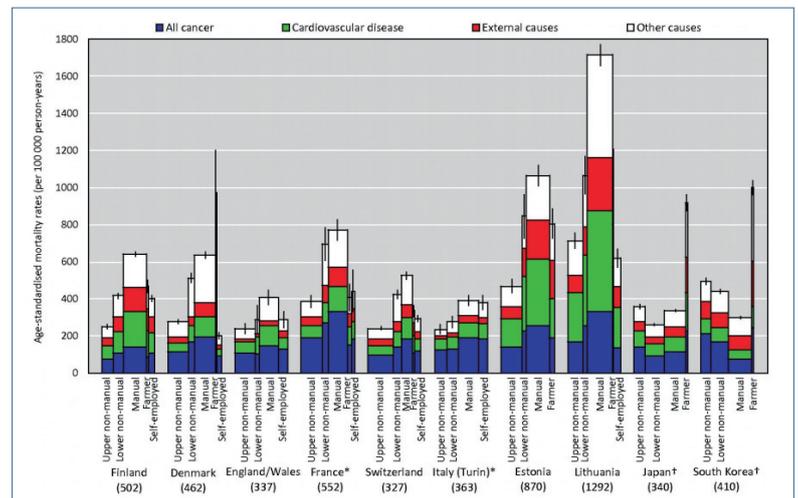
Researchers from all over the world frequently visit our center for joint researches and active discussions.

Health Policy

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

Health Policy is the academic fields in which scientific evidence is collected, established, accumulated, and disseminated for health policy making. Through studies in various aspects in health policy, our department aims to advance research, support policy development, and promote education toward these ends. This department is concurrently operated with Department of Public Health.

- Efficiency and equity issues of health systems
- Health manpower policy
- Occupational and environmental epidemiology
- Health services research



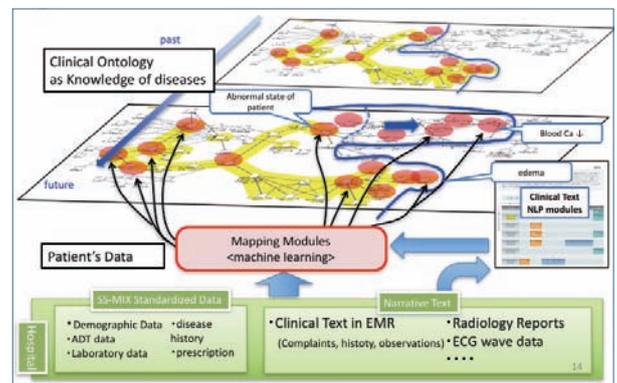
International comparison of age-standardized cause-specific mortality rate by occupational class among men aged 35-64

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.



Automatic Mapping from Clinical Case Data to Knowledge of Disease Transition

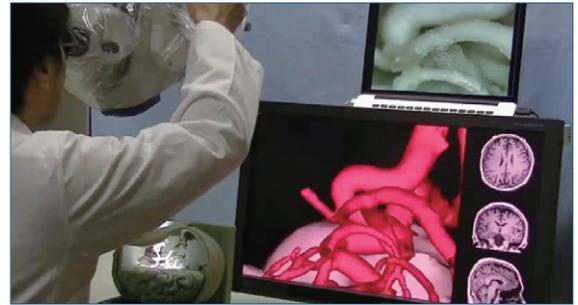
- Development and application of clinical ontology
- Research for sharing healthcare data among medical institutions and hospitals, and the application for clinical epidemiology
- Extraction of medical knowledge from electronic medical record database using natural language processing
- Development of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

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

<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



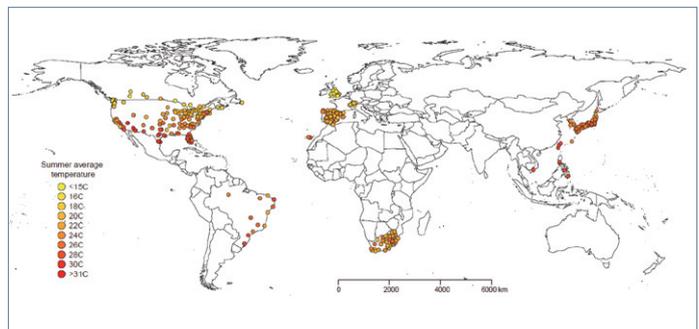
Forensic autopsy room

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

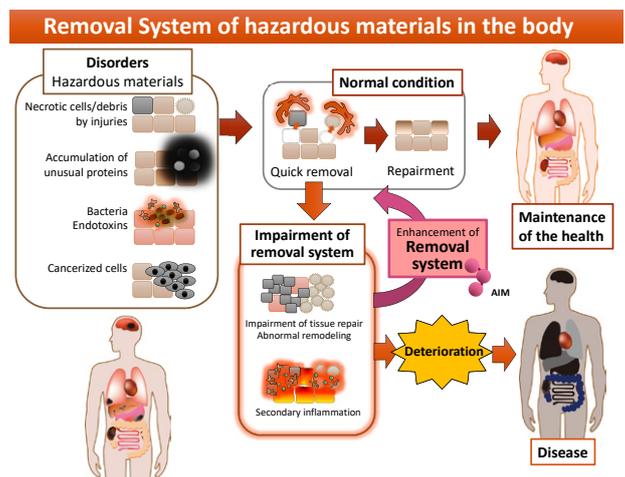


Center for Disease Biology and Integrative Medicine

Molecular Biomedicine for Pathogenesis

<http://tmlab.m.u-tokyo.ac.jp/english/index.html>

A variety of biological garbage such as necrotic cells, cancerous cells, excess lipids, or degenerated cells and proteins, are constitutively developed in our body. Such undesired substances are usually eliminated quickly, which is followed by tissue regeneration. Abrogation of such "removal system" may cause accumulation of garbage in tissues, accompanied by the secondary inflammation and fibrosis, resulting in the development of types of diseases. Thus, this scavenging response is essential to maintain the body in homeostasis and healthy state. Our overall goal is to apply our findings to develop a novel therapy based on this system against diseases.



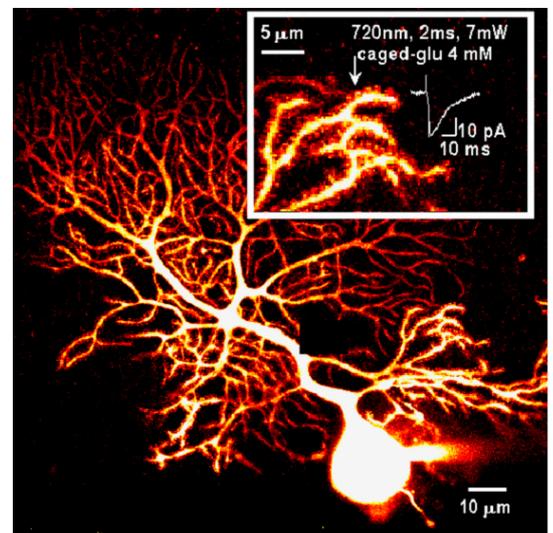
- Elucidation of molecular mechanism of "removal system" conducted by serum protein AIM.
- Comprehension of diseases caused by abrogation of this removal system: acute kidney injury, chronic kidney disease, cancer, obesity, neurodegenerative diseases, autoimmune diseases, aging, etc.
- Development of novel therapies against diseases.

Structural Physiology

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

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 and secretory organs.

- The dynamics of synapses in the cerebral cortex, in relation to memory, cognitive processes and mental disorders
- Molecular mechanisms of exocytosis in synapses and the islet of Langerhans, and their optical control



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

Biomedical Equipment and Biomaterial

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

We aim to create a basic methodology for research and development of new biomedical equipment and biomaterial applicable clinical site by integrating bioengineering technology such as mechanical, measurement, material and chemical engineering. For biomaterial, we develop new biocompatible hydrogels based on polysaccharides, hyperbranched polymers, and DNA analogues, which materials are applied to drug delivery systems for peritoneal diseases, artificial red blood cells, and artificial pancreas islets. In research of medical equipment, robot-assisted technologies are studied to promote medicine-engineering collaboration. Targets of our robotic applications include microsurgery, minimally invasive surgery, pathological examination and science experiments.

- Fabrication of new biocompatible hydrogels and particles
- Development of anti-peritoneal adhesion barrier, hemostats
- Drug delivery for peritoneal diseases, mesothelioma, liver cirrhosis, scleroderma
- Medical robots and their intelligent control
- Quantitative surgical skill assessment and its applications

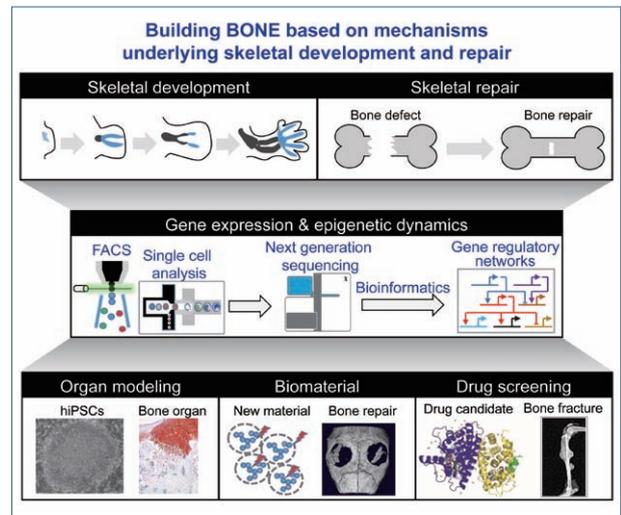


Clinical Biotechnology

<https://gel.tokyo/med/>

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.

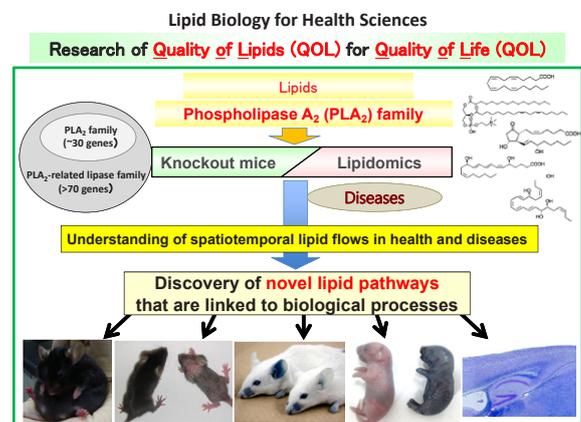
- Identifying dynamics of epigenome and gene regulation in skeletal development and repair by utilizing omics analysis and bioinformatics
- Development of screening tools for identifying mechanisms underlying skeletal development and pathology of skeletal tissues.
- Modeling human skeletal development 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.



Environmental and Metabolic Health Sciences

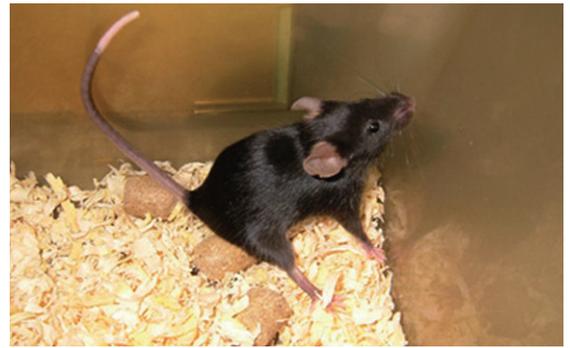
<https://lmmhs.m.u-tokyo.ac.jp>

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.



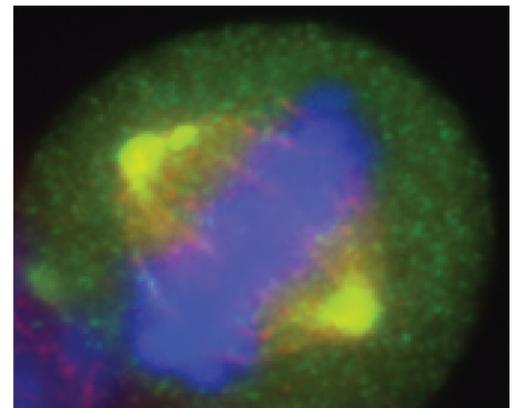
A mutant mouse lacking metabotropic glutamate receptor subtype-1 (mGluR1)

- 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

Molecular Radiology / Reserch Resources and Suport-Radiation Biology

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

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.



Centrosome fragmentation which may lead to aneuploidy

- 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

Biomedical Informatics

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

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 Hospital, to conduct those researches using clinical information. Our activities also include the practical management of information infrastructure to support medical researches.



Computer System for Biomedical Research

- 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



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.



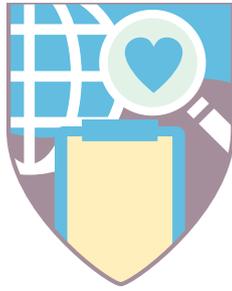
Clinical Simulation Center

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.



One scene of a faculty development workshop

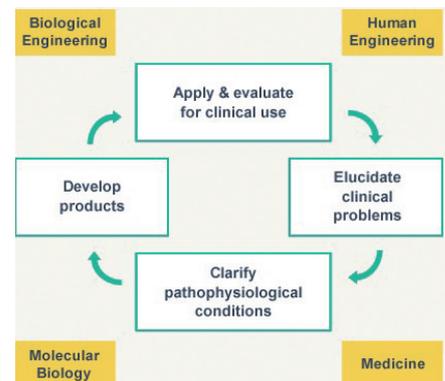


Global Nursing Research Center

Division of Care Innovation

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.

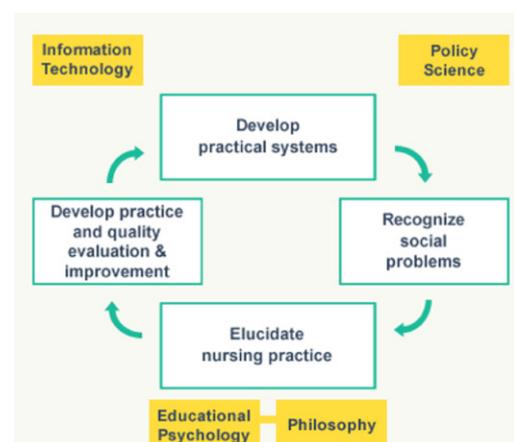
- AI Smart Nursing
 - Data collection and development of AI prediction models for health conditions based on sensor data
 - Development of an AI-based care recommendation application that visualizes disease states and presents appropriate care methods
- Robotics Nursing
 - Development of robotics technology to realize tele-nursing
 - Application of AI/AR to support self-learning of nursing skills
- Biological Nursing
 - Development of a evaluation method for skin physiological status by skin blotting
 - Development of a detecting method of biofilm by wound blotting
- Visualized Nursing
 - Development of educational program for visualization technology using ultrasonography
 - Development of automatic measuring tool for bladder urine volume
- Clinical Nursing Technology
 - Development of nursing technology for early detection of extravasation using the thermo-sensitive liquid crystal film
 - Elucidation of the mechanism of infiltration and extravasation



Division of Nursing System

We promote research activities with the aim of 'providing nursing practice solutions that reflect important cultural and social concerns, constructing Japan-origin nursing theories that support high quality practices, and making policy proposals.' Health Quality and Outcome Research department contributes to developing a methodology to evaluate their health quality well, conducting studies using outcomes from their perspectives, and then finally creating new effective and optimized nursing systems in order to improve the total of quality of life and health quality among. At the Department of Care Quality Management, we explore new research methodologies/innovations of research for care quality assurance and continuous quality improvement system.

- Health Quality and Outcome Research
 - Practice and evaluate nursing care directly or indirectly
 - Deploy research using patient-reported outcomes
 - Explore new health quality indicator
 - Develop evaluation methodologies to understand health quality among overall family and nursing system well
- Care Quality Management
 - Knowledge development in caring practice
 - Support for care workers
 - Care quality assurance in community care system
 - Development of quality indicators and benchmarking



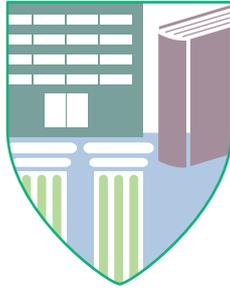


Center for Diversity in Medical Education and Research

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

Office of International Academic Affairs

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

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.

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.



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.

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.

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.

Medical Library

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

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 2021) :
Books(number of volumes) : 274,819 (Japanese 112,470 Foreign 162,349)
Periodicals(number of titles) : 3,623 (Japanese 1,681 Foreign 1,942)
- Visitors (2020): 1,365*
- Borrowed Books (2020): 5,536*

*To deal with COVID-19, our library was open only for 155 days in 2020.



Museum of Health and Medicine

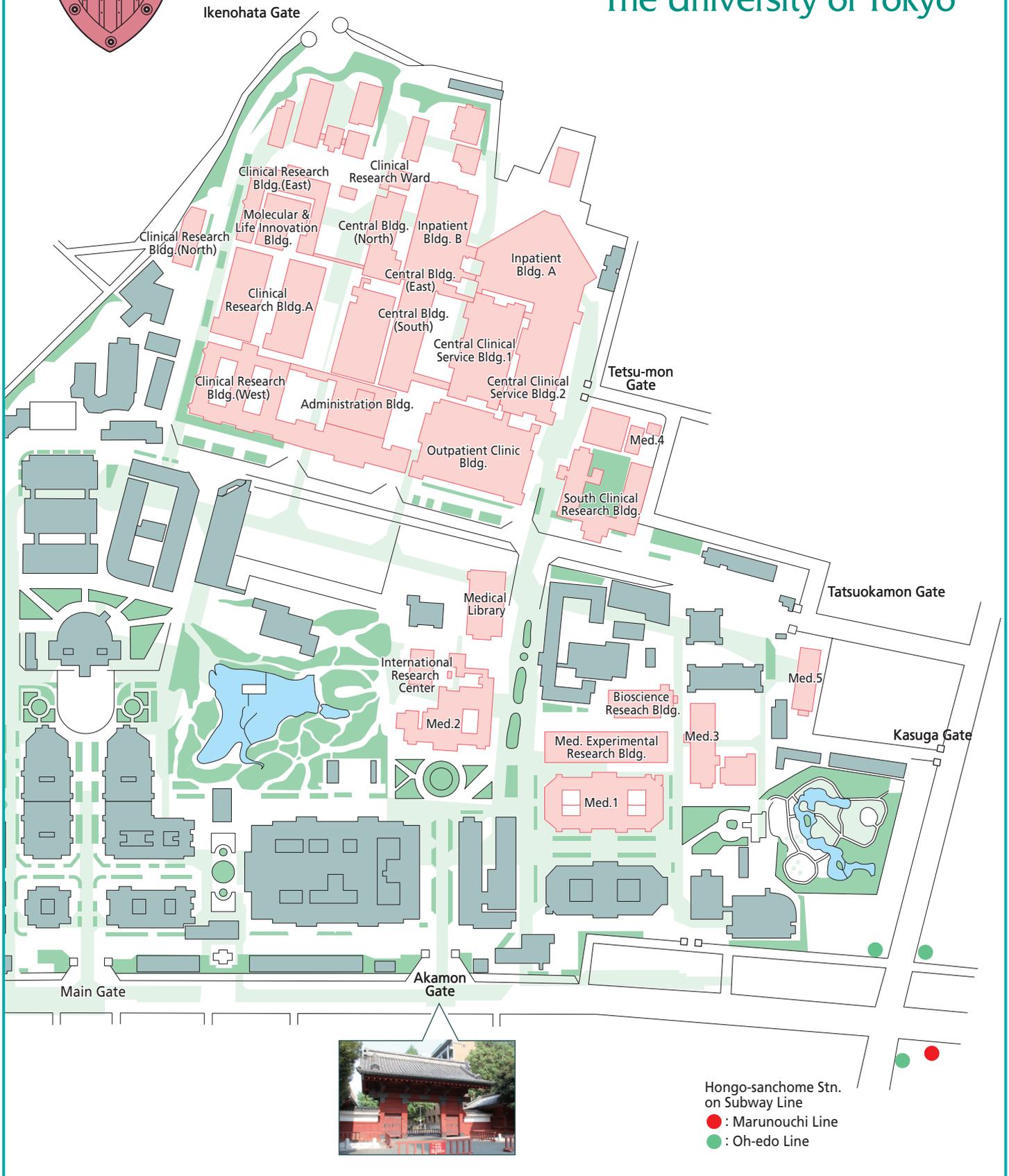
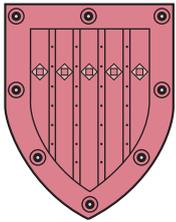
<http://mhm.m.u-tokyo.ac.jp/>

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 gastroscope developed at the University. Special exhibitions is planned to promote understanding among the regarding advances in medical science and health.



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