The University of Tokyo

Faculty of Medicine Graduate School of Medicine



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PROSPECTUS 2011—2012



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

Faculty of Medicine, the University of Tokyo was established in 1858, and in May of 2008 we celebrated the 150th anniversary of our founding. University Executives, faculty members, staff, and students came together for an impressive birthday ceremony, and a student-designed monument was installed in front of our main building. To mark the occasion, we also established the Museum of Health and Medicine in 2011. In addition, we are planning to renovate our clinical amphitheater and lecture rooms.

With its history and traditions in mind, we must move Faculty of Medicine, the University of Tokyo continuously forward. Each year in our Faculty, some 100 to 110 students begin medical school and about 40 are admitted to School of Integrated Health Sciences (School of Health Sciences and Nursing until 2009). Also, through our highly competitive PhD-MD program and the Medical Scientist Training Program that we began in 2008, several outstanding medical students have already taken their first steps on the road to research careers. In 2010, we started the Clinical Research Training Program for clinicians and students who are interested in clinical research. Our graduate school has a wide range of programs of study, and we grant from 150 to 200 doctoral degrees each year. Since its establishment in 2007, our new School of Public Health has admitted many exceptional physicians and public health researchers. It is also noteworthy that many students who enter our Master's degree program in the medical sciences after graduating with Bachelor's degrees in fields other than medicine continue their studies in our doctoral programs.

We expect that medicine will be at the center of the rapidly advancing life sciences in the 21st century. Furthermore, as we face the consequences of having an increasing number of elderly people in our population, we know that integrated health sciences, preventive medicine, environmental medicine, and nursing will become increasingly important. We have internationally prominent teachers and researchers working in a wide variety of fields, and numerous endowed departments and social cooperation programs that embody productive relations between academia and industry.

Through our four Global Centers of Excellence (GCOE), we support financially graduate students and collaborative research with other graduate schools. Among our international activities, we teach students mainly from Asia and southeast Asia but also from other regions, and we are forging new ties with universities in Europe and North America.

Thus we are involved in a broad and growing spectrum of activities: investigating the human body in health and disease; promoting cross-disciplinary integration at the cutting edge of medical research and education; improving methods of diagnosis, treatment, and acute and long-term care; strengthening preventive medicine; improving hospital management and medical services delivery; and communicating effectively in the wider social sphere.

In brief, we continue on our missions to provide the best possible medical care to patients in need today and to train top-level research scientists who will lay the foundations of medicine for tomorrow.

Chri Miyan

Dean, Faculty and Graduate School of Medicine The University of Tokyo



HISTORY

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

- 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 Phoniatrics 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.
- 2003 Apr. The Center for Disease Biology and Integrative Medicine was established.
- 2004 Apr. All the National Universities owned by the Japanese Government became National University Corporations. and the University of Corporation.
- 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.

Graduate School of Medicine

Dean Kohei Moyazono

Molecular Cell Biology			
Cell Biology and	Cell Biology	Associate Professor	Yosuke Takei
Anatomy	Structural Biology	Professor	Masahide Kikkawa
-	Structural Cell Biology	Associate Professor	Yoshimitsu Kanai
	Cellular Neurobiology	Professor	Shigeo Okabe
Biochemistry and Molecular Biology	Molecular Biology	Professor Associate Professor	Hiroto Okayama Shigeki Jinno
Molecular Biology	Cellular Signaling	Professor Associate Professor	Takao Shimizu Motonao Nakamu
	Physiological Chemistry and Metabolism	Professor	Hiroki Kurihara
Functional Biology			
Physiology	Integrative Physiology	Professor Associate Professor	Yasushi Miyashita Seiki Konishi
	Cellular and Molecular Physiology	Professor	Kensaku Mori
	Neurophysiology	Professor Associate Professor	Masanobu Kano Kazuo Kitamura
Pharmacology	Cellular and Molecular Pharmacology	Professor	Masamitsu lino
i narina cology	Molecular Neurobiology	Professor	Masayoshi Mishina
Pathology, Immunology	and Microbiology		
Pathology		Professor	Masashi Fukayama
	Pathology and Diagnostic Pathology	Associate Professor Associate Professor	Hiroshi Uozaki Shumpei Ishikawa
	Molecular Pathology	Professor Associate Professor	Kohei Miyazono Tetsuro Watabe
Microbiology	Microbiology	Professor	Masanori Hatakey
	Infection Control and Prevention	Professor	Kyoji Moriya
Immunology	Immunology	Professor Associate Professor	Tadatsugu Taniguc Kenya Honda
*Collaborative Department	Tumor Pathology / Infection Patholog	gy / Molecular Onc	ology
Radiology and Biomedic	al Engineering		
Radiology	Diagnostic Radiology	Professor Associate Professor	Kuni Ohtomo Satoshi Kunimatsu
	Radiotherapy	Associate Professor	Keiichi Nakagawa
	Nuclear Medicine	Associate Professor	Toshimitsu Momo
Biomedical Engineering	System Physiology		
	Chemical Biology and Molecular Imaging	Professor	Yasuteru Urano
	Biosystem Construction and Control	Associate Professor	Yusuke Abe
Neuroscience			
Basic Neuroscience	Neuropathology	Professor	Takeshi lwatsubo
	Neurochemistry	Associate Professor	Haruhiko Bito
	Neurobiology	Professor	Kenzo Hirose
Internative Medical	Developmental Neuroscience		
Neuroscienco	Cognitive Neuroscience	Associate Professor	Katsuyuki Sakai
וזכעוטגוכוונפ	Systems Medical Neuroscience		
	Child Neuropsychiatry	Associate Professor	Yukiko Kano

	Clinical Neuroscience	Neuropsychiatry	Professor Associate Professor Associate Professor	Kiyoto Kasai Hidenori Yamasue Chihiro Kakiuchi
		Neurology	Professor	Shoji Tsuji
			Associate Professor	Shin Kwak
		Neurosurgery	Professor	Nobuhito Saito
			Associate Professor	Kensuke Kawai
	Social Medicine			
	Occupational, Environmental and	Molecular Preventive Medicine	Professor Associate Professor	Kouji Matsushima Sho Ishikawa-Yamawal
p26	Preventive Medicine	Public Health	Professor Associate Professor	Yasuki Kobayashi Takahiro Higashi
		Radiological Health		
	Forensic Medicine, and	Forensic Medicine	Professor	Ken-ichi Yoshida
	Medical Informatics and Economics	Medical Informatics and Economics	Professor	Kazuhiko Ohe
	Internal Medicine			
	Medicine I	Cardiovascular Medicine	Professor	Ryozo Nagai
		Vascular Biology		, 0
D)8		Respiratory Medicine	Professor	Takahide Nagase
PZO		Gastroenterology	Professor	Kazuhiko Koike
		Nephrology	Professor	Toshiro Fujita
	Modicipo II	Endocrinology	Professor	Toshiro Fujita
		Nutrition and Metabolism	Professor Associate Professor	Takashi Kadowaki Kohjiro Ueki
		Hematology and Oncology	Professor	Mineo Kurokawa
		Allergy and Rheumatology	Professor	Kazuhiko Yamamoto
		Infectious Diseases	Associate Professor	Hiroshi Yotsuyanagi
		Stress Science and Psychosomatic Medicine	Professor Associate Professor	Akira Akabayashi Kazuhiro Yoshiuchi
	Clinical Laboratory Medicine and Pathology	Clinical Laboratory Medicine	Professor Associate Professor	Yutaka Yatomi Hitoshi Ikeda
	medicine and ratiology	Transfusion Medicine	Professor	Koki Takahashi
	Reproductive, Developme	ental and Aging Sciences		
	Obstetrics and Gynecology	Reproductive Endocrinology	Professor Associate Professor	Yuji Taketani Tomoyuki Fujii
22	cyccgy	Gynecological Oncology	Associate Professor	Tetsu Yano
P32		Perinatal Medicine	Professor	Shiro Kozuma
		Molecular Cellular Reproductive Medicine	Professor	Shiro Kozuma
	Pediatric Sciences	Pediatrics	Professor Associate Professor	Takashi Igarashi Kohmei Ida
		Developmental Pediatrics	Professor Associate Professor	Takashi Igarashi Sachiko Kitanaka
		Pediatric Surgery	Professor	Tadashi Iwanaka
		Pediatric Oncology	Professor	Tadashi Iwanaka
	Aging Sciences	Geriatrics	Professor Associate Professor	Yasuyoshi Ouchi Masahiro Akishita
		Aging Research	Professor	Yasuyoshi Ouchi

Surgical Sciences			
Surgery	Thoracic Surgery	Professor	Jun Nakajima
Surgery	Cardiovascular Surgery	Professor Associate Professor	Minoru Ono Arata Murakami
	Gastrointestinal Surgery	Professor Associate Professor Associate Professor	Yasuyuki Seto Sachiyo Nomura Nobuyuki Shimi
	Hepatobiliary Pancreatic Surgery	Professor Associate Professor	Norihiro Kokud Kiyoshi Hasegav
	Urology	Professor Associate Professor	Yukio Homma Haruki Kume
	Artificial Organ and Transplantation Division	Associate Professor	Yasuhiko Sugaw
	Surgical Oncology	Associate Professor	Joji Kitayama
	Vascular Surgery	Associate Professor	Tetsuro Miyata
	Metabolic Care and Endocrine Surgery	Associate Professor	Toshihisa Ogaw
Sensory and Motor System Medicine	Dermatology	Professor Associate Professor	Shinichi Sato Takafumi Kador
	Plastic and Reconstructive Surgery	Professor	Isao Koshima
	Oral and Maxillofacial Surgery	Professor Associate Professor Associate Professor	Tsuyoshi Takato Takafumi Susam Yoshiyuki Mori
	Orthopaedic Surgery	Associate Professor Associate Professor	Hiroshi Kawagu Sakae Tanaka
	Ophthalmology	Professor Associate Professor Associate Professor	Shiro Amano Satoshi Kato Yasuhiro Tamak
	Otorhinolaryngology and Head & Neck Surgery	Professor Associate Professor Associate Professor	Tatsuya Yamaso Takahiro Asakag Shinichi Iwasaki
	Rehabilitation Medicine	Professor	Nobuhiko Haga
Vital Care Medicine	Anesthesiology	Professor	Yoshitsugu Yama
vital care meanine	Emergency and Critical Care Medicine	Professor	Naoki Yahagi
Health Sciences and Nurs	sing		
Health Sciences	Health Sociology		
nearth sciences	Mental Health	Professor Associate Professor	Norito Kawaka Akihito Shimazi
	Epidemiology and Preventive Health Sciences	Professor	Yasuo Ohashi
	Social Gerontology	Professor	Ichiro Kai
	Health Promotion Sciences	Associate Professor	Jung Su Lee
	Biostatistics	Associate Professor	Yutaka Matsuva
	Biomedical Ethics	Professor	Akira Akabavasi
	Advanced Clinical Nursing	Professor	Katsuva Kanda
Preventive and	Nursing Administration	Professor	Katsuya Kanda
Administrative Nursing	Family Nursing	Associate Professor	Kiyoko Kamibe
	Community Health Nursing	Professor	Sachiyo Murash
	Public Health Nursing	Professor	Sachiyo Murash
	Adult Nursing	Professor	Hiromi Sanada
Clinical Nursing	Palliative Care Nursing	Professor	Hiromi Sanada
	Midwifery and Women's Health	Professor	Sachivo Murash
	Psychiatric Nursing	Professor	Norito Kawaka
	Gerontological Nursing	Professor	Hiromi Sanada
	Wound Care Management	Professor	Hiromi Sanada
	Tound Care Flanagement	10163501	i in orni Sariada

International Health			
International Social	Global Health Policy	Professor	Kenji Shibuya
Medicine	Community and Global Health	Professor	Masamine Jimba
International Biomodical Sciences	Human Genetics	Professor Associate Professor	Katsushi Tokunaga Akihiko Mabuchi
biometrical sciences	Developmental Medical Sciences	Professor Associate Professor	Masashi Mizuguchi Teruyuki Tanaka
	Human Ecology	Professor Associate Professor	Chiho Watanabe Masahiro Umezaki
	Biomedical Chemistry	Professor Associate Professor	Kiyoshi Kita Yoh-ichi Watanabe
School of Public Health			
Epidemiology and Health Sciences	Biostatistics	Professor Associate Professor	Yasuo Ohashi Yutaka Matsuyama
	Social and Preventive Epidemiology	Professor	Satoshi Sasaki
	Health Economics and Epidemiology Research	Professor Associate Professor	Hideki Hashimoto Takashi Fukuda
	Health Communication	Professor Associate Professor	Takahiro Kiuchi Hirono Ishikawa
Behavioral Health	Mental Health	Professor Associate Professor	Norito Kawakami Akihito Shimazu
Sciences	Health Sociology and Health Education	on	
	Social Gerontology	Professor	Ichiro Kai
	Health Promotion Science	Associate Professor	Jung Su Lee
	Biomedical Ethics	Professor	Akira Akabayashi
Health Services Sciences	Health Policy	Professor Associate Professor	Yasuki Kobayashi Takahiro Higashi
	Healthcare Informatics	Professor	Kazuhiko Ohe
	Clinical Information Engineering	Professor	Hiroshi Oyama
	Forensic Medicine and Medical Law	Professor	Ken-ichi Yoshida
Center for Disease Biology	/ and Integrative Medicine	Direct	or Masamitsu lino
Laboratory of Molecular	Biomedicine for Pathogenesis	Professor	Toru Miyazaki
, Laboratory of Structural I	Physiology	Professor	, Haruo Kasai
Laboratory of Regeneration	ve Medical Engineering	Professor Associate Professor	Takashi Ushida Taichi Ito
Laboratory of Clinical Bic	otechnology	Professor Associate Professor	Kazunori Kataoka Nobuhiro Nishiyama
Laboratory of Environme	ntal Health Sciences	Professor Associate Professor	Chiharu Tohyama Seiichiroh Ohsako
Laboratory of Animal Res	ources	Professor Associate Professor	Atsu Aiba Kazuki Nakao
Laboratory of Molecular	Radiology	Professor	Kiyoshi Miyagawa
Divisions of Research Res	sources and Support		
(Section of Animal Rese	arch)		

(Section of Radiation Biology)

(Section of Bioinfomatics)



Institution

Office of International Academic Affairs	Head	Yasuyuki Seto
Medical Library	Head	Kazuhiko Ohe
Medical Scientist Training Program	Head	Masahide Kikkawa
Museum of Health and Medicine	Head	Kazuhiko Ohe

Endowed Department Pharmacoepidemiology Kiyoshi Kubota Professor Department of Integrated Traditional Medicine (Tsumura) Associate Professor Tetsuro Okabe Hiroyuki Koyama Department of Vascular Regeneration (Daiichi Sankyo Co., Ltd.) Associate Professor Department of Bone & Cartilage Regenerative Medicine Taku Saito Associate Professor Department of Cartilage & Bone Regeneration (Fujisoft) Kazuto Hoshi Associate Professor Department of Clinical Renal Regeneration Keiichi Hishikawa Associate Professor Clinical Molecular Epidemiology (Mitsubishi Tanabe Pharma Corporation) Associate Professor Takanari Gotoda Immunotherapeutics (Medinet) Kazuhiro Kakimi Associate Professor **Total Renal Care Medicine** Associate Professor Akira Ishikawa Integrated Molecular Science on Metabolic Diseases Associate Professor Kazuo Hara Department of Advanced Clinical Science and Therapeutics Associate Professor Junichi Suzuki Yasunobu Hirata Associate Professor Ischemic Circulatory Physiology, Kaatsu Training Associate Professor Toshiaki Nakajima Translational Research for Healthcare and Clinical Science Hiroyuki Morita Associate Professor Department of Joint Disease Research Associate Professor Noriko Yoshimura Health Management and Policy Associate Professor Hideo Yasunaga Naoto Hayashi Computational Diagnostic Radiology and Preventive Medicine Associate Professor Kansei Uno Associate Professor Clinical Motor System Medicine Associate Professor Toru Akune Healthcare Safety Management (Tokio Marine & Nichido) Yasushi Kodama Professor Katsuyuki Ando Molecular Cardiovascular Metabolism Associate Professor Department of Healthcare Quality Assessment Associate Professor Hiroaki Miyata Anti-Aging Medicine Satoshi Inoue Professor Integrated Imaging Informatics Associate Professor Naoki Yoshioka Department of Nutriproteomics Professor Kazumi Yagasaki **Clinical Epidemiology and Systems** Tsutomu Yamazaki Professor Associate Professor Daisuke Koide **Clinical Trial Data Management** Associate Professor Takuhiro Yamaguchi Pharmacology and Pharmacokinetics Akihiro Hisaka Associate Professor **Ubiquitous Preventive Medicine** Associate Professor Toru Suzuki Science for Joint Reconstruction Yoshio Takatori Professor Associate Professor Toru Moro Therapeutic Strategy for Heart Failure Shunei Kyo Professor Satoshi Gojo Associate Professor Takashi Nishimura Associate Professor Molecular Neuroscience on Neurodegeneration Atsushi lwata Associate Professor Chronic Kidney Disease Associate Professor Miki Nagase Molecular Structure and Dynamics (JEOL / Zeiss) Professor Nobutaka Hirokawa Molecular Vascular Endocrinology Masashi Isshiki Associate Professor Department of Medical Genomics Professor Hiroyuki Mano Associate Professor CHOI Young Lim **Continence Medicine** Professor Yasuhiko Igawa Department of Molecular Psychiatry Kazuya Iwamoto Associate Professor Department of Life Support Technology (Molten) Taketoshi Mori Associate Professor Quality Assessment and Control of Medical Device Sterilization Yushi Uetera Associate Professor Department of Youth Mental Health Associate Professor Tsuyoshi Araki Molecular Medicinal Sciences on Metabolic Regulation Hiroaki Okazaki Associate Professor

Socia	l Cooperation Program				
	Department of Ubiquitous Health Informatics	Associate Professor	Hideo Fujita		
	Department of Lipidomics	Associate Professor	Yoshihiro Kita		
	Functional Regulation of Adipocytes	Associate Professor	Hironori Waki		
Resea	Research Unit				
	Translational Systems Biology and Medicine Initiative	Associate Professor	Naoto Kubota		
	Organization of the Center for Supporting Innovative Medicine and Execution of Translational Research	Professor Associate Professor	Tomoki Todo Yasushi Ino		
	Comprehensive Center of Education and Research for Chemical Biology of the Diseases	Associate Professor Associate Professor	Ichiro Manabe Hiroshi Kawasaki		
	Medical System Innovation through Multidisciplinary Integration	Associate Professor	Keiji Itaka		
	Cancer Genomics Project	Associate Professor	Seishi Ogawa		
	Human Resource Development for Multidisciplianary Medical Teams	Associate Professor	Masato Eto		

Faculty of Medicine	Dean Kohei Moyazono
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 / Clinincal Laboratory Medicine and Pathology / Obstetrics and Gynecology / Pediatric Science / Aging Science / Sugery / 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



University Hospital

Director Takashi Kadowaki

	Clinical Division			
	Department of	General Medicine	Professor	Takahide Nagase
	Internal Medicine	Cardiovascular Medicine	Professor	Ryozo Nagai
		Respiratory Medicine	Professor	Takahide Nagase
		Gastroenterology	Professor	Kazuhiko Koike
		Nephrology and Endocrinology	Professor	Toshiro Fujita
		Metabolic Diseases	Professor Associate Professor	Takashi Kadowaki Kojiro Ueki
		Hematology and Oncology	Professor	Mineo Kurokawa
		Allergy and Rheumatology	Professor	Kazuhiko Yamamoto
		Infectious Diseases	Associate Professor	Hiroshi Yotsuyanagi
		Neurology	Professor Associate Professor	Shoji I suji Shin Kwak
			Professor Associate Professor	Yasuyoshi Ouchi Masahiro Akishita
		Psychosomatic Medicine	Professor Associate Professor	Akira Akabayashi Kazuhiro Yoshiuchi
	Department of	General Surgery	Professor	Norihiro Kokudo
	Surgery	Stomach and Esophageal Surgery	Professor Associate Professor	Yasuyuki Seto Sachiyo Nomura
		Colon and Rectal Surgery	Associate Professor	Joji Kitayama
		Hepatobiliary Pancreatic Surgery	Professor Associate Professor	Norihiro Kokudo Kiyoshi Hasegawa
		Vascular Surgery	Associate Professor	Tetsuro Miyata
		Breast and Endocrine Surgery	Associate Professor	Toshihisa Ogawa
		Artificial Organ and Transplantation Surgery	Professor Associate Professor	Norihiro Kokudo Yasuhiko Sugawara
		Cardiovascular Surgery	Professor Associate Professor	Minoru Ono Arata Murakami
		Thoracic Surgery	Associate Professor	Jun Nakajima
		Neurosurgery	Professor Associate Professor	Nobuhito Saito Kensuke Kawai
		Anesthesiology and Pain Relief Center	Professor	Yoshitsugu Yamada
		Urology and Andrology	Professor Associate Professor	Yukio Honma Haruki Kume
		Gynecologic Surgery	Associate Professor	Tetsu Yano
	Department of	Dermatology and Photolaser Medicine	Professor Associate Professor	Shinichi Sato Takefumi Kadono
	Motor System Medicine	Ophthalmology and Vision Correction	Professor Associate Professor Associate Professor	Takahide NagaseRyozo NagaiTakahide NagaseKazuhiko KoikeToshiro FujitaTakashi Kadowaki Kojiro UekiMineo KurokawaKazuhiko YamamotoHiroshi YotsuyanagiShoji Tsuji Shin KwakYasuyoshi Ouchi Masahiro AkishitaAkira Akabayashi Kazuhiro YoshiuchiNorihiro Kokudo Yasuyuki Seto Sachiyo NomuraJoji KitayamaNorihiro Kokudo Kiyoshi HasegawaTetsuro MiyataToshihisa OgawaNorihiro Kokudo Yasuhiko SugawaraMinoru Ono Arata MurakamiJun NakajimaNobuhito Saito Kensuke KawaiYoshitsugu YamadaYukio Honma Haruki KumeTetsu YanoShinchi Sato Takefumi KadonoShiro Amano Yasuhiro Tamaki Satoshi KatoHiroshi Kawaguchi Sakae TanakaTatsuya Yamasoba Takafuri Asakage Shinichi IwasakiNobuhiko HagaIsao KoshimaYasuhiro JakajimaYoshitsugu YamadaYukio Honma Haruki KumeTetsu YanoShinchi Sato Takefumi KadonoShiro Amano Yasuhiro Tamaki Satoshi KatoHiroshi Kawaguchi Sakae TanakaTakafumi Susami Yoshisuki MoriTakafumi Susami Yoshiyuki MoriTakashi Igarashi Sachiko Kitanaka Koumei IdaTaudashi IwanakaYuji Takatani Tomoyuki Fujii
		Orthopaedic Surgery and Spinal Surgery	Associate Professor Associate Professor	Hiroshi Kawaguchi Sakae Tanaka
		Otorhinolaryngology, and Auditory and Voice Surgery	Professor Associate Professor Associate Professor	Tatsuya Yamasoba Takahiro Asakage Shinichi Iwasaki
		Rehabilitation Medicine	Professor	Nobuhiko Haga
		Plastic, Reconstructive and Aesthetic Surgery	Professor	Isao Koshima
		Oral-Maxillofacial Surgery, Dentistry and Orthodontics	Professor Associate Professor Associate Professor	Tsuyoshi Takato Takafumi Susami Yoshiyuki Mori
	Department of Pediatrics, Perinatal and	Pediatrics	Professor Associate Professor Associate Professor	Takashi Igarashi Sachiko Kitanaka Koumei Ida
	women's weakine	Pediatric Surgery	Professor	Tadashi Iwanaka
		Obstetrics and Gynecology	Professor Associate Professor	Yuji Takatani Tomoyuki Fujii

Department of Neuropsychiatry	Neuropsychiatry	Professor Associate Professor Associate Professor	Kiyoto Kasai Hidenori Yamasue Chihiro Kakiuchi	
Department of Radiology	Radiology	Professor Associate Professor Associate Professor Associate Professor	Kuni Ohtomo Keiichi Nakagawa Toshimitsu Momose Akira Kunimatsu	
Central Clinical Faci	lities			
Pharmaceutical	Department	Professor Associate Professor	Hiroshi Suzuki Kousei Ito	
Clinical Labora	tory	Director Vice Director	Yutaka Yatomi Hitoshi Ikeda	
Operation Cen	iter	Professor Associate Professor	Hiroshi Yasuhara Kazuhiko Fukatsu	
Imaging Center		Professor and Directo Associate Professor	r Kuni Ohtomo Masaaki Akabane	
Emergency Ser	vices	Professor	Naoki Yahagi	
Department of	Blood Transfusion	Professor	Koki Takahashi	
Perinatal Cente	er	Professor	Shiro Kozuma	
Rehabilitation S	Service	Professor	Nobuhiko Haga	
Department of	Medical Engineering			
Central Supply	Service	Associate Professor	Kazuhiko Fukatsu	
Intensive Care	Unit	Professor	Naoki Yahagi	
Pathology		Professor Associate Professor	Masashi Fukayama Hiroshi Uozaki	
Department of	Corneal Transplantation	Associate Professor	Satoru Yamagami	
Department of	Cell Therapy and Transplantation Medici	ine Professor	Mineo Kurokawa	
Department of	Endoscopy and Endoscopic Surgery	Associate Professor	Mitsuhiro Fujishiro	
Department of	Hemodialysis and Apheresis	Professor Associate Professor	Toshiro Fujita Eisei Noiri	
Medical Comm	unity Network and Discharge Planning	Professor	Yasuyoshi Ouchi	
Infection Cont	rol and Prevention Service	Professor	Kyoji Moriya	
Department of	Planning, Information and Management	Professor Associate Professor	Kazuhiko Ohe Soichi Koike	
University Hos	pital Medical Information Network Cent	er Professor	Takahiro Kiuchi	
Organ Transpla	ntation Service	Professor Associate Professor	Norihiro Kokudo Yasuhiko Sugawara	
Department of	Nutrition			
Labor Safety an	nd Health Management Office	Associate Professor	Shin Onishi	
Child Psychiatr	у	Associate Professor	Yukiko Kano	
Tissue Bank				
Epidemiology ar	nd Preventive Medicine	Professor	Tsutomu Yamazaki	
Cancer Resour	rce Center			
Center for Liais	on and Public Relations	Professor	Kazuhiko Ohe	
Database Cent	er of the National University Hospital			
Department of	Chemotherapy	Professor	Norihiro Kokudo	
Neonatal and F	Neonatal and Pediatric Intensive Care Unit		Arata Murakami	
Department of	Department of Medical Record Management		Yasuyoshi Ouchi	
Critical Care C	Center	Associate Professor	Susumu Nakajima	
Department of	Palliative Medicine	Associate Professor	Keichi Nakagawa	
Nursing Depar	tment		0	
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Clinical Research Division				
Clinical Research Support Center	Professor	Nobuto Saito		
22nd Century Medical and Research Center	Professor	Tsuyoshi Takato		
Department of Tissue Engineering	Professor	Tsuyoshi Takato		
Cooperative Unit of Medicine and Engineering Research	Associate Professor	Tetsuro Miyata		
Translational Research Center	Professor	Ryozo Nagai		
Center for Genome Medicine	Professor	Shoji Tsuji		

Organization of Clinical Management Support

Department of Personnel Administration and Human Resource Management / Department of Performance Monitoring, Risk Management, and Staff Development / Department of Hospital Planning and Management / Department of Education and Research Support Associate Professor

Associate Professor

Nobuyuki Shimizu Shin Onishi

Organization of Clinical Management

Inpatient Services Administration / Outpatient Services Administration / Central Clinical Services Administration

Center			
p56	The International Research Center for Medical Education	Director Professor	Kazuhiko Yamamoto Kiyoshi Kitamura





Faculty of Medicine Graduate School of Medicine The University of Tokyo

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Molecular Cell Biology

Cell Biology and Anatomy

Cells transport various kinds of proteins, lipids and mRNAs after synthesis to their specific destinations such as several types of membranous organelles, protein complexes and the mRNA complex. Thus, intracellular transport is fundamental to cellular functions, survival and morphogenesis. Our laboratory is studying the mechanisms of intracellular transport and cellular morphogenesis, especially focusing on molecular motors, Kinesin superfamily proteins (KIFs) and microtubule associated proteins (MAPs) using molecular cell biology, biophysics, structural biology, and molecular genetics

- Molecular cell biological study of KIFs
- Studies of the mechanism for recognition of and binding to cargoes by KIFs and the regulation of this mechanism
- Studies of the mechanisms of differential directional transports and sorting
- Studies of the dynamics and mechanism of motility of KIFs using molecular biophysics and structural biology
- Molecular genetics of KIFs
- Studies of KIFs and related diseases
- Molecular cell biology and molecular genetics of MAPs



CELL BIOLOGY

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

MOLECULAR

nature

REVIEWS

CARGO TRANSPORTERS

Molecular Cell Biology 10, 2009)

Schematic representation of intracellular transport performed by Kinesin superfamily motor proteins, KIFs.

(Reproduced from the cover of Nature Review of

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



Structural Biology

Kikkawa lab is interested in flagella/cilia, which works as an actuator as well as a sensor of cells. We are studying the mechanism of formation and function of flagella/cilia using cryo-electron microscopy, optical microscopy, and genetics. We are also developing new technologies to analyze images taken by microscopes.

Our focuses are:

- Molecular formation of flagella and axonemal dyneins.
- Mechanism of force generation by dyneins.
- Structures of microtubule-associated proteins
- Development of new image analysis methods for cryo-electron microscope

Three dimensional reconstruction of the outer dynein arm-microtubule complex from wild type. A: rigor state and B: relaxed state.

Structural Cell Biology

Our research aims to elucidate the cellular architecture, especially focusing on the cytoskeleton by combining molecular cell biology, molecular genetics and structural biology.

- Structure of the cytoskeleton and the related proteins
- Dynamics of the cytoskeleton and the related proteins
- Function of the cytoskeleton and the related proteins

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



The neuronal cytoskeleton (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



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

Molecular Biology

We have been studying the molecular mechanism enabling anchorage-independent S phase onset that is the key for malignant transformation.

- Understanding the anchorage signal cascades that control cell cycling
- Understanding the mechanism by which anchorage signals control the G1-S transition

http://www.cellcycle.m.u-tokyo.ac.jp



Cellular Signaling

Our laboratory specializes in biochemistry, molecular and cellular biology, and genetic engineering to elucidate the roles of lipid mediators in vivo. We further study the molecular mechanism and biological significance of diversity and asymmetry of cellular membrane lipids. In collaboration with the Department of Lipidomics, we analyze stimulus induced dynamic changes in the lipid composition of the cellular membrane.

- Discovery and structural determination of novel lipid mediators
- Cloning, functional characterization and K/O studies of enzymes involved in the metabolism of lipid mediators and receptors for lipid mediators
- Structure, function and dynamics of GPCR
- Lipidomics and enzyme characterization of membrance organization

Production of lipid mediators during Lands' Cycle and activation of GPCRs (Shimizu, T., Ann. Rev. Pharmacol. Toxicol. 49, 123-150, 2009)

Physiological Chemistry and Metabolism

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

- Molecular mechanisms of neural crest fate determination and craniofacial morphogenesis
- Molecular mechanisms of cardiovascular development
- Epigenetic control of embryonic development
- Roles of microRNA in embryonic development

http://biochem2.umin.jp/index_j.html



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



Transformation of the upper jaw into a lower jaw in endothelin-1 knock-in (misexpressing) mouse (upper). The lower is the wild-type control.



Functional Biology

Integrative Physiology

Our laboratory specializes in the neuroscience research on cognitive functions in the primate. We investigate interactions among many neurons in the cerebral cortex, which create human cognitive abilities such as memory and its cognitive control. These studies have been done through integrative efforts using electrophysiological, molecular biological and neuroimaging approaches.

- Neural circuits of memory neurons in the temporal cortex
- Roles of the top-down signal from the prefrontal cortex
- Functional architecture of the prefrontal cortex
- Molecular biological basis of declarative memory in the primate
- Development of optogenetics and viral gene-delivery methods in the primate
- High-field MRI for humans and monkeys

http://www.physiol.m.u-tokyo.ac.jp/ indexe/indexe.html



Brain activation in cognitive tasks (left) and gene expression (BDNF) in cortical neurons

Cellular and Molecular Physiology

We aim at a better understanding of neuronal mechanisms that translate sensory information of the external world into motivational and emotional responses. We are currently analyzing the central nervous system for olfaction, a sensory modality that has a strong influence on human emotion. Another major focus is to understand cellular and molecular mechanisms for reorganization of neuronal circuits and memory consolidation in the central olfactory system.

- Functional analysis of the neuronal circuit in the central olfactory nervous system (olfactory bulb and olfactory cortex)
- Neurogenesis and neuron-elimination in the adult brain
- Cellular and molecular mechanisms for the reorganization of neuronal circuits and memory consolidation in the central olfactory system.

http://morilab.m.u-tokyo.ac.jp/eindex.html



Neuronal circuits and 'odor maps' in the olfactory nervous system

Neurophysiology

Our laboratory studies the function of the synapse, a key structure for brain functions, and its changes related to postnatal development, learning, and memory. We make real time monitoring of neuronal activities, using 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



Molecular mechanisms of endocannabinoid-mediated retrograde modulation of synaptic transmission

Cellular and Molecular Pharmacology

We are studying the basic principles of Ca²⁺ signaling, the fundamental signal transduction mechanism of life. Based on such studies, we are searching for new functions of Ca2+ signaling in the central nervous system, and are aiming at shedding new light on brain functions using innovative imaging methods.

- Elucidation of basic principles of Ca²⁺ signaling
- Search for new functions of Ca²⁺ signaling in the brain
- Functional analyses of neurons and glial cells using imaging methods of signaling molecules

Glutamate IP Ca² [Ca²⁺]mt NFAT NO signal Synapse Neuron-Glia

Outline of our research on Ca2+ signaling

Molecular Neurobiology

We have been investigating the molecular basis of higher brain functions by focusing on the glutamate receptor and memory. Previous studies have led to the hypothesis that there is a common principle between memory signaling and synapse formation. The combination of conditional gene targeting in mice and molecular genetics in zebra fish will facilitate our understanding of the mechanism of higher brain function at the molecular, cellular and neural network levels.

- Regulation of brain functions by glutamate receptors in specific brain regions
 - Identification of neural networks for learning and memory
 - Regulation of learning and memory
 - Roles of glutamate receptors in decision-making
- Signaling from glutamate receptors to memory
- Molecular mechanisms of synapse formation and remodeling
 - Molecular mechanism of synapse formation during development
 - · Molecular mechanism of synapse remodeling in the adult brain

http://www.pharmacol2.m.u-tokyo.ac.jp/



From synaptic molecules to brain function and dysfunction

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

http://calcium.cmp.m.u-tokyo.ac.jp/



Pathology, Immunology and Microbiology

Pathology and Diagnostic Pathology

We investigate the pathogenesis and pathobiology of disease, especially the neoplastic diseases, by means of morphology. Our goal is to discover new entities and to clarify unknown pathogenesis of diseases through the interaction with clinical medicine.

- Chronic inflammation and neoplasm
 - Epstein-Barr virus associated gastric carcinoma
 - Epigenetics of carcinoma
 - Carcinoma-stromal interaction
 - Lung adenocarcinoma and its scar formation
 - Lung fibrosis and adenocarcinoma
- Application of molecular pathology to pathological diagnosis
 - Discovery of cancer therapy target by DNA chip technology
 - Establishment of objective criteria for cancer grading
 - · Streamlining and acceleration of pathological diagnostic processes

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



Investigation of the development of EB virus-associated gastric carcinoma

Molecular Pathology

Our research is focused on the molecular mechanisms of carcinogenesis. We study the signaling mechanisms of the TGF- β family, including TGF- β and bone morphogenetic proteins (BMPs), and elucidate how they regulate progression of cancers. We also investigate the mechanisms of differentiation of murine embryonic stem cells (ESCs) into various cells, including vascular and lymphatic endothelial cells. Based on these findings, we will develop new strategies for the treatment of vascular and lymphatic diseases and cancer.

- Molecular mechanisms of growth regulation by TGF-β
- Roles of TGF-β in epithelial-to-mesenchymal transition
- Effects of TGF-β family cytokines on cancer-initiating cells
- Roles of TGF-β family cytokines in vascular and lymphatic diseases
- Differentiation of vascular and lymphatic endothelial cells and mechanisms of diseases

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



Microbiology

http://microbiology.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 wellas 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



Infection control team rounds



Immunology

Since its initial identification of the genes for interferon (IFN)- β and interleukin (IL)-2, our laboratory has continued to elucidate the signal transduction and transcriptional regulatory networks involved in immunity and oncogenesis.

- The signaling and transcriptional networks that operate in the regulation of and by IFN- α/β during innate immune responses,
- The role and regulation of the interferon regulatory factor (IRF) transcription factor family in innate and adaptive immune responses,
- The regulation of dendritic cell maturation/activation in the link between innate and adaptive immunities,
- The molecular mechanisms of protective and pathological immune responses mediated by nucleic acid sensor proteins,
- The regulation of oncogenesis by IRFs,
- The regulation of mucosal immune responses.

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



A schematic view of the hierarchy in the nucleic-acid-mediated activation of immune responses.

All immunogenic nucleic acids bind HMGBs (promiscuous sensing), which is required for subsequent recognition by specific pattern recognition receptors (discriminative sensing) to activate the innate immune responses



Radiology and Biomedical Engineering

Radiology

We have been performing a variety of clinically oriented research programs in biomedical imaging, voxel-based or ROI-based analysis, information analysis and radiotherapy, such as computer-assisted diagnosis (CAD), PET-based diagnosis, and intensity modulated radiotherapy (IMRT).

- Diagnostic Radiology
 - Multi-row detector (up to 16 rows) helical computed tomography
 - MR imaging, MR digital subtraction angiography, perfusion imaging, and diffusion tensor imaging/tractography
- Radiation Oncology
 - Physical engineering aspect of radiotherapy
 - Stereotactic irradiation by gamma knife and synergy system and IMRT
 - · Clinical and biological studies for reduction of radiation-induced damage
- Nuclear Medicine
 - Functional imaging by radioisotope-labeled tracer technology
 - Evaluation of blood flow and metabolism by emission tomography (PET and SPECT)

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



Representative images analyzed with computerassisted technology

Chemical Biology and Molecular Imaging

Our research field is so-called chemical biology. One of our main research interests is to develop novel small molecule-based photofunctional tools for biological and medical research, including fluorescence probes for detecting various events in living cells and animals. Recently, we have succeeded to develop fluorescence probes for in vivo tumor detection, and they are now applied to real resected human samples by collaborating with many surgeons.

- Establishment of rational design strategies for various photofunctional small molecule-based probes
- Development of novel fluorescence probes, photosensitizing probes and caged compounds, and their application to various living biological samples
- In vivo detection and therapy of tumors in model mice and real human samples by using rationally designed novel fluorescence and photosensitizing probes



Injection or Spraving

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

Biosystem Construction and Control

Our research fields include medical engineering high-technologies represented by artificial organs. Especially the research of artificial heart has gotten excellent results such as the world longest survival record in animal replaced with a total artificial heart. We are performing the researches from the basic to the application.

- Implantable total artificial heart
- Implantable ventricular assist device
- Polymer artificial valve
- Next generation artificial lung
- Tissue engineered artificial organs
- Blood compatible material
- Implantable pressure sensor
- Implantable angiogenesis observation probe

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



Implantable total artificial heart (Undulation pump total artificial heart) and artificial heart animal (goat)



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.

- Structural and functional analysis of γ-secretase
- Molecular analysis of the mode of action of γ-secretase inhibitors
- Mechanism of Aβ production, aggregation and clearance
- Pathological 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 (J-ADNI Clinical Study)



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.

- Molecular investigation (including identification, characterization and real-time visualization) of signaling molecules involved in calcium-dependent synaptic modification, especially during signaling from synapse-to-nucleus, and back from nucleus-to-synapses
- Understanding molecular mechanisms controlling cytoskeletal dynamics and remodeling on both sides of the synapses, in the dendritic spines and in axon terminals

http://www.neurochem.m.u-tokyo.ac.jp/ Homepage.html



Real-time measurement of biochemical events triggered by glutamate uncaging at hippocampal spines (A); Visualization of actin cytoskeleton in cerebellar Purkinje cell dendrites (B)

Neurobiology

The goal of our research is to elucidate regulation mechanisms of various cell functions. Toward this goal, we have been developing novel technologies including live cell imaging and RNAi technologies.

- Development of novel strategy for generating fluorescent probes for live cell imaging We develop a high-throughput screening system for constructing high performance fluorescent probes for live cell imaging.
- Study of synapse physiology by glutamate imaging technique

To clarify the dynamics of exocytosis in excitatory synapses, we have tried to quantitatively analyze released glutamate at individual synapses by using our original optical glutamate probe.

• Novel technology for construction of genome-wide RNAi library We are currently constructing a high performance genome-wide RNAi library based on our EPRIL technology.

Cognitive Neuroscience

We are trying to understand the neural mechanisms of human cognition using functional MRI, EEG and TMS.

- Working memory and cognitive control
- Attention, perception and consciousness
- Mind-reading and prediction of behavior

http://square.umin.ac.jp/dcntky/English/Etop.html

http://www.neurobiol.m.u-tokyo.ac.jp/



Main diseases of our current research are autism spectrum disorders (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.

- Behavior phenotype, neuropsychological and genetic study of Tourette syndrome and childhood OCD
- Brain-imaging study of ASD, ADHD and Tourette syndrome by structural-MRI, functional-MRI and near-infrared spectroscopy
- Genomic and epigenomic analysis of ASD
- Development of predictor of pharmacotherapy and parent training for ADHD
- Effectiveness study of early intervention for autistic preschoolers and group cognitive behavior therapy for adults with ASD









Neuropsychiatry

Our department mainly investigates schizophrenia and pervasive developmental 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.

- Integrated Neuroimaging studies in Schizophrenia Targeting Early intervention and Prevention http://plaza.umin.ac.jp/arms-ut/
- Todai Twin Project with Integrative Neuroimaging
- http://npsy.umin.jp/study/exam.html
- Multimodal neuroimaging studies of pervasive developmental disorders
- Clinical trials to establish the medical equipment as a clinical test useful for the pharmacological treatment of mental disorders





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

Neurology

Our Department is promoting research programs to elucidate the pathophysiological mechanisms of neurological diseases including neurodegenerative diseases, immune-mediated diseases and neuromuscular diseases, and to establish therapeutic approaches for these diseases. We are also providing excellent programs to train neurologists.

- Molecular Genetics (identification of disease genes and development of therapeutic approaches)
- Molecular pathopysiology of neurological diseases (RNA editing, and protein structures)
- Immune-mediated diseases (autoantibodies)
- Neuropysiology 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
- Development of new therapeutics

Neurosurgery

The 21st century has been designated as "The Century of the Brain". To lead Japanese Surgical Neuroscience, we have devoted our activities to the following: advanced Clinical Neurosurgery, Neuroscience Research and Graduate and Postgraduate education.

- Skull base surgery in managing benign or malignant skull base tumors and cerebrovascular disorders
- Functional neurosurgery including epilepsy surgery
- Development of new therapeutic strategies for malignat brain tumors
- Cinical study on gamma-knife surgery
- Application of brain functional imaging for neurosurgery
- Application of VR technology for surgical simulation
- Experiment on cerebral ischemia
- Development of new stenting device for endovascular surgery

http://square.umin.ac.jp/neurotky/



http://www.h.u-tokyo.ac.jp/neurosurg/



Simulation images using 3D-fusion images and tractography.



Social Medicine

Molecular Preventive Medicine

The immune system is maintained by continuous migration of immune cells between lymphoid organs and peripheral tissues. Immune cells change their function during this migration and interact with tissue cells at the periphery. In the context of disease, immune cells induce functional changes, destruction, and remodeling of affected tissues. We aim to clearify how immune cell migration regulates immune function, which may lead to the development of novel therapeutic and preventive strategies toward various diseases.

- Molecular and cellular basis of tissue fibrosis during chronic inflammation
- Pathophysiological regulation of the immune system by chemokines and the implication of this in GVHD, tumor development, infectious diseases, and autoimmunity
- Development of vaccines against cancers and infectious diseases
- Gene expression analysis of hematopoietic and other tissue cells by nextgeneration sequencing

Public Health

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
- Evaluation of preventive services
- Health services research

Physician distribution by municipality in Japan

http://www.prevent.m.u-tokyo.ac.jp/





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

Forensic Medicine

http://plaza.umin.ac.jp/~forensic/

We conduct autopsies and examinations related to unnatural deaths and therapeutic deaths. We also perform the following studies.

- Development of new animal model of sleep apnea syndrome, and the elucidation of the pathogenesis of heart failure and pulmonary hypertension
- Study on the mechanism underlying sudden cardiac deaths and myocardial lesions related to myocardial infarction and amphetamine-class drug poisoning
- Study on the Takotsubo cardiomyopathy-like pathology in restrained rats
- Study on the mechanism underlying propagation of brain contusion
- Study on the information disclosure, bereavement service, and research use of retained organs in death investigation system
- Development of new methods for examinations of drug, histological and DNA analyses in autopsy cases.



Forensic autopsy room

http://www.m.u-tokyo.ac.jp/medinfo/index_e.html

Medical Informatics and Economics

The role of research and education of this department is provided as the department of the graduate school, and the role of practical management is conducted as the Department of Planning, Information and Management in the University of Tokyo Hospital. All teaching staffs are in charge of both the two roles and the department of health informatics of school of public health. The research and postgraduate education programs cover basic medical informatics, advance applications of information technology for clinical practice, technology assessment and standardization of healthcare information.

- 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
- Evaluation study of hospital management and analysis of medical resource placement



Development of clinical ontology



Internal Medicine

Cardiovascular Medicine

We are investigating the pathogenesis, pathophysiology, diagnostic methods, and novel therapeutic measures for various cardiovascular diseases (ischemic heart disease, heart failure, cardiomyopathy, arrhythmias, atherosclerosis, hypertension, etc.) using a variety of research tools (from molecular biology to epidemiology, bioinformatics).

- Interplay between organs, cells, and molecules in chronic inflammation
- Transcriptional regulation of various genes involved in cardiovascular development and pathogenesis
- Cardiac hypertrophy and heart failure: analyses of pathogenic mechanisms and development of novel therapies (gene therapy, etc.)
- Differentiation of smooth muscle cells (atherosclerosis and restenosis after vascular interventions)
- Endothelial dysfunction in various diseases
- Genetic polymorphisms and risk factors in cardiovascular disease
- Optimization of individual treatment using the Computer Heart Simulator
- Development of new integrated databases for clinical information and research
- Investigation of disease pathophysiology and development of novel therapies (severe heart failure, cardiac transplantation, Marfan's syndrome, pulmonary hypertension, congenital heart disease, cardiac rehabilitation, etc.)
- Imaging techniques (echocardiography, MRI, CT, RI) in cardiovascular diseases

Respiratory Medicine

Based on the fact that a number of patients with respiratory diseases including lung cancer and COPD is tremendously increasing, fruitful results of respiratory research are more and more expected in the 21st century. In this era, we are conducting basic and clinical researches for wide variety of respiratory disorders including lung cancer, asthma and COPD. Especially, we have been intensively studying the molecular mechanisms underlying the pathogenesis of lung disorders. Our research goal is to develop novel therapeutic tools to manage these pulmonary diseases.

- Clinical studies of lung cancer, COPD, bronchial asthma and pulmonary fibrosis
- Epidemiological studies of diffuse panbronchiolitis (DPB) and interstitial lung disease
- Molecular mechanisms underlying the pathogenesis of acute lung injury or ARDS
- Molecular mechanisms underlying the pathogenesis of pulmonary fibrosis (as shown in Figure)
- Analysis of disease models using genetically-engineered mice
- Effects of air pollutants such as diesel exhausts on airway hyperresponsiveness Roles of chemokines/cytokines and eicosanoids on airway epithelial cells, smooth muscle cells and eosinophils.
- DNA methylation and lung cancer
- Establishment of conditional vectors for hairpin siRNA knockdowns
- Establishment of CpG island searcher

http://plaza.umin.ac.jp/~utok-card/





http://kokyuki.umin.jp/



Murine model of pulmonary fibrosis

Gastroenterology

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 hepatocaricinogenesis mechanism in viral hepatitis
- Development of a better therapeutic modality for hepatocellular carcinoma & metastatic liver tumor
- Elucidation of gastric injury mechanisms by Helicobacter pylori
- Clarification of colon disease, especially right-sided colon carcinogenesis
- 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

We are investigating the pathophysiology of renal and endocrine disorders for the development of innovative diagnostic and therapeutic tools. Hypertension is our special interest because not only it is a serious medical problem which impairs many vital organs and the QOL of our patients, but also we have the great advantage of organizing the strategic research aproach since hypertension is closely related to both nephrology and endocrinology.

- Renal physiology and morphology
- Pathophysiology of immune-mediated renal injury
- Analysis of pathophysiology and prognistic factors of chronic renal failure
- Endothelial injury and vascular biology in kidney disease
- Role of nitric oxide and oxidative stress in renal disease and hypertension
- Clinical and basic investigation of bone and mineral disorders
- Mechanism of action of nuclear hormone receptors
- Pathophysiology of hypertension and roles of adrenomedullin
- G protein signaling in health and disease
- Epigenetics and hypertension

Nutrition and Metabolism

We are investigating to reveal the molecular mechanisms underlying the development of metabolic diseases (diabetes mellitus, lipid metabolic disorders, obesity, metabolic syndrome and atherosclerosis) using interdisciplinary approaches and state-of-the-art technology including genetically engineered model animals, DNA chip, epigenetics, RNA technology, human genetics, clinical epidemiology and bioinfomatics. Our major goal is to develop mechanism-based fundamental treatment and prevention strategies for the metabolic diseases.

- Molecular mechanism of insulin resistance linked to obesity focusing on adipokines
- Transcriptional regulation of insulin resistance and obesity by nuclear receptors and cofactors
- 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
- Development of accurate diagnostic 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





http://plaza.umin.ac.jp/~kid-endo/top.html



http://www.h.u-tokyo.ac.jp/gastro/

Hematology and Oncology

We are investigating the pathogenesis, diagnostic methods, and novel therapeutics of hematological disorders by making comprehensive use of research technologies in molecular biology, developmental biology, and immunology. Studies about transcriptional regulation and signal transduction in hematopoiesis and analyses of regulation of hematopoietic stem cells are performed. We are also performing basic and clinical studies based on genomics, regenerative medicine, and transplantation medicine, which aim at application to therapeutic strategies.

- Self renewal and differentiation of hematopoietic stem cells
- Genome-wide analyses of hematological malignancies
- Identification of molecular pathogenesis of leukemia
- Analyses of the immune system by developmental biology
- Regenerative medicine of hematopoietic cells using human ES and iPS cells

http://www.h.u-tokyo.ac.jp/hematology/



Allergy and Rheumatology

Allergy and rheumatic diseases are immune mediated disorders. We are investigating the fine mechanisms of such disorders. One of our final purposes is to establish novel therapies which control pathological immune disorders but do not suppress other physiologically important immune functions. We are combining recent findings in basic immunology and our own viewpoints base on our clinical experience.

- Clonal analyses of T cell receptor (TCR) , in vitro reconstitution of the TCR function using such information and antigen specific immunotherapy
- Mechanisms of oral tolerance and application to therapeutic strategies
- Mechanism of immunological tolerance to autoantigens and immunoregulation
- Development and induction of regulatory T cells and their applications
- Intracellular signaling in immune disorders
- Genomic analyses of rheumatic diseases
- Development of molecular targeting immunosuppressive reagents
- Airway hypersensitivity and remodeling of bronchial asthma
- Mechanisms of IgE mediated allergic disorders and applications for therapies
- Involvement of chemokines in allergic diseases and applications to therapeutic strategies

Infectious Diseases

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

- Clinical studies of HIV infection
- Development of new methods in infection control and treatment of viral hepatitis
- Molecular pathogenesis of hepatocellular carcinoma in HCV infection
- Pathogenesis of extrahepatic manifestations and its control in HCV infection
- Pathogenesis of progression of HIV infection
- Molecular pathogenesis of hepatocellular carcinoma in HBV infection
- Molecular pathogenesis of hepatitis B viral infection
- Host defences to microorganisms
- Molecular analysis of innate immunity in microorganism infection
- Pathogenesis of influenza viral infection
- Mechanism of multi-drug resistant microorganisms





Clonal analyses of T cell receptor (TCR) and in vitro reconstitution of the TCR function for an antigen specific immunotherapy

HCV

Stress Sciences and Psychosomatic Medicine

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 guestionnaire, which we refer to as the TEG.

Clinical Laboratory Medicine

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

- Elucidation of (patho)physiological roles of lysophospholipid mediators, and its application to laboratory medicine
- Platelet biology, Hepatology
- Genetic testing
- Research on bioactive peptides, especially adrenomedullin
- Oxidative stress and organ damage
- Cell surface analysis and quantification of cell surface antigens using flow cytometry
- Analysis of the ventricle functions using ultrasound
- Relationship between the respiratory function and various pathophysiological conditions
- Magnetoencephalographic (MEG) study on neural mechanisms for audiovisual integration

Transfusion Medicine

http://square.umin.ac.jp/traf-tky/ Control, testing and supply of all blood products for transfusion are the main clinical activities of the department of transfusion medicine, which is responsible for the provision of safe blood products and the control of the transfusion practice in the hospital. It actively takes part in autologous blood collection, preservation, and supply for patients receiving routine surgery. In addition, apheresis procedures for collection of peripheral blood stem cells for transplantation, and of peripheral blood mononuclear cells for dendritic cell-based vaccine therapy of cancer patients are performed. Also, lymphocyte-based vaccine is prepared for the immunotherapy of recurrent abortion cases. Special laboratory testings, including HLA typing (serologic and DNA-based) for bone marrow and organ transplantations and the detection of anti-HLA, anti-platelet (HPA) and anti-granulocyte antibodies, as well as the phenotyping and genotyping of platelet- and granulocyte-specific antigens for patients with adverse reactions after transfusion, are performed. The research fields include 1) the development of immunological methods for antigen-antibody testing of red cells, lymphocytes, granulocytes, platelets and endothelial cells, 2) the development and clinical application of dendritic cell-based and other vaccines for immunotherapy of cancer, and 3) the development of new anti-thrombotic materials for clinical use.

- Detection of platelet alloantigens and alloantibodies /Detection of leukocyte alloantigens and alloantibodies
- Detection of anti-endothelial cell antibodies and investigation on their clinical relevance
- Development of a novel method for the evaluation of platelet function
- Dendritic cell-based immunotherapy for malignant diseases
- Development of new anti-angiogenic strategies to treat cancer
- Development of new immunotherapeutic approaches to treat malignant diseases
- Development of new anti-thrombotic materials for clinical use /Use of stem cells in regenerative medicine

http://lab-tky.umin.ac.jp/





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



Reproductive, Developmental and Aging Sciences

Reproductive Endocrinology

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.

- Establishment of effective and low-risk treatment for infertility
- Development of assisted reproductive technology
- Interaction between the endometrium and embryo during the implantation period
- Pathophysiology of endometriosis
- Local regulation of folliculogenesis
- Technical development of advanced endoscopic surgery
- Development of hormone replacement therapy for postmenopausal women
- Medical treatment for menopausal women

http://square.umin.ac.jp/tkyobgyn/



ICSI (intracytoplasmic sperm injection)

http://square.umin.ac.jp/tkyobgyn/

Gynecological Oncology

We are developing the intensive surgical management and selection of the most suitable chemotherapy regimen, which improved prognosis of the patients with ovarian cancer. The basic researches are focusing on the mechanism of gynecological malignancies, especially cervical cancer. We have identified the tumor suppressors involving in the process of cervical carcinogenesis. We are investigating a possible clinical application of the vaccine against human papillomavirus, which is a causative agent of cervical cancer.

- Intensive surgery including pelvic and paraaortic lymphadenectomy
- Selection of adjuvant chemotherapy based on the pathological and molecular marker
- Tumor suppressors involving carcinogenesis of gynecological malignancy
- Analysis of the molecular marker in tumor cells related to clinical behavior
- Prevention of cervical cancer using the human papillomavirus vaccines



Expression of tumor suppressor scribble in malignant cells

Perinatal Medicine

The researches are on going for development of precise prenatal diagnosis on the fetal status using ultrasonography. We are also focusing on the immunological aspects in patho-physiology of pregnancy, developing the therapy for habitual abortion or pregnancy induced hypertension.

- Early diagnosis of abnormal pregnancy
- Development of three dimensional ultrasonography
- Management of habitual abortion
- Management of complicated pregnancy

http://www.iiosan.umin.jp/



Three dimensional ultrasonography of fetus

Molecular Cellular Reproductive Medicine

We are approaching the molecular mechanisms in various reproductive pathological states, using the knowledge and techniques of molecular biology, cellular biology and genetics. The studies are proceeding on the effects of endocrine disruptors on reproductive phenomena, such as embryogenesis, spermatogenesis and fetal development, and on the prenatal genetic diagnosis.

- Effect of endocrine disruptors on reproduction
 - Embryogenesis
 - Spermatogenesis
 - Intrauterine fetal development
- Prenatal diagnosis using molecular genetics
- Molecular mechanisms of embryonic development



Molecular mechanisms of endocrine disruptors

Pediatrics / Developmental Pediatrics

We are studying all the issues concerning the health of infants, children and adolescents. We have achieved very important investigations to clarify the molecular pathogenesis of human congenital disorders.

- Molecular diagnosis and analysis and collaborative treatment of intractable renal glomerular and tubular diseases
- Molecular diagnosis and analysis of hematological malignancy and bone marrow transplantation
- Diagnosis, molecular analysis and collaborative treatment of congenital heart diseases
- Molecular analysis and collaborative treatment of congenital immunodeficiency and allergic diseases
- Collaborative treatment of extremely premature neonates and babies with pulmonary hypoplasia
- Enhancement of the immunological resistance of premature neonates using a new type of lactobacillus
- Diagnosis and treatment of neurological, endocrine and metabolic diseases
- Collaborative study and treatment of psychological disorders
- Investigation of new systems to promote mother and baby co-relationships during rearing



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

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.

- The development and differentiation of the fetal lung
- Fetal diagnosis of congenital malformations
- Fetal surgery and treatment
- Pediatric minimally invasive surgery
- Pediatric robotic surgery
- Probiotics and prebiotics applied to padiatric surgical patients
- The development and differentiation of intestinal lymphoid organs
- Renal functions in congenital hydronephrosis
- Biliary atresia and biliary dilatation: their treatment and long-term prognosis
- The treatment by regenerative medicine of air way malacia and stenosis



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

Pediatric Oncology

Solid tumors in children are dealt with in our department. Appropriate care strategies combining surgical treatment and chemotherapy are decided and carried out on various malignant tumors after extremely close discussion with pediatric oncologists.

- Genetic analysis and investigations for prognostic factors in neuroblastoma
- Tumorigenesis in Wilms tumors
- Analysis of cellular biology in Wilms tumors
- Treatment of rhabdomyosarcoma
- Genetic mutation in hepatoblastoma



Microscopic and ultramicroscopic features of Wilms tumor cell line

Geriatrics

Our department is the first established department of Geriatric Medicine in Japan. It is our goal to treat all the geriatric diseases, such as atherosclerosis, hyperlipidemia, osteoporosis, senile dementia, diabetes, COPD, and aspiration pneumonia, and to improve the quality of life of elderly patients.

- Vascular endothelial function and atherosclerosis
- Studies of molecular mechanisms in vascular calcification
- Antioxidants inhibit vascular smooth muscle cell proliferation and induce apoptosis
- Vascular gene therapy using adenoviral mediated gene transfer of estrogen receptors
- New guidelines for hormone replacement therapy in females in Japan
- Novel gene responsible for breast cancer
- Novel gene responsible for osteoporosis
- Molecular cloning of novel Ring finger protein
- Studies of pathophysiology and novel treatment for Alzheimer's disease
- Pathophysiological studies on bronchial asthma using gene-targeted mice
- The antimicrobial peptide, defensin
- The molecular mechanisms of vascular injury in sleep apnea syndrome

http://www.h.u-tokyo.ac.jp/patient/ depts/1510rounenbyou.html





Surgical Sciences

Thoracic Surgery

We specialize in surgical treatment for malignant neoplasms of the chest, such as primary lung cancer, pulmonary metastases, and mediastinal tumors. Patients with these diseases have been increasing recently in our country. We actively perform minimally invasive surgery through thoracoscopy for patients with comorbidities. We also perform extended surgery with extracorporeal circulation in collaboration with cardiac surgeons. In 2010 we performed chest surgery for more than 330 patients in our institute. We also study on nonsurgical treatment for patients with postoperative recurrence of lung cancer or refractory malignant neoplasms, doing new clinical trials of immunotherapy. In response to increasing number of brain-death donor in our country, we are now establishing a lung transplantation program in our institute.

- Minimally invasive surgery for chest diseases
- Genetic studies on primary lung cancer
- Clinical or biological studies on thymic neoplasms
- Immunotherapy for lung neoplasms
- Basic studies on lung or tracheal transplantation

http://ctstokyo.umin.ne.jp/



Figure: A case of lung cancer with interstitial pneumonia. (left upper) High-resolution Computed Tomography (left lower) Axial section of 18F-FDG-PET (right upper) Frontal section of 18F-FDG-PET (right lower)resected specimen

http://ctstokyo.umin.ne.jp/

Cardiovascular 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
 - Brain and spinal cord protection in thoracic aortic surgery
 - Minimally invasive cardiac
 - · Valve or vascular tissue allograft transplantation
 - Ventricular assist device for end-stage heart failure
- Basic and experimental research
 - Development of myocardial regeneration therapy
 - · Analysis of resistance to infection of tissue allograft



MRI diffusion-weighed images of brain by various brain perfusion techniques

Gastrointestinal Surgery

Our research activities range from basic topics to clinical ones with close interconnections. Basic research topics encompass underlying molecular mechanisms and the regulation of carcinogenesis, progression, metastasis and prevention of gastrointestinal cancer. Clinical research topics include the establishment of tailored treatment strategies from a patients-by-patient point of view, which ultimately provide a better quality of life while improving survival quality.

- Carcinogenesis, progression, metastasis and prevention of gastrointestinal cancer
 - Inflammation and gastrointestinal carcinogenesis (gastroduodenal reflux, H. pylori infection)
 - Are cancer cells derived from bone marrow?
 - Earlier detection of cancer and micrometastasis by new genetic markers
 - Roles of epigenetic alteration (DNA methylation) in gastrointestinal carcinogenesis
 - Carcinogenic analysis with murine esophageal reflux model
- Establishment of tailored treatment strategies
 - · Less invasive treatment of early cancer by laparoscopic (assisted) surgery
 - Sentinel node navigation surgery for early cancer
 - Extended radical treatment of advanced cancer
 - Induction of neaoadjuvant chemotherapy and improvement of survival
 - Estimation of chemotherapy effects by new bio- and genetic-markers
 Alternative gastrointestinal reconstruction and estimation of the results

Hepatobiliary Pancreatic Surgery

We constantly perfom nearly 200 hepatectomies every year on patients with hepatobiliary malignancies including hepatocellular carcinoma and metastatic liver tumors. The surgical results can be classified as amongst the highest ranking in the world. In order to improve the surgical outcome for hepato-biliary-pancreatic malignancies, we conduct wide areas of research such as analysis of prognostic factors for liver malignancies, evaluation of liver hemodynamics using ultrasonography, liver ischemia/reperfusion injury, and liver regeneration.

- The development of a radical and safe operative procedure for hepato-biliary malignancies
- 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
- Study of the effect of ischemic preconditioning on liver normothermic ischemia/reperfusion
- Study of intraoperative diagnosis (enhanced ultrasound and ICG fluorescent imaging)
- Clinical trials concerning adjuvant therapies after hepatic resection for hepatocellular carcinoma (HCC) or colorectal liver metastasis
- RCT to evaluate the effects of surgical resection and RFA for HCC (SURF trial)
- Investigation of adjuvant immunotherapies after surgery for pancreato-biliary malignant tumors

Urology

We constantly perform more than 1,400 urological surgeries every year, including nephrectomy, cystectomy and prostatectomy, with increasing trend of laparoscopic maneuvers. Robotic surgery will be introduced in 2011. Surgical or non-surgical means are employed for non-cancer disease including chronic renal failure, urinary dysfunction, urinary incontinence and interstitial cystitis. With regard to basic research and treatment, vaccine, dendritic cell, virus, prevention drugs, tumor suppressor, bio-marker and Botulinum toxin injection are now under extensive investigation.

- Vaccine against NY antibody for bladder cancer treatment
- Botulinum toxin injection therapy for interstitial cystitis
- Dendritic cell therapy for metastatic renal cancer
- Investigation of bio-marker for renal cancer and interstitial cystitis
- Advanced therapy for male urinary incontinence
- Virus therapy for prostate cancer and bladder cancer (Fig.1)
- Tumor suppressor gene for renal cancer, bladder cancer and prostate cancer
- Prevention drugs for prostate cancer
- Prostate cancer and ER beta (Fig.2)

http://todai3ge.umin.jp/



Barett's esophagus and Cancer in reflux model mouse

http://square.umin.ac.jp/hbp-t/index21.htm



Color flow mapping of intraoperative Doppler ultrasonography before division of the middle hepatic vein. Portal flow was hepatopetal (shown in red).

Color flow mapping of intraoperative Doppler ultrasonography after transection of the middle hepatic vein. Portal flow was hepatofugal (shown in blue) in the venoocclusive area.



Preoperative 3-D image of the liver constructed by simulation software. Accurate anatomy of vasculatature and tumor location is analyzed.

http://www.h.u-tokyo.ac.jp/urology/



Fig.1 The combination therapy of oncolytic HSV-1 with androgen ablation led to significantly enhanced inhibition of the tumor growth.



Fig.2 Expression of KLF5/ERbeta is correlated with prostate cancer specific survival

al arterial dis

Distal bypass

Artificial Organ and Transplantation Division

We are doing the clinical studies about liver transplantation for end staged liver diseases. We have performed 471 living donor liver transplantation and 14 deceased donor liver transplantation until June, 2011.

- Surgical technique of liver transplantation
- Diagnosis and treatment of acute rejection
- Diagnosis and treatment of postoperative infection

The 5-year survival rate for adult cases was 85%, which is significantly superior to that of the national data (70%)

Surgical Oncology

We had a great deal of experience in treating patients with various cancers and vascular diseases, and we have performed much research on carcinogenesis, cancer metastasis, immunology, 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 the novel and order-made therapy for cancer

- · Genetic mutation analysis of various cancers
- Radiosensitivity and chemosensitivity of cancer
- Intraperitoneal chemotherapy for peritoneal carcinomatosis
- Immunotherapy using dendritic cells
- Characterization of tumor vasculature and its therapeutic application
- Gene therapy for disseminated metastasis
- Drug development to target the receptor and signal transduction cascade of bioactive lipids
- Development of chemoradioimmunotherapy

Vascular Surgery

We had 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
 - 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



eripheral arterial disease

Endovascular surgery

outer Laborators



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

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

Diagramatic representation of clinical-oriented research, with the ultimate goal of improving patient QOL

http://www.h.u-tokyo.ac.jp/patient/ depts/1512ishokugeka.html



• Basic Research

Clinical Research

•

Metabolic Care and Endocrine Surgery

Our department has two main divisions. Division of surgical metabolism and nutrition performs research on vital response to surgical stress and on metabolic and nutritional care during peri-surgical period. Division of breast and endocrine surgery performs surgery for 230 cases of breast, thyroid and parathyroid tumors a year, and performs research on tumorigenesis, establishment of treatment and prevention of breast and thyroid cancers.

- Surgical metabolism and nutrition
 - Induction of tolerance against surgical stress and endotoxemia
 - Response to endotoxemia through Toll-like receptors
 - Effects of surgical stress on tumor development
 - Gender difference in the response to surgical stress
 - Bacterial translocation during chemotherapy for cancer
 - Establishment of metabolic care and nutritional support team
- Breast and endocrine surgery
 - · Roles of nuclear receptor in development of breast cancer
 - Micrometastasis of breast cancer
 - Diagnosis of breast and thyroid tumors by fluorescence in situ hybridization of telomere
 - Expression of insulin-like growth factor 1 receptor in breast cancer tissue as prognostic factor
 - Roles of carbohydrate in breast cancer metastasis
 - Establishment of evaluation on QOL of the patients with breast cancer

Dermatology

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 scleroderma
- Development of novel therapies to scleroderma, 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

In our lab, we are investigating the mechanisms of morphogenesis of congenital anomalies using a developmental biological approach. In addition, we are performing extensive research into the clinical application of engineered tissues such as skin, soft tissue, and cartilage. We also have several cosmesis-related projects such as clinical hair regrowth with cultured cells and analysis of skin aging mechanisms.

Immunological abnormalities of atopic dermatitis

Plastic and Reconstructive Surgery

Mesenchymal stem cells derived from lipoaspirates Organ engineering with human adult stem cells



Supermicrosurgical vascularized nerve graft. 100% of

Schwan cells within a nerve graft can survive with microvascular anastomosis(0.5mm).

Ultramicrosurgical reconstruction using vascularized tissue transfers

Regulation of epidermis by factors derived from dermal fibroblasts

Hair regrowth with cultured dermal papilla cells • Research on aging skin-

related factors • Regulation of skin aging using hormones and retinoids

- Reconstructions for established nerve palsy Esthetic microneurovascular surgery
- Mechanism and surgical treatments of lymphedema Vascularized ovarial preservation and transplantation
- Free vascularized transfers of nerve cells, muscle cells, adiposal cells, and lymphnodes Allogenic tissue transfer (uterus, ovarium, anus etc.) Training method for supermicrosurgical anastomosis



volume of telomere attenuates with increase of cell division. (red: telomere, green: centromere, blue: chromosome)

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



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

http://todai3ge.umin.jp/

Oral and Maxillofacial Surgery

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:
 - · Correction of facial deformity in patients with cleft lip and palate
 - Facial growth in craniofacial anomalies
 - Surgical-orthodontic treatment of dentofacial deformities
 - Evaluation of the treatment outcomes in patients with cleft lip and/or palate
 - · Clinical application of artificial bone that displace into bone
 - Implant type artificial bone generated from tissue engineered human chondrocyte
 sets and a maximum the sense rele
- Basic and experimental research:
 - Cartilage and bone regeneration using the tissue engineering technique
 - · Gene analysis of congenital anomalies in the oral and maxillofacial region
 - · Effect of free radicals on bone metabolism
 - · COX-2 regulation on bone metabolism
 - · Development of intelligent type of artificial bone invested with osteogenic differentiation factors
 - · Development of tetra pod type micro artificial bone unit

Orthopaedic Surgery

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

- Systemic and comprehensive study for osteoarthritis
- Bone, cartilage and nerve regeneration
- Regulation of anabolic and catabolic bone metabolism by cytokines
- Molecular mechanism of age-related bone loss
- Molecular mechanism of osteoclast differentiation and apoptosis (RANKL-RANK, INF, Src)
- Gene therapy to control pathological bone destruction (arthritic bone resorption and arthritic joint destruction) using adenovirus vectors
- Non-invasive analyzing system to evaluate the mechanical properties of skeletal system in vivo using CT based finite element analyses
- Surgical navigation system with a three-dimensional display and navigation robot

Ophthalmology

Our department applies cutting-edge technologies and knowledge to diagnosis and treatment of eye diseases. To elucidate pathogenesis and establish more efficient ways of diagnosis and treatment of various refractory eye diseases, basic researches utilizing molecular biological, immunological and/or pharmacological techniques and clinical studies utilizing epidemiological, biostatistical and/or optical methods are conducted. Our efforts are also dedicated to regenerative medicine of the cornea and retina.

- Investigation of primary glaucomas and relating factors
- Development of new methods of glaucoma treatment and validation by RCT
- Investigation of new ocular hypotensive drugs and their mechanism of action by using transgenic or KO mice or experimental glaucoma monkeys
- Investigation of mechanism of neural cell death by using cultured RGCs or retinal glial cells and exploratory search for new neuroprotective agents
- Analysis of ocular circulation in glaucoma and retinal diseases
- Analysis of corneal topography and wave-front analysis of optical aberrations
- Development of tissue-engineered cornea by using cultured stem cells of corneal endothelium and epithelium
- Investigation of molecular mechanism of choroid-retinal neovascularization and new drug delivery system for it utilizing nanotechnology
 Regenerative medicine of the retina using retinal stem cells
- Investigation of immune responses in rejection of transplanted cornea and role of chemokines and receptors in uveitis

ear C

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



Cartilage & Bone

http://www.h.u-tokyo.ac.jp/ortho/

Surgical navigation system



http://plaza.umin.ac.jp/oph/

40

Otorhinolaryngology and Head & Neck Surgery

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

- Clinical research
 - Cochlear implantation in deaf children and their development of hearing, speech and language
 - Surgical correction of congenial microtia and atresia and postoperative radical ears to improve hearing
 - Quality of life in patients with head and neck cancer to restore speech and swallowing function
 - Vestibular research on the oculomotor and balance system and myogenic potential
 - Navigation of the paranasal sinuses and skull base surgery Surgical treatment of voice and swallowing disorders
- 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
 - Physiology of vocal cord vibration

Rehabilitation Medicine

Our research purpose is to improve the provision of a unique and comprehensive rehabilitation service enabling people to develop their full potential and often returning from being a "patient" to being a "person". Clinically oriented studies concentrate on elucidation of the origin of disabilities to cause activity limitation and restriction of participation.

- Gait analysis
 - 3-dimensional image analysis with a infrared camera system
 - · Measurements of 3 dimensional ground reaction forces with a force platform
 - Measurements of foot pressures with a computerised pressure sensor
- Clinical research on intractable rare diseases
 - Fibrodysplasia Ossificans Progressiva
 - Congenital Insensitivity to Plan
- Clinical research on congenital limb malformations
- Research on the effect of physical therapy in locomotive syndrome

http://www.anes.umin.ne.jp/

Anesthesiology

We have seven research groups and their fields include respiration, circulation, pain, immune system and shock. These are recent major subjects of our research.

- Respiratory system: A role of cytokine signaling in acute lung injury; Exploring optimal ventilatory strategy for respiratory failure
- Immune systems: Modification of immune system by anesthesia; Signal transduction pathway related to apoptosis induced by sepsis or ischemiareperfusion injury
- Shock: Investigation of pathophysiology of shock; Effect of new plasma substitutes on hemorrhagic shock.
- Inflammation: A role of lipid mediators in organ damage mediated by ischemiareperfusion injury of a mouse lower limb.
- Pain: A role of lipid mediators in the formation of hyperalgesia; A role of spinal microglial cells in the development of inflammationmediated neuropathic pain; Mechanism of pruritoceptive and neurogenic Itch; Cognitive-behavioral therapy on chronic pain.
- Nervous system: Analysis of electroencephalography during general anesthesia; Clinical evaluation of neurological sequelae after cardiac surgery.
- Anesthesia apparatus and other medical equipment: Invention and validation of a new airway device; Development and assessment of the system for treating waste anesthetic gases
- Glucose metabolism: Effect of anesthetics on glucose metabolism in vivo





http://www.h.u-tokyo.ac.jp/orl/

Anesthesia and monitors

Emergency and Critical Care Medicine

We are collaborating with the School of Engineering, and now concentrating on the development of the infrastructure of emergency medicine including "the Vital Care Network System", which allows us to manage continuously large numbers of high risk patients. We are also making efforts to improve sterilization and wound healing.

- Vital Care Network System
- Telemonitoring system for prehospital medicine
- High-performance transfer system for the ambulances
- Electrolyzed water
- Autonomic nervous system regulation of the heart





Health Sciences and Nursing

Mental Health / Psychiatric Nursing

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
 - Psychoeducation/Stress management
 - Evaluation of school counseling
 - Practice and Evaluation of Psychotherapy
 - Early detection and therapeutic education of PDD
- Psychiatric Nursing
 - Supporting people living with mental health problems
 - Practice and evaluation of home visiting psychiatric nursing
 - Illness self-management in mental health
 - Recovery for people with mental illness
 - Patients' satisfaction with psychiatric services

Biostatistics / Epidemiology and Preventive Health Sciences

Biostatistics and epidemiology provide the methodological basis for health sciences. We are conducting basic methodological research of biostatistics and theoretical epidemiology as well as consultation works and collaborative projects with basic/clinical researchers. The NPO "Japan Clinical Research Support Unit" established by the staff of the department is supporting investigator-initiated clinical trials and largescale epidemiological studies in respect of data management, statistics and quality assurance.

• Methodological research

- Design of clinical trials
- Analysis of correlated data and longitudinal data such as QOL data, multiple recurrence (events) data
- Causal inference
- Collaborative projects
 - Japan Arteriosclerosis Longitudinal Study
 - Comprehensive Support Project for Oncology Research- Breast Cancer
 - Comprehensive Support Project for Adequate Treatment of Osteoporosis
 - Other investigator-initiated clinical trials



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

Japan Arteriosclerosis Longitudinal Study



Social Gerontology

The three major research areas of this department include social gerontology, psychosocial oncology and biomedical ethics. The faculty and graduate students are multidisciplinary and include those whose primary training is in nursing, medicine, psychology, anthropology and health sciences. Using the theories and research methods of those disciplines, we aim to suggest practical ways to deal with a wide variety of public health problems.

- Exchange of social support and subjective well-being among the elderly
- Psychological well-being among the elderly who have experienced relocation
- Measurement of active life expectancy
- Sexuality and body image issues related to cancer treatments
- Treatment decision-making process among cancer survivors
- Self-help group activities for chronic, life-threatening illnesses
- Psychosocial issues related to infertility treatments
- Multi-disciplinary collaboration in the clinical setting

http://www.sg.m.u-tokyo.ac.jp/ informatione.htm



Class meeting of the department

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

こころと体にいいことしてますか?

Health Promotion Sciences

The main research activities of the Department of Health Promotion Sciences are experimental and survey research concerning health behavior and life-style related diseases. Our research results contribute to the proposals of health care systems, and health policy concerning health promotion in the community and the workplace.

Our classes include lectures and practical training and students are required to understand the methods of planning, implementation and evaluation of the health promotion programs in the community and the workplace.

Specific research topics include:

- Development of effective health promotion programs
- Assessment of the supportive environments in the community and the workplace
- Evaluation of the supporting methods for health behaviors
- Short- and long-term effects of behavior change
- Influence of behavior change on medical costs, and cost effectiveness analysis
- Social and physical environmental determinants of the adherence of behavior change

Biomedical Ethics

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 Center for Biomedical Ethics and Law (CBEL) was recently set up as an adjunct to the Department of Biomedical Ethics. (http://www.cbel.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
- Publication of a medical ethics case book for Japan
- Acceptability of advance directives in Japan
- Development of evaluation methods for biomedical ethics education
- Psychosocial and ethical aspects of living related organ transplantation

A scene as part of a community health promotion program

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



Outreach Program: CBEL provides training courses for ethics committee members. Participants include physicians, nurses and medical pharmaceutical representatives.

Nursing Administration / Advanced Clinical Nursing

Our research programs aim to support clinical nurses in providing high quality care for their patients in efficient way. Under a nation-wide healthcare reform, improving the efficiency of healthcare delivery systems becomes essential. For nursing care, assessing the efficacy and the putting in place of quality assurance systems are required. Applying management theories to nursing administration, we focus on nursing quality improvement, nurse staffing, patient classification systems, budgetary management, staff development and continuing education.

- Evaluation and improvement of quality of nursing care
- Benchmarking of nursing quality indicators
- Outcome management for nursing practice
- Risk management
- Human resources management
- Nursing case management and critical pathways
- Effect of care environment on patients
- International comparison of nursing guality indicators
- Nursing policy and economics

Family Nursing

Hand-in-hand with the changes occurring in society, such as declining birthrate and a growing proportion of elderly people, vulnerability of regional network, and gender-equal society, the conformation and the function of the family are also changing. Current Japanese society expects not only client-centered perspective but also a perspective to refer family as 'client' in the nursing research. We are especially performing research on childrearing issues and caring for child with illness.

- Postnatal depression and difficulties in childrearing.
- Prevention of child abuse and neglect.
- Development of Pediatric QOL Inventory for child with chronic illness and their parents.
- Late effect of treatment and posttraumatic stress symptoms in children with cancer.
- The role and expertise of the nursing staffs in daycare centers.
- Primary caregivers' burden of the severely disabled children and the utilization of the respite care.
- Care for dying patients and their families (QOL, family function).
- Development of Japanese version of Families Importance in Nursing Care-Nurses' Attitudes.

Community Health Nursing

Our research focuses on the development of health care programs, and establishment and evaluation of community health care systems, in response to the health care needs of individuals, families, aggregates and the communities. Also, we are performing research on standardization of skills of public health nurses.

- Establishment and evaluation of community health care systems
 - Around-the-clock in-home care system
 - Expansion of the target of visiting nurse
 - Hospital discharge planning
 - Comprehensive community care, care-networking
- Development of health care programs
 - Support for people with diseases or disabilities
 - Support for families with babies and children
 - Elderly care
 - Occupational health

Definition and standardization of skills of public health nurses/ Development of community health program

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







Promoting quality nursing care



Adult Nursing / Palliative Care Nursing

Mainly for subjects in their adulthood, we have been performing research in a variety of domains including prevention of diabetes and several chronic illnesses, support for coexistence with disease, and palliative care. Focal points in our research, which we conduct under a team approach, are strategies in education and provision of relevant information based on the findings of molecular biology, and the team-approach nursing care system.

- Prevention and self care support for chronic illness
- Development of HR-QoL scale for patients with chronic illness
- Physical activity in middle- aged / elderly
- Nursing care system for transplantation recipient / donor
- Genetic counseling in nursing
- Evaluation of palliative care services
- Continuity and dissemination of palliative care
- Nursing care system for out patients

Midwifery and Women's Health

The Department of Midwifery and Women's Health was founded in 2002. Our mission is to promote women's health across the lifespan, which includes reproductive and postmenopausal periods. Specifically, we include the fetus and newborns as inseparable being of the mother. Our department focuses our efforts in research in the following areas:

- Effects of prenatal lifestyle modifications on the maternal oxidative stress.
- Maternal body composition and the birth outcomes.
- Dietary and weight management during pregnancy and postpartum for cardiovascular health.
- Uterine biomarkers and prediction of labor progression.
- Fear of childbirth among pre- and postnatal Japanese women.
- Ergonomics of perinatal women's posture and their effects on the pelvic floor and supporting muscles.
- Stress urinary incontinence and the pelvic floor and abdominal muscles among women across lifespan.
- Development of the behavior interventions to promote the pelvic floor health.

Gerontological Nursing / Wound Care Management

Pressure ulcers and diabetic foot ulcers usually occur in elderly people due to basic activities of daily living such as walking, sleeping, diet and excretion. Thus their supports are inevitable for comprehensive wound care management. Especially, diabetes mellitus, nutrition, and skin care are of importance for wound healing, hence we account for these keys to develop wound care technologies and devices. Our department address the new concept of nursing science, "Bioengineering Nursing", in which the basic science will be translated into clinical science through co-development of new technologies and devices with specialized engineers.

- Development and evaluation of wound management technology and devices
 - Elucidation of pathophysiology and its diagnosis technology of wound
 Development of technology and devices for wound management and
 - preventionEvaluation of new technology and devices
 - Investigation of bioengineering aspect of elderly skin
 - Exploring of objective parameter of skin status
 - Development of intervention methodology for improving skin function

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



Example of Bioengineering Nursing research in our department. –Investigation of mechanism for deep tissue injury and its effective management strategy–

http://park.itc.u-tokyo.ac.jp/ midwifery/index1eng.htm





http://www.adng.m.u-tokyo.ac.jp/indexe.htm



International Health

Global Health Policy

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, strengthen technical and leadership skills through educational programs, and enhance national capacities through collaborative projects, especially in the developing world. http://www.ghp.m.u-tokyo.ac.jp



The priority areas of research are:

- Health outcomes (mortality, morbidity and disability), health services, cost-effectiveness of interventions, disease modeling, resource flows, and impact evaluation, including tracking the progress towards the Millennium Development Goals and contributing to the Global Burden of Disease study);
- 2. Health system performance assessment, including the analysis of health system inputs (evidence on financing and human resources), outputs (service delivery, effective coverage), and impact (health status); and
- 3. Health and foreign policy (e.g. global health architecture and governance, G8 and global health, donor commitments).
- Finally, the fundamental role of the Department is to produce the next generation of leaders in global health.

Community and Global Health

Our Department aims at bringing together clinical, public health and social science research to address following aspects of international health. We also conduct international cooperation activities with the U.N., JICA, local government and NGOs in developing countries. Our educational activities provide practical trainings for students, who are enthusiastic about contributing to research in international health and to international cooperation.

- Health promotion in developing countries
- Health and human rights
- Health and human security
- School health
- Infectious diseases (HIV/AIDS, TB, Malaria etc.)
- Nutrition
- Health policy and its impact on health of community people
- Global health workforce policy





Human Genetics

Department of Human Genetics is broadly interested in the human genome diversity, especially in the Asian populations. Specifically, we are using genomic research tools including SNP and microsatellite analyses, as well as gene expression profiling, to better understand the genetic background of a variety of complex diseases, especially bone and joint diseases, infectious diseases and sleep disorders.

- Theoretical and experimental analyses on the genetics of complex diseases
 - Development of statistical approaches for susceptibility gene mapping in complex diseases
 - Comprehensive genetics of bone and joint diseases
 - Host susceptibility factors to infectious diseases
 - Molecular mechanisms of sleep disorders
- Development of new methodologies for genomic polymorphism
- Analysis on the genome diversity of Asia-Pacific populations
- Development of methodologies for the analysis of protein interactions

Developmental Medical Sciences

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, including studies of infectious diseases, nutritional disorders and congenital anomalies. At present, the main research activities are experimental and epidemiological studies on the etiology (genetic and environmental factors), pathogenesis, prevention and treatment of various childhood brain disorders (congenital and acquired) that cause mental and motor disabilities and epilepsy, from the viewpoint of international health science and developmental neuroscience.

- Studies on developmental brain disorders
 - Abnormal neuronal differentiation and size control (tuberous sclerosis)
 - Neuronal migration disorders (lissencephaly, polymicrogyria)
 - Perinatal brain injury (periventricular leukomalacia)
 - Postnatal brain injury (acute encephalopathy)
 - Inherited metabolic disorders (peroxisomal and mitochondrial disorders)
- Molecular epidemiology of infectious diseases (diarrheal viruses)
- Field studies of maternal and child health (malnutrition, obesity)

Human Ecology

Ecological understanding of health and survival of contemporary human populations through the analyses of nutritional, demographic, and environmental aspects of each population is our primary goal. Both fieldworks on various Asia-Oceania populations as well as experimental studies dealing with nutrition and environmental chemicals are conducted, which would serves as the basis in challenging the International Health issues.

- Mechanistic analyses of the effect of subsistence transitions on the health and environment in rural and urban communities in developing countries
- Application of GPS, GIS, and remote sensing to health ecology and international health
- Exposure-effects evaluation of chemical pollution of watershed in rural Indonesian children
- Nutritional ecology, subsistence ecology, medical anthropology and biological demography in Asia-Oceania populations
- Development effects of perinatal exposures to heavy metals, pesticides, or endocrine disrupting chemicals
- Modulating effects of nutrients and nutritional status on environmental hazardous chemicals
- Sustainable society and health





Inhibition of doubledortin expression by shRNA reduces the distance of neuronal migration from the ventricular zone to cortical plate.

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



At a school in a survey area, West Java, Indonesia

http://www.humgenet.m.u-tokyo.ac.jp/

Biomedical Chemistry

The aim of our department is to contribute to the overall global health and welfare through basic research. Our current interests are: the energy metabolism of humans, parasites, and bacteria; and RNA and RNA-binding proteins.

- Human succinate dehydrogenase complex and mitochondrial myopathy
- Ascaris suum and Caenorhabditis elegans
- Molecular mechanism of adaptation to low oxygen tension
- Mitochondrial quinol-fumarate reductase
- C. elegans as a model system of parasitic nematodes and ageing
- Malaria and Trypanosome: characterization of mitochondria as a target for chemotherapy
- *Escherichia coli* and *Mycobacterium*: respiratory enzymes and regulation of energy supply
- RNA and RNA-binding proteins
- Mitochondriral translation system
- RNA biogenesis of Eukarya and Archaea



Free-living nematode Caenorhabditis elegans expressing a recombinant green fluorescent protein inside the body under the control of the promoter of the iron-sulfur subunit (Ip) gene of succinate-ubiquinone reductase (complex II)



School of Public Health

Social and Preventive Epidemiology

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 with clinical trial groups on nutritionrelated diseases



Health Economics and Epidemiology Research

The department purports to help students become a health service practitioner with a sound theoretical and scientific ground underscored by quantitative methods of epidemiology and economics. The department will also contribute to the society through conducting empirical assessment of health practice and policy on the themes such as;

- Economic assessment of medical technology
- Clinical evaluation through patient-derived outcome
- Standardization and management of quality of care
- Health policy assessment
- Health impact of socio-economic policy



Comparison of quality of primary care; Japan vs. U.S. Hashimoto, et al. Lancet 2011

Health Communication

The Department of Health Communication conducts research on the University hospital Medical Information Network (UMIN) Center related activities as well as health communication research at various levels.

Main research topics include;

- Communication of health information to general public
- Patient-provider relationship and communication
- Health literacy
- Activities related to the UMIN
- Information systems for clinical epidemiologic studies
- Security of the information network



Clinical Information Engineering

Clinical Information Engineering 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 biomedical research and clinical care.

- Medical Decision Making
- Cancer informatics
- Data Mining & Knowledge Discovery in Database
- Virtual reality for medical science
- Social information engineering for Public Health (Public Health Informatics : PHI)



A virtual reality application for medical decision making

School of Public Health

Biostatistics See Biostatistics / Epidemiology and preventive Health Sciences(p42) Mental Health See Mental Health / Psychiatric Nursing(p42) Social Gerontology See Social Gerontology(p43) Health Promotion Science See Health Promotion Sciences(p43) Biomedical Ethics See Biomedical Ethics(p43) Health Policy See Public Health(p26) Health Informatics See Medical Informatics and Economics(p27) Forensic Medicine and Medical Law See Forensic Medicine(p27)



Center for Disease Biology and Integrative Medicine

Molecular Biomedicine for Pathogenesis

Focusing on functional analysis of newly isolated genes, particularly related to apoptosis, cell differentiation, or cell cycle, our laboratory is pursuing clarification of the pathogenesis of various diseases and the related physiological machineries in cellular and molecular aspects. Based on our technical advantage in gene manipulation via gene knockout and transgenesis, we give high priorities to in vivo analyses. Our overall goal is to apply our findings to development of novel and definitive therapies for types of diseases.

- Role of AIM (Apoptosis Inhibitor of Macrophage) in atherosclerosis development and other diseases
- Regulation of hematopoiesis and its relevance to leukemogenesis; via functional analysis of a newly identified Polycomb group molecule MBT-1
- Regulation of tumorgenesis by modulating apoptosis and cell cycle; via analysis of DEDD-deficient animals

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



Structual Physiology

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

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



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

Regenerative Medical Engineering

We aim to create a basic methodology for tissue engineering by integrating engineering sciences such as mechanical, material, and chemical system engineering into basic and clinical medicine. Especially for the regeneration of bones, cartilages, and blood vessels, we focus on cellular response to physical stimulations, which can be utilized instead of growth factors and cytokines. In addition, fabrication of new biomaterials is important. 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.

- Development of new polymeric and inorganic biomaterials for regenerative medicine
- In vitro regeneration of carriages, bones, and small blood vessels
- Mechanism of cellular response to physical stimulations
- Fabrication of new biocompatible hydrogels
- Development of anti-peritoneal adhesion barrier and drug delivery system for peritoneal diseases
- Development of artificial pancreatic islet by a microcapsulation technique, and development of artificial red blood cells by a membrane emulsification technique

Clinical Biotechnology

Nanodevices produced by nanotechnology integrate materials and systems on a nanometer scale, and hold the key to realizing the futuristic medical system that can serve the needed function at the right time and the right place with minimal invasiveness. Furthermore, nanodevices are expected to become an important interface between basic biomedical science and clinical medicine by facilitating the translation of basic achievements into clinical applications. Our division wishes to produce revolutionary medical nano-devices based on nanotechnology and thereby to spread the idea of "Nanomedicine" intranationally and internationally.

- Development of nano-scaled carriers of drugs and genes based on polymeric micelles
 - Functional diagnostic imaging
 - Pinpoint cancer therapy
 - Gene therapy
- Development of functional polymeric micelles responsive to external stimuli
- Development of functional cell arrays based on nano-fabrication of polymers
- Development of intelligent scaffolds delivering drugs and genes and their application to regenerative medicine

Environmental Health Sciences

Children's health problems of today include such conditions as disorders in the reproductive and immune functions, learning deficits, mental problem and metabolic syndrome. Our research is carried out on the recognition that the homeostasis is disrupted by various environmentally hazardous chemicals, to which expectant mothers and their newborn babies are exposed during their highly sensitive period of life, and that the contamination with these chemicals may lead to various disease conditions in children after birth. Our experimental investigations are focused on the following themes.

- Elucidation of mechanisms involved in the manifestation of toxicity at the molecular and cellular level due to exposure to environmental pollutants, such as dioxin/PCBs and heavy metals.
- Clarification of epigenetic mechanisms that alter susceptibility to environmental chemicals.
- Development of methodologies for evaluating the toxicity of chemicals to the learning and emotion of rodents and of *in vitro* toxicity techniques at the molecular and cellular levels.
- Development and application of techniques and methodology for evaluating risks of toxic substances in formulating safety standard for the environment and food.

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

Ushida Lab



http://www.bmw.t.u-tokyo.ac.jp/english/index.html http://www.cdbim.m.u-tokyo.ac.jp/english/ research/01 04.html



http://env-health.m.u-tokyo.ac.jp/english/index.html



Animal Resources / Research Resources and Support - Animal Research

Our laboratory focuses on understanding the molecular mechanisms which underlie the synaptic plasticity, activity dependent formation of neuronal circuitry, and learning and memory. We generate knockout mice and inducible knockout mice of signal transduction molecules including the glutamate receptors. We also manage the animal facilities, give researchers advice on their animal experiments, and give lectures on laboratory animal science so that animal experiments are carried out in consideration of animal welfare.

- Molecular analysis of brain function using genetically modified mice
- Development of new reproductive technologies in mammals
- Development of model animals for signal transduction diseases



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

Molecular Radiology / Reserch Resources and Suport-Radiation Biology

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

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

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

english/index.html

Centrosome fragmentation which may lead to aneuploidy

Research Resources and Support-Bioinformatics

Targeting biomedical research support using information technologies, the division performs management of the research network and the central servers of the Graduate School of Medicine, and researches on knowledge infrastructure and processing techniques (e.g. information model, ontology, natural language processing, machine reasoning, etc.) and their application to clinical practice.

- Biomedical research support using network system
- Medical terminologies and ontologies
- Standardization of healthcare information and information models
- Natural language processing and its application to the medical domain
- Machine reasoning and clinical decision support systems

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



Computer System for Biomedical Research



Institution

The Office of International Academic Affairs

The Office of International Academic Affairs is under the direct authority of the Dean of the Graduate School of Medicine. Its four most important roles, as defined by the Committee on International Academic Affairs, are i) international educational exchange, ii) international contacts in research and scientific fields, iii) helping young researchers excel not only as scientists, but also as educators for the next generation and as administrators of their research groups, and iv) holding Medical English classes and developing language-teaching materials for medical students.

http://koryu.m.u-tokyo.ac.jp/homepage10.html

http://www.lib.m.u-tokyo.ac.jp

Medical Library

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

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

• Holdings:

54

Books(number of volumes) : 280,578 (Japanese 111,986 Foreign 168,592) Periodicals(number of titles) : 5,650 (Japanese 3,295 Foreign 2,355)

- Visitors: 73,994
- Borrowed Books: 11,514

Foreign 168,592) Foreign 2,355)



Medical Scientist Training Program

Medical Scientist Training Program was launched in 2008, aiming that medical students have the opportunity to experience basic medical research in their early years and learn the attitude as a researcher. Students taking this program will attend activities such as journal club, medical English course, an assignment to the lab, and FQ, during their free time in addition to their usual curriculum. 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.

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



Museum of Health and Medicine

Museum of Health and Medicine was planned as part of commemorative projects to celebrate the 150th anniversary of the founding of the School and the University of Tokyo Hospital, and was opened on January 20, 2011. The first permanent exhibition was a display of medical texts and instruments from the early Meiji era, Ishihara's Color Blind Test Charts and a gastroscope developed at the University. Special exhibitions are planned to promote understanding among the public regarding advances in medicine and health care. The first special exhibition is related to the beginnings of the School and the Hospital, entitled "the Challenge to Infectious Diseases". It introduced the history of vaccinations against smallpox, research into infectious diseases conducted in the University and its graduates since the Meiji era (1868-1912), and the latest information about infectious diseases and our current efforts. We will hold three special exhibitions every year and events for our visitors.









Center

The International Research Center for Medical Education

The International Research Center for Medical Education is a research institute to develop and improve medical education (including other health professional education) domestically and internationally. We implement innovative curricula for the Faculty of Medicine and invite overseas experts to provide updated information about medical education. We also manage international cooperation projects and produce a research hub in medical education field in Asian region such as Afghanistan and Lao P. D. R.

http://www.ircme.u-tokyo.ac.jp/



PBL class in Kabul Medical University, Afghanistan





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