

Master's Program
Medical Science Course

Graduate School of Medicine and
Pharmaceutical Sciences for Education
(Medicine)
(Second Recruitment)

Application and Admission Information
For
April 2018 Admission

(General Admission/ Special Admission for Working Students)

University of Toyama
December 2017

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Application and Admission Information

(General Admission / Special Admission for Working Students)

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The University of Toyama will accept applications for admission to its Medical Science Course, Graduate School of Medicine and Pharmaceutical Sciences for Education for April Admission of the 2018 academic year twice.

Information on the second application period is contained in this packet.

Information regarding the first application was announced at the end of August 2017.

Application and Admission Information (General Admission / Special Admission for Working Students)

Admission Policy

The Graduate School of Medical Science seeks the following prospective students:

- Those who are interested in life science and wish to be active in the wider field of medical science as advanced professionals through furthering their knowledge of basic medicine and through becoming acquainted with the cutting-edge in the field of basic and clinical medicine.
- Those who wish to cultivate cutting-edge knowledge as medical professionals in the field of medical science and who wish to advance their careers.

1. Programs and Seats Available

Course	Programs and Seats Available	Remarks
Medical Science	15 students	This number includes working students (a few), and at the first recruitments

Notes:

1. Applicants should consult with a professor in their area of study prior to submitting their applications.
2. The Graduate School of Medicine and Pharmaceutical Sciences for Education extends preferential treatment under Article 14 of the Standards for Establishing Graduate Schools by providing special consideration to working students as a means of making graduate education more accessible. Such consideration includes the scheduling of classes and research guidance in the evenings or other specific times and periods to avoid conflicts with work schedules if such is considered necessary from an educational standpoint.

2. Eligibility

The following individuals are eligible to apply:

- (1) Individuals who have graduated from a university or students scheduled to graduate in March 2018.
- (2) Individuals with a bachelor's degree conferred by the National Institution for Academic Degrees and Quality Enhancement of Higher Education under Article 104, Paragraph 4 of School Education Act, or who are scheduled to fulfill said requirement by March 2018.
- (3) Individuals who have completed 16 years of formal education abroad culminating in graduation from a university, or who are scheduled to fulfill said requirement by March 2018.
- (4) Individuals who have completed 16 years of formal education provided by an educational institution in a foreign country, including periods of correspondence or distance study while residing in Japan, culminating in the completion of a university, or individuals scheduled to fulfill said requirement by March 2018.
- (5) Individuals with a degree from a foreign university located in Japan which is authorized by their home countries as educational institutions (whose graduates are regarded as having completed 16 years of school education in their home countries) and designated as such by the Minister of Education, Culture, Sports, Science and Technology, or individuals scheduled to fulfill said requirement by March 2018.
- (6) Individuals who have completed an educational program of three years or more at a university or an educational institution in a foreign country (which has been evaluated for its educational

and research activities by an institute certified by the government or its related organization, or an equivalent thereof designated by the Minister of Education, Culture, Sports, Science and Technology, Japan) (including individuals who have completed a correspondence course offered by the foreign educational institution while residing in Japan, and individuals who have completed an educational program at an educational institution authorized by the School Education System and designated as such by the Minister of Education, Culture, Sports, Science and Technology, Japan), and have been conferred a degree that is equivalent to a bachelor's degree, or will be conferred said degree by March 2018.

- (7) Individuals who have completed a professional course (with a term of four years or longer and which fulfills the requirements of the Minister of Education, Culture, Sports, Science and Technology of Japan) designated as such by the Minister after the day it was so designated, or individuals scheduled to fulfill said requirement by March 2018.
- (8) Individuals designated by the Minister of Education, Culture, Sports, Science and Technology. (1953 Ministry of Education Ordinance No.5)
- (9) Individuals who have been enrolled in another graduate school in accordance with the provisions of School Education Law Article 102, Paragraph 2 and have been deemed by the Graduate School to have the academic ability required to study at the Graduate School.
- (10) Individuals 22 years of age or older at the time of entrance who have taken the preliminary qualification screening and have been determined to have a level of academic ability equal to or higher than that of a graduate of a university by the University of Toyama Graduate School of Medicine and Pharmaceutical Sciences for Education.
- (11) Individuals who have been enrolled in a university for three years or longer and regarded by the University of Toyama Graduate School of Medicine and Pharmaceutical Sciences for Education as having acquired the necessary credits and having attained the appropriate level of academic achievement during the period of enrollment.

Notes:

1. Applicants who fall into categories (8) ~ (11) are required to undergo preliminary qualification screening in advance. Please contact the Admissions Office, Educational Affairs Division of Medicine and Pharmaceutical Sciences Courses at the University of Toyama by Friday, January 5, 2018 for details regarding the examination.
2. Applicants for the special admission for working students should fall into one of the above categories, and have three or more years of work experience.

3. Application Procedures

(1) Submission of Application

Applicants are required to **make payment of the examination fee via bank transfer** by the below-listed application deadline. Regarding the application, enclose the required documents in an envelope and write "Application for admission to the Graduate School, Medical Science Course (Master)" on the front of the envelope **in red ink**. Submit by **registered express mail**.

Application Period

From January 15, 2018 (Mon.) to February 15, 2018 (Thu) (must arrive)

Send application forms and related documents to:

Admission Office, Educational Affairs Division of Medicine and Pharmaceutical Science Courses, University of Toyama
2630 Sugitani, Toyama 930-0194 Japan

See (3) Method of Examination Fee Payment for reference.

(2) Documents to be Submitted

Document		Notes
1	Application Form	Fill out the designated forms.
2	Reasons for Application	Fill out the designated form. (If you have a second choice for an area of study, submit the statement of purpose for the second choice as well.)
3	Certificate of (Expected) Bachelor's Degree	The certificate must be signed by the President or Faculty Dean of the issuing university. (Graduates of or students currently enrolled at University of Toyama are not required to submit this document.)
4	Official Transcripts (sealed)	The transcript must be signed by the President or Faculty Dean of the issuing university, and must be sealed.
5	Examination Admission Card/ Photograph Card	Use the designated form. Affix a frontal photograph of yourself from the waist up to the space indicated on the photograph card. Hats should not be worn and the photograph must have been taken within three months prior to the submission of the application. (Photo size: 4cm long × 3 cm wide)
6	Examination Fee Wire Transfer Receipt	After making the wire transfer payment of the examination fee using the designated form, affix the wire transfer receipt you receive from the bank to the prescribed form.
7	Approval for Examination	Applicants who are enrolled in a graduate program at a school other than University of Toyama or who are employed at a public office or private company are required to submit approval for examination signed by the Dean of their graduate school or their immediate supervisor at work. (There is no designated format.)
8	Copy of the Certificate of Residence	Foreign nationals currently residing in Japan should attach a Copy of the Certificate of Residence issued by the city, town, village or special ward in which they reside.
9	Stamped, Self-addressed Envelope	This is required to issue an Examination Admission Card to each applicant. Affix a 362 yen postage stamp (for express mail) and write your postal code, address and name in the addressee space of a No.3-long size envelope (23.5 cm × 12 cm).
10	Mailing Label (for a notification of acceptance)	Use the designated form. Include postal code, address and name.

Notes:

Applicants for the special admission for working students should submit the following documents in addition to the above:

1. Certificate of Working Period

The certificate should certify that the applicant has three or more years of work experience, and should be signed by a representative of the organization. (No set format)

2. Research Report (No set format)

3. Research Plan (No set format)

(3) Method of Examination Fee Payment

Make the examination fee (**30,000 yen**) payment as described below.

Payment deadline: 15:00 on February 15, 2018 (Thu)

Fill in the wire transfer form designated by the University of Toyama and make the wire transfer at your nearest bank, credit union, or agricultural cooperative handling wire transfers.

Payment of the examination fee cannot be made through ATMs (automatic teller machines) or the Japan Post Bank.

The examination fee refunds will only be made for the reasons listed below.

- 1) In the event that the individual does not in fact apply to the University of Toyama after paying the examination fee (e.g. Said applicants did not submit an application or the application submitted was not accepted.),
- 2) In the event of a double payment, and
- 3) In the event of a payment exceeding the required amount.

Note: When applying to the University of Toyama for an examination fee refund, affix the Examination Fee Payment receipt to the designated Examination Fee Refund Request Form and mail it to the University of Toyama at:

Accounting Division, Financial Affairs Division, University of Toyama
3190 Gofuku, Toyama 930-8555 Japan
TEL: 076-445-6053 (for domestic)/ +81-76-445-6053 (from overseas)

(4) Applicants with Disabilities

Individuals with disabilities are requested to notify the Admission Office, Educational Affairs Division of Medicine and Pharmaceutical Science Courses, University of Toyama prior to the submission of the application if there is a need for a special consideration when taking the examination or attending school.

Applicants requesting special consideration may be required to submit doctor's note or documents indicating the matters listed below.

- Type and level of disability
- Matters requiring special consideration for the examination
- Matters requiring special consideration for school attendance, and
- Daily life status and other matters, as needed.

- 1) Deadline for notification: January 5, 2018 (Fri.)
- 2) Contact:

Admissions Office, Educational Affairs Division of Medicine and Pharmaceutical Sciences Courses, University of Toyama
2630 Sugitani, Toyama 930-0194 Japan
TEL: (076) 434-7658 (within Japan)/ +81-76-434-7658 (from abroad)

4. Selection Method

Applicants are selected based on their performance on both a written and an oral examination, a review of their accomplishments, reasons for application, and transcripts.

(1) Written Examination

[General admission]

Essay

English (Only English-Japanese paper dictionaries can be used during the examination. No electronic dictionaries or medical dictionaries in any medium are allowed to be used.)

[Special admission for working students]

English (Only English-Japanese paper dictionaries can be used during the examination. No electronic dictionaries or medical dictionaries in any medium are allowed to be used.)

Note: Non-native English speaking foreign nationals who would like to use a dictionary during the examination are asked to notify the Admissions Office, Educational Affairs Division of Medicine and Pharmaceutical Science Courses, University of Toyama in advance.

(2) Oral Examination

An oral examination will be given separately for each of the areas of study the applicant selects

as first and second choices.

- (3) Review of Accomplishments (For the special admission for working students only)
- (4) Examination Date, Time and Place

Date	Time	Subject	Place
March 1 2018 (Thu)	9:30 ~11:00	Essay	Sugitani Campus, University of Toyama 2630 Sugitani, Toyama, Japan
	13:00 ~14:30	English	
	15:00 ~	Oral examination	

5. Notification of Acceptance

The Examination Admission Numbers of successful applicants will be posted **at 15:00 on March 9, 2018 (Fri)** on the notice board in front of the entrance of the research building of the Faculty of Medicine at the Sugitani Campus of the University of Toyama. The Graduate School of Medicine and Pharmaceutical Sciences for Education will also promptly send notification of acceptance to successful applicants.

Telephone and facsimile inquiries will not be accepted.

6. Admission Procedures

Admission procedures are shown below. Enrollment forms and details will be sent to successful applicants.

- (1) Enrollment **March 22, 2018(Thu.)** (scheduled)
- (2) Place: University of Toyama, Sugitani Campus
- (3) Documents Required for Enrollment

Notification of acceptance, a photograph (4 cm long × 3 cm wide in color), a written oath (on the designated form), etc.

- (4) Enrollment Fees

a) Enrollment Fee: **282,000 yen (plan)**

Note 1: The above is the currently valid enrollment fee. Should the enrollment fee be revised, the new enrollment fee will go into effect as of the time of the revision.

Note 2: The enrollment fee received by the University of Toyama cannot be refunded for any reason.

b) Other

- 1) Students who have difficulties paying the enrollment fee may be exempted from or granted a postponement for the payment upon screening.
- 2) The tuition fee shall be paid following enrollment. Notification of the amount and method of payment will be provided during enrollment procedures.
Tuition for FY 2017: 535,800 yen
- 3) Scholarships are available through the Japan Student Services Organization.
- 4) Students are required to pay the cost of obtaining Personal Accident Instance for Students Pursuing Education and Research.

- (5) Notes

Students who have not completed the enrollment procedures on the designated date will be considered to have declined enrollment.

7. Privacy Policy

The University of Toyama handles all personal information in accordance with the Act on the

Protection of Personal Information Held by Independent Administrative Agencies, etc. and the University of Toyama Policies on Personal Information Protection.

- (1) Names, addresses, and other personal information that the University of Toyama obtains from applicants will be used for 1) the selection of students (accepting applications and providing examinations), 2) announcement of successful applicants, 3) admission procedures, 4) investigation and research for the selection process, and 5) other related operations.
- (2) Personal information obtain from the students who have completed the admission procedures will be used for preparatory education before admission and 1) matters related to instruction and administration (registration, instruction, etc.), 2) student assistance (health management, application for scholarships and tuition exemptions, employment assistance, etc.), and 3) the collection of tuition after admission.
- (3) The names and addresses of successful applicants may be used to facilitate contact by organizations related to after-school activities, the alumni association, the support association, and the student cooperative association of the University of Toyama.

Note: If you are a successful applicant and would not like to be contacted by the above-mentioned organizations, please notify the Admissions Office, Educational Affairs Division of Medicine and Pharmaceutical Science Courses, University of Toyama.

- (4) The University of Toyama may partially outsource operations to commissioned companies (hereinafter referred to as “Contractors”). We may supply said Contractors with all or part of the personal information obtained through the application process as required for the execution of their contracted business.

8. Notes

- (1) Incomplete applications may not be processed.
- (2) Once submitted, application forms cannot be returned for any reasons.
- (3) Falsification of information submitted during the application process may result in rejection of the application or cancellation of enrollment.
- (4) For inquiries, please contact the following office:

Admissions Office, Educational Affairs Division of Medicine and Pharmaceutical Sciences
Courses, University of Toyama
2630 Sugitani, Toyama 930-0194
TEL: (076) 434-7658 (for domestic)/ +81-76-434-7658 (from abroad)

Overview of the Medical Science Course University of Toyama Graduate School of Medicine and Pharmaceutical Sciences for Education (Medicine) (Master's Program)

1. Objectives

Because of its increasing complexity, sophistication and interdisciplinary advancements, the field of medicine requires the participation of more people from other fields. This program, therefore, has been established to provide, systematically and intensively, a wide range of medical knowledge to people from areas of study other than medicine, and to train them to become professionals with advanced medical expertise.

2. List of Subjects (As of April 2017)

As is shown Appendix I.

3. List of Instructors and Areas of Research

As is shown in Appendix II .

4. Class Enrollment

Students should enroll in the subjects listed in Appendix I to earn 18 credits or more (compulsory subjects: 12 units / elective subjects: 6 units or more), and write a dissertation for a master's degree through attending medical seminars (4 units) and conducting special medical research (8 units).

5. Preferential Treatment

The Graduate School of Medicine and Pharmaceutical Sciences for Education extends preferential treatment to working students under Article 14 of the Standards for Establishing Graduate Schools to enable them to access graduate education without leaving their job.

Preferential treatment is extended to eligible students following submission of a study plan and consultation with their advisors. Preferential treatment allows students to schedule classes and research sessions in the evenings from 6:05 PM to 9:10 PM on weekdays (from Monday through Friday). Depending on the subject, classes and research time may be scheduled on Saturdays, during summer vacation, etc.

6. Requirements for Completion of the Program

The requirements for the master's program in Medical Science are enrollment for a period of two or more years, and 30 or more credits earned according to 4. Class Enrollment and successful completion of a screening of a master's dissertation and final examination after having obtained the necessary research guidance.

If, however, a student is considered to have made excellent accomplishments that deserve special consideration, the period of enrollment in the master's program may be shortened to one year.

If a student presents a plan to take and complete the program systematically over a certain period of time beyond the standard course term (two years) due to special circumstances such as working outside the campus, it will be considered for possible acceptance.

7. Conferral of Degree

The degree offered is a Master of Medical Science.

Appendix I

List of Subjects

As of April , 2017

Subjects	Credits			Compulsory/Elective	Remarks	
	Lecture	Seminar	Others			
Introduction to Medical Science	1			Compulsory	Required number of credits Compulsory: 24 or more Elective: 6 or more	
Biomedical Ethics	1			Compulsory		
Human Morphology	2			Compulsory		
Human Physiology	2			Compulsory		
Pathology/ Pathophysiology	2			Compulsory		
Social Medicine	2			Compulsory		
Introduction to Clinical Medicine	2			Compulsory		
Microbiology and Immunology	2			Elective		
Genomic and Medical Sciences	2			Elective		
Clinical Behavioral Science	2			Elective		
Morbid Pharmacology	2			Elective		
Outline of Clinical Pathology	2			Elective		
Somatosensory, Neuronal and Locomotor System	2			Elective		
Introduction to Japanese Oriental(Kampo) Medicine	2			Elective		
Practical Course of Advanced Clinical Medicine	2			Elective		
Introduction to Clinical Biostatistics	1			Elective		
Designing Clinical Research	1			Elective		
Clinical Neuropsychology	2			Elective		
Psychological Assessment	2			Elective		
Psycho-medical Interview Methods	2			Elective		
Current Concept on Emergency and Resuscitation Medicine in Health care	2			Elective		
Management of Disaster and Crisis Medicine	2			Elective		
Organ Transplantation Coordinator Update Course I	2			Elective		
Organ Transplantation Coordinator Update Course II	2			Elective		
Advanced Mathematics	2			Optional		
Advanced Physics	2			Optional		
Advanced Chemistry	2			Optional		
Advanced Biology	2			Optional		
Seminar for Medical Science		4		Compulsory		
Special Research for Medical Science			8	Compulsory		
Research Ethics and Methods	1			Optional		e-learning
Japanese Language · Culture (for foreign students)	2			Optional		*For foreign students only
Total	55	4	8		Total number of credits: 30 or more	

Appendix II

List of Instructors and Areas of Research

Field of study	Areas of Research
Director	
Anatomy	[Research content] Behaviors are based on neural circuits. Animals move toward favorable environments: feeding and mating, and escape from unfavorable stressful environments. These behaviors governed by specific neural circuits are selected through evolution and enhance their survival. Our purpose is to specify neural circuits for the behaviors and understand structural and functional basis of the behaviors.
Professor Hiroyuki Ichijo	[Guidance content] <ul style="list-style-type: none"> • Neural basis of stress responses: lateralization and maturation of habenular complex in mice • Neural basis of feeding behaviors and their lateralizaion in fish • Neural basis of courtship and aggression behaviors in terms of reproductive isolation in fish
Regenerative Medicine	[Research content] Cellular therapy has emerged as a new potential tool for curing a wide variety of degenerative diseases like Alzheimer's diseases, spinal cord injury, hepatocirrhosis, myocardial infarction and diabetes for improving their quality of life (QOL). In our lab, we focus on the both of embryonic and somatic stem cell character of amniotic membrane and investigate their ability for applying source of regenerative medicine.
Professor Toshio Nikaido	[Guidance content] <ul style="list-style-type: none"> • Histological research about tissue regeneration • Molecular biological research about tissue regeneration • Research about cancer stem cells • Histological and developmental research about placenta, amnion membrane and embryo-derived tissues • Tissue engineering using human cells • Research about immune cells related with immune-feedback mechanism- especially about microenvironments • Histological and morphological research using immunohistochemistry and electromicroscopes
Physiology	[Research content] The amount of information processed by the brain in our daily life, are estimated to be about 10 billion bits per second. In the human brain, there is a massively parallel information processing system (neural networks) to allow real-time processing of such information. Elucidation of the working principle in the brain would contribute to the modern information-oriented society as well as the understanding of the human brain. To investigate mechanisms and principles of neural information processing in the brain, we conduct neurophysiological and neuropsychological researches on higher brain functions including recognition of sensory information (inputs), and behavioral manifestation based on sensory perception and memory (outputs).
Professor Hisao Nishijo	[Guidance content] <ol style="list-style-type: none"> (1) Neural mechanisms of non-verbal communication based on emotional expression and gaze (2) Neural mechanisms of navigation and place recognition in virtual reality (3) Functional brain mapping using non-invasive brain imaging (dipoe tracing, NIRS, etc.) (4) Neural mechanisms of sensory perception including sensation during acupuncture and muscle massage (5) Neural mechanisms of autonomic control associated with higher brain functions (6) Neural mechanisms of food recognition in the limbic system, hypothalamus and brainstem (7) Neural mechanisms of behavioral manifestation in the limbic system (8) Assessment of brain functions in rehabilitation medicine
Physiology	[Research content] This century will be the era of brain sciences. "The mind" has long been regarded as one of the most enigmatic psychological processes. Recent technological advances have enabled us to approach the neural basis of the mind. The purpose of our research is to elucidate brain mechanisms of "learning and memory", one of the key members of the mind. For this, we mainly use laboratory animals such as monkeys, rats and mice, record neural activities in the brain of the animals while they perform a behavioral (learning and memory) task or they are asleep subsequent to the task performance, and analyze the pattern of brain activities.
Professor Ryoi Tamura	[Guidance content] <ol style="list-style-type: none"> (1) Basic skills of electrophysiology. (2) Basic skills for handling animals. (3) Basic skills of data analysis and presentation. (4) Basic skills for writing a scientific paper.

Brain Science	<p>[Research content] We aim to resolve the molecular mechanism of memory formation in mammals by making full use of molecular biology, biochemistry, cell biology, histochemistry, electrophysiology, and behavioral pharmacology.</p>
Professor Kaoru Inokuchi	<p>[Guidance content] We guide the student how to achieve a real science, i.e., creating a new concept. Specific research contents are indicated below: <ul style="list-style-type: none"> • Research on molecular mechanisms of memory formation • Research on cell assembly and memory formation • Research on destabilization and re-stabilization of fear memory </p>
Molecular Neuroscience	<p>[Research content] We focus on molecular basis of brain functions and dysfunctions. To develop the novel methods for diagnosis and cure of neurodegenerative and neurodevelopmental disorders, we have used molecular biological approaches to generate new mouse models of such disorders and new probes to detect functional changes in the brain.</p>
Professor Hisashi Mori	<p>[Guidance content] <ol style="list-style-type: none"> (1) Analysis of molecular basis of higher brain functions such as cognition, emotion, and sociality using genetically modified mouse models. (2) Development of novel imaging method of brain functions. (3) Analysis of molecular basis of neuro-immune interactions. (4) Research on molecular mechanisms of central synapse formation. </p>
Pathology	<p>[Research content] The true ideal that pathology aims at is to elucidate the nature of disease. They were performed from various points of view till now. Shifting from the diagnostic pathology mainly on the morphological stand points, various molecules to involve in constitution of the disease had been discovered, and the molecular pathology to elucidate the disease entity using them is established. To study essence of the disease using more technique as a base in morphology in our department, they will be able to contribute to the field of the treatment as a result.</p>
Professor Johji Imura	<p>[Guidance content] The studies to elucidate mechanism of the disease with the morphology on the cell and tissue's level as a base. The morphological, functional and molecular research using the cell line derived from a various kinds of tumors. The study on elucidation of various kinds of disease mechanism using the animal model. Analysis of the molecular mechanism using maneuvers such as immuno-histo(-cyto) -chemistry, (RT-) PCR, Western blotting and mass spectrometry to acquire the cause factors of the disease at the molecular level. The instruction for contribution of English article to an international journal.</p>
Molecular neuropathology	<p>[Research content] <ul style="list-style-type: none"> • We aim to resolve the functional role of platelet-derived growth factor (PDGF) in various biological phenomena. We established conditional knockout mouse models of PDGF receptors, and analyzed these models and the cultured cells isolated from them. Cell biology and morphology are the major tools of our analyses. • Our studies are focusing on the coordination of higher brain function, and on the protection, repair and regenerative mechanism of nervous system. • Fibroproliferative diseases and regenerative tissue responses are focused as well. </p>
Professor Masakiyo Sasahara	<p>[Guidance content] <ol style="list-style-type: none"> (1) Methods of PCR, Northern • Western blot, and Immunostaining (2) Establish and analyses of animal disease model including ischemia. (3) Functional analyses of the neurotrophic factors </p>
Clinical Infectious Diseases	<p>[Research content] Study of infectious diseases</p>
Professor Yoshihiro Yamamoto	<p>[Guidance content] <ul style="list-style-type: none"> • Pharmacokinetics-pharmacodynamics analysis of antimicrobial agents • Appropriate antibiotic treatment with molecular microbiology • Establishing surveillance system of nosocomial infection • Analysis of prognostic factors of Legionella Infection </p>
Molecular and Cellular Immunology	<p>[Research content]</p>
N/A	<p>[Guidance content]</p>

Clinical Virology	<p>[Research content]</p> <p>We are analyzing the pathogenesis of viral infections. In this process we have elucidated the role of brain-derived neurotrophic factor (BDNF) in pain during herpes zoster and the mechanism of action of herbal medicine (Kakkon-to) from the transcription to the cytokines and antiviral mechanism in influenza and herpes simplex virus infection. We also developed helicase-primase inhibitor (ASP2151, Amenamevir) of herpesviruses and a novel influenza drug (T-705, Favipiravir).</p>
Professor Kimiyasu Shiraki (will be retired in March 2018)	<p>[Guidance content]</p> <p>The mechanism pain in herpes zoster and postherpetic neuralgia Novel anti-influenza drug (T-705, Favipiravir) Pathogenesis and Latency of human herpes viruses Development of antiviral drugs and herbal medicines</p>
Molecular and Medical Pharmacology	<p>[Research content]</p> <ul style="list-style-type: none"> • Search for therapeutic agents to treat septic syndrome using animal models. • Development of prevention and treatment of diabetic cardiovascular complications that specifically target endothelial dysfunction. • Analysis of pathological regulatory mechanisms on intestinal mucosal inflammation.
Professor Yuichi Hattori	<p>[Guidance content]</p> <p>Acquirement of skills and knowledge required for functional, morphological, biochemical, and molecular biological experiments in cardiovascular pharmacology, neuropharmacology, endocrine pharmacology, and immunopharmacology</p>
Epidemiology and Health Policy	<p>[Research content]</p> <p>We conduct several longitudinal studies of Japanese adults and children. The Japanese civil servants study (the JACS study) is an ongoing follow-up study of approximately 5,000 Japanese civil servants. This study is an international collaborative study with the British civil servants study (the Whitehall II study) and the Finnish civil servants study (the Helsinki Health Study). The Toyama birth cohort study (the Toyama study) is a birth cohort study of approximately 10,000 Japanese children. The Toyama dementia study is an ageing and gerontological study of approximately 1000 adults aged 65 or more.</p>
Professor Michikazu Sekine	<p>[Guidance content]</p> <p>Postgraduate students become members of the research units and are involved in each step of epidemiological research (i.e. study planning, and conducting, data analysis, and manuscript writing and publishing). The following is examples of current research topics.</p> <ul style="list-style-type: none"> • Socioeconomic and sex inequalities in physical and mental health of Japanese civil servants with international comparisons • Associations of psychosocial stress at work, work-life balances, health behaviors and personality characteristics with health of Japanese civil servants with international comparisons • Associations of social environments, parental factors, and lifestyle factors with health (e.g. QOL, sleep quality, and obesity) of Japanese children • Epidemiological study on dementia
Public Health and Environmental Medicine	<p>[Research content]</p> <p>Focus of children's environmental health is the discovery and prevention of diseases in children that are associated with harmful exposures from the environment. Our department is one of the regional centers of the Japan Environment and Children's Study, a nationwide birth cohort study in Japan. We also conducted toxicological research of environmental chemicals. The goal of occupational health is the promotion of the highest degree of physical, mental and social well-being of all workers.</p>
Professor Hidekuni Inadera	<p>[Guidance content]</p> <ol style="list-style-type: none"> (1) Epidemiological Study on Children's Environmental Health (2) Fundamental Study of Environmental Chemicals (3) Prevention of Non-communicable Diseases (4) Occupational Health
Legal Medicine	<p>[Research content]</p> <p>We mainly interested in cardiovascular and neuropathology, and aim to establish the new aspect of the field. The area of studies are not localized in morphology, but the method of molecular biology is used. We try to perform investigation to contribute the progress of clinical medicine such as diagnosis and treatment, in addition to progress of forensic medicine.</p>
Professor Naoki Nishida	<p>[Guidance content]</p> <ol style="list-style-type: none"> (1) Pathology of sudden unexpected death (2) Neuropathology of degenerative and vascular disease (3) Pathology and anatomy of cardiac conduction system (4) Molecular biology of ion channel (5) Etiology and neuropathology of suicide

Diabetes and metabolism, rheumatic and respiratory diseases	<p>[Research content]</p> <ul style="list-style-type: none"> • Dissection of the pathogenesis of type 2 diabetes and metabolic syndrome. Development of the methods to treat and prevent them. • Dissection of genetic factors of type 2 diabetes, rheumatoid arthritis and asthma. Development of tailor-made therapy. • The role of Sirtuin family proteins, longevity genes, in the development of metabolic syndrome and type 2 diabetes. • Dissection of the pathogenesis of lung and rheumatic diseases. • The development of methods to detect lung cancers at an earlier stage. • Regulatory mechanisms for gut microbiome on glucose metabolism.
Professor Kazuyuki Tobe	<p>[Guidance content]</p> <p>Our focus is how chronic inflammation in tissues causes metabolic, lung and rheumatic diseases.</p> <p>(1) Metabolism and Endocrinology: We are examining how adipose tissue hypoxia affects adipose inflammation, thus leading to insulin resistance. We are interested in how various bacterial metabolites regulate glucose metabolism and energy homeostasis.</p> <p>(2) Respiriology: We are examining how chronic inflammation causes COPD and asthma, in mouse models. We are examining how tobacco smoking affects cell signal transduction.</p>
Internal Medicine	<p>[Research content]</p> <p>Cardiovascular diseases have been increasingly popular in Japan along with aging society. Ischemic heart disease due to atherosclerosis with uncontrolled multiple risk factors, valvular disease in aged population, heart failure as a terminal figure of all heart disorders, and a number of arrhythmias modifying their clinical course are common. It is crucial to find out the underlying mechanisms of them, and to explore the therapeutic and preventive strategies for them.</p> <p>Also, renal diseases are closely related with cardiovascular diseases, and the relationship has been called as cardio-renal syndrome. Not only primary kidney disease such as nephritis, but also secondary renal dysfunction caused by heart failure should be an important target for investigation</p>
Professor Koichiro Kinugawa	<p>[Guidance content]</p> <p>(1) Mechanisms of sympathetic nerve inhibition by non-pharmacological therapy for heart failure</p> <p>(2) Development of novel strategy for heart failure to alter cardiac-specific gene expression</p> <p>(3) Investigation of relationship between beta-adrenergic receptors and reversibility of myocardial remodeling</p> <p>(4) Exploitation of factors to determine the viability of renal collecting tubules</p> <p>(5) Effect of renal denervation on autonomic disorders in heart failure model</p> <p>(6) Mechanisms of onset of atrial fibrillation</p>
Gastroenterology, Hematology and Medical Oncology	<p>[Research content]</p> <p>Gastrointestinal (GI) tract is multi-functional. Major functions are digestion of foods and absorption of nutrition. As GI tract is a front-line to external factors including foods, bacteria, virus, intestinal flora and other external agents, GI tract has various interactions to the external factors and reacts to them, which are inducing normal or abnormal immune reaction. Such aberrant interactions will be a first step to develop GI diseases. Our research goal is to understand the molecular mechanism to link to the interaction and find a new molecule to associate with the development of GI diseases.</p>
Professor Toshiro Sugiyama (will be retired in March 2018)	<p>[Guidance content]</p> <p>(1) Carcinogenic mechanism of gastric cancer by <i>H.pylori</i> infection and the chemoprevention</p> <p>(2) Distribution and function of TRP family in gastrointestinal tract and the related GI functional diseases</p> <p>(3) Mechanism of molecular agents targeted to GIST and the resistant mechanism</p> <p>(4) Immuno-pathogenesis of inflammatory bowel diseases and identification of novel therapeutic target molecule of the disease</p> <p>(5) Progressive mechanism from viral hepatitis and NASH to hepatocellular carcinoma</p> <p>(6) Immunomodulation for bone marrow transplantation in hematological malignancy and the resistant mechanism to proteasome inhibitors in multiple myeloma</p>

Dermatology	<p>[Research content] Environmental and intrinsic factors cause exacerbation of skin diseases. For example, percutaneous entry of environmental allergens through barrier-disrupted skin is strongly associated with the induction of immunological responses. Exposure to ultraviolet radiation leads to various acute deleterious cutaneous effects including sunburn and immunosuppression, and the long-term consequences lead to premature aging, including photo carcinogenesis. The purpose of our department is to investigate the mechanisms of cutaneous diseases caused by environmental and intrinsic factors.</p>
Professor Tadamichi Shimizu	<p>[Guidance content] (1) Mechanisms of the atopic dermatitis and inflammatory skin diseases (2) Mechanism of photoaging and photocarcinogenesis (3) Pathology of the skin lymphoma (4) Development of the therapeutic agent of melanoma (5) Mechanism of the wound healing</p>
Pediatrics	<p>[Research content] Although a child has a similar body structure to an adult, all the organs in a child are in the process of growth and development. Therefore, in order to perform a research in the pediatric field, we have to take account of the difference between a child and an adult.</p>
Professor Yuichi Adachi	<p>[Guidance content] • Immune development and allergic disease • Association between allergic diseases and environmental factors • Genetic analysis of cardiac sudden death, fatal arrhythmia and cardiomyopathy • Neurodevelopmental outcome following cardiac surgery • Immunological diagnosis and treatment of childhood leukemia • Molecular mechanisms of the relationship between low birth weight and adult metabolic diseases</p>
Neuropsychiatry	<p>[Research content] Recent advances in brain imaging techniques have enabled us to explore brain structure and function non-invasively <i>in vivo</i>. However pathophysiology and mechanisms of mental disorders are still remain elusive. In our department, clinical and basic researches are being performed to elucidate pathophysiology of severe mental illnesses such as schizophrenia and to develop innovative and optimized approaches for diagnosing and treating patients for the purpose of improving their long-term outcome.</p>
Professor Michio Suzuki	<p>[Guidance content] (1) Investigation of pathophysiology and development of objective diagnostic methods for schizophrenia by brain imaging (2) Pharmacotherapy to improve cognitive dysfunction in schizophrenia (3) Neurophysiological studies in schizophrenia (4) Early intervention for psychosis (5) Early diagnosis and intervention for dementia</p>
Diagnostic and Therapeutic Radiology	<p>[Research content] By the rapid development of the medical imaging, not only high-resolution anatomical image but also functional image can be obtained. Using the functional images, we are able to evaluate the function and metabolism of the living body. We aim at developing the new imaging method of early diagnosis with combination of the high-resolution anatomical image and functional image.</p>
Professor Kyo Noguchi	<p>[Guidance content] A characteristics and analysis of the anatomical image A characteristics and analysis of the functional image</p>
Surgery	<p>[Research content] We reach an aging society, and coronary disease, aneurysms, peripheral arterial disease, malignant neoplasms increase, and the less invasive surgical technique should be developed.</p>
Professor Naoki Yoshimura	<p>[Guidance content] • Surgical approach for arrhythmia • Clinical and biological research of lung cancer • Surgical approach for atherosclerosis • Surgery for ischemic heart disease • Mechanical assist for congestive heart failure • Surgery for congenital heart disease</p>

Second Surgery	<p>[Research content]</p> <p>The aim of our research is to solve the clinical questions and feed them back to the clinical practice. Research for the science and technology about esophagus-gastro-enterological surgery, liver-biliary-pancreatic surgery, pediatric surgery and breast and thyroid disease surgery.</p>
Professor Tsutomu Fujii	<p>[Guidance content]</p> <ul style="list-style-type: none"> • Surgical treatment of malignant tumors • Development of novel surgical technique such as Robotic surgery • Preoperative diagnosis • Understanding of physiology, nutrition and infection • Cell culture from resected tumors, and basic research about cancer cells
Neurosurgery	<p>[Research content]</p> <p>Neurosurgical aspects of basic and clinical research are included in this course.</p>
Professor Satoshi Kuroda	<p>[Guidance content]</p> <ol style="list-style-type: none"> (1) Stem cell research (2) Molecular and stem cell research of malignant glioma (3) Angiogenesis of cerebrovascular disorders (4) Cognitive function in neurosurgical disorders (5) Electrophysiological analysis (6) Epidemiological analysis of stroke
Orthopaedics and Locomotor System Science	<p>[Research content]</p> <ul style="list-style-type: none"> • Developmental biology of skeletal tissues • Pathomechanism of joint destruction • Development of therapeutic strategy for arthritic diseases • Genetic analysis of spinal disorders • Differentiation induction for malignant soft tissue tumors
Professor Tomoatsu Kimura	<p>[Guidance content]</p> <p>Locomotor system (bone, cartilage, muscle, tendon, ligaments, nerve, etc.) is an organ directly related to the maintenance of human health and quality of the life. Studies in this course include molecular and pathophysiological mechanisms of various diseases and conditions affecting the locomotor system, such as joint damage, intervertebral disc degeneration, injury, osteoporosis, and soft tissue tumor. Studies also extend to understanding of the present status of various therapeutic methods including surgical treatments and to future strategies toward tissue regeneration or reconstruction.</p>
Obstetrics and Gynecology	<p>[Research content]</p> <ul style="list-style-type: none"> • Basic reproductive immunology and clinical reproductive immunology • Reproductive endocrinology and cytokine network • Growth and differentiation of trophoblast • Clinical pathology in gynecological cancer • Preterm labor • Preeclampsia • Recurrent pregnancy loss • Endometriosis
Professor Shigeru Saito	<p>[Guidance content]</p> <ul style="list-style-type: none"> • RT-PCR • Cell culture • Flow cytometry • Immunohistochemistry
Ophthalmology	<p>[Research content]</p> <p>Ophthalmology is an area to research the eye which plays important roles in quality of life. The eye is a peculiar organ and needs specific approaches for its research. Our department focuses on biochemical and histological analyses using various eye disease animal models and rapid diagnosis and treatment of ocular infections. Our department is also collaborating with Department of regenerative medicine and researching new applications of hyper dry amniotic membrane for eye diseases. We aim translational researches.</p>
Professor Atsushi Hayashi	<p>[Guidance content]</p> <ol style="list-style-type: none"> (1) Develop new ocular drug delivery systems (2) Develop new applications of hyper dry amniotic membrane for eye diseases (3) Establish rapid diagnosis of infectious sources in ocular infections (4) Develop new drug treatment for retinal degenerative diseases (5) Gene expression and biomarker research on ocular tumors

Otolaryngology-Head and Neck Surgery	<p>[Research content]</p> <p>(1) Clinical research of intractable inner ear disorders (2) Brain imaging research in response to auditory, vestibular, gustatory and olfactory stimulations</p>
Professor Hideo Shojaku	<p>(3) Clinical research of new diagnostic technique in vestibular systems (4) Clinical research of minimally invasive therapy in vestibular disorders</p> <p>[Guidance content]</p> <p>(1) Estimation of endolymphatic hydrops of inner ear by auditory and vestibular test batteries. (2) Cortical hemodynamic responses to auditory, vestibular, gustatory and olfactory stimulations by near infrared spectroscopy (3) Analysis of otolith function by Vestibular Evoked Myogenic Potentials (VEMP) (4) Evaluation of therapeutic effect on Meniere's disease by middle ear overpressure treatment</p>
Urology	<p>[Research content]</p> <p>Our medical staffs in the department have dedicated themselves to better care for patients having urological diseases. We are conducting basic and translational research for providing various strategies for treatment of the diseases that patients are satisfied with. We are enthusiastic about studying basic science of urology that will lead to a future innovative treatment.</p>
Professor Hiroshi Kitamura	<p>[Guidance content]</p> <p>(1) Biomarker research on urological cancers (2) Development of immunotherapy for urological cancers (3) Cancer stem cell research on urologic cancers (4) Growth factor research on prostate cancer (5) Basic research on impaired spermatogenesis (6) Research on vascular epithelial cells in erectile dysfunction (7) Research on Heat Shock Protein in acute/chronic rejection after renal transplantation</p>
Anesthesiology	<p>[Research content]</p> <p>The aim of our study is to clarify the mechanisms of anesthesia and to develop new anesthetic and analgesic drugs using most up-to-date technology for safety anesthesia. We are also aiming at applications of the new acquired results for clinical practices, such as anesthesia, pain clinic and terminal care.</p>
Professor Mitsuaki Yamazaki	<p>[Guidance content]</p> <p>Clarification of mechanisms of anesthetic and analgesic drugs in central nervous and circulatory systems Development of new anesthetic methods for surgical patients Elucidation of mechanisms of neuropathic pain Development of new anesthetic methods in patients with chronic pains</p>
Comprehensive Oral Science	<p>[Research content]</p> <p>Oral and maxillofacial region is composed of several important organs for articulation, mastication and deglutition, which are essential for human life. Several disturbances of these functions may lead to decreasing quality of life. Early detection and early treatment of oral disease could contribute to keep up the social activity as well as to improve patient's prognosis. Our research programs address for better understanding pathogenesis of oral disease and developing of novel treatment modalities based on the basic research. Further, studies on rehabilitation of oral function and the functional reconstruction are being pushed along.</p>
Professor Makoto Noguchi	<p>[Guidance content]</p> <p>(1) Development of visualizing system at articulation disorder (2) Development of novel oral health care methods and assessment of its clinical significance (3) Immunological study on oral lichen planus and lichenoid mucositis (4) Immunosuppressive population in oral cancer microenvironment (5) Mechanism of jaw osteonecrosis induced by bone-modifying agents (6) Regenerative medicine in oral and maxillofacial reconstruction</p>

Clinical Pathology Clinical Laboratory	<p>[Research content]</p> <p>Clinical pathology supports the diagnosis of disease using laboratory testing of blood and other bodily fluids, tissues, and microscopic evaluation of individual cells. Our board-certified veterinary clinical pathologists and technologists provide laboratory results in a timely, efficient and thoughtful manner; supporting research, clinicians, referring veterinarians, and students in the diagnosis. The Department of Clinical Laboratory and Molecular Pathology and Clinical Laboratory Center include the chemistry, hematology, immunology, microbiology, molecular Diagnostics and physiological examination. Especially, our research projects are the development of a rapid measurement system for nuclear factor-kappa B that is a novel transcription factor, which regulates various processes of acute and chronic inflammatory diseases, and also establishment of rapid identification of unknown pathogenic microorganisms in patients with sepsis.</p>
Professor Isao Kitajima	<p>[Guidance content]</p> <ul style="list-style-type: none"> • Management of clinical laboratory: Learn principle of automation analysis system. • Hematology; CBC, Smear (and fluid cytopathology) interpretation and correlation with cytology, Interpretation of coagulation and hemostasis tests. • Microbiology; Learn general microbiology techniques including gram-stainig, Interpret routine and special cultures, Interpret biochemical identification and antibiotic sensitivity profiles. • Evaluate blood transfusion reactions. • Learn basic molecular genetics, including the application of its technology to the management of genetic diseases (PCR, sequencing etc) • Learn to assess and discuss test methodology and evaluate application of new technology.
Japanese Oriental Medicine (Kampo Medicine)	<p>[Research content]</p> <p>Japanese Oriental medicine is the academic discipline, which performs “Integration of Eastern (Kampo) medicine and Western medicine” in the clinical setting, and also makes scientific studies. Even today when the modern medicine progresses day by day, there exists disease or condition, which cannot be treated by Western medicine. The department of Japanese Oriental medicine engages in the objective assessment of clinical efficacy and diagnostic procedure of traditional Japanese medicine (Kampo medicine) by modern medical approach, and also the elucidation of action mechanism of Kampo medicines by basic study.</p>
Professor Yutaka Shimada	<p>[Guidance content]</p> <ul style="list-style-type: none"> • Improving effects of Kampo medicines and their action mechanisms on microcirculation, vascular endothelial dysfunction and arteriosclerosis, etc. • Protective effects of Kampo medicines and their action mechanisms on cell and organ damages induced by neurological, hypertensive and diabetic diseases, etc. • Immunomodulating and defensive effects of Kampo medicines and their action mechanisms on immunological, allergic and infectious diseases, etc.
Neurology	<p>[Research content]</p> <p>The pathomechanisms of many neurological diseases are not well-known and there are few effective treatments against those disorders due to the lack of appropriate methods to elucidate. However, recent development of image analysis and analyzing biological samples, and neuroimmunological insight enable new approaches to elucidate. We need to learn latest knowledges and way of thinking to establish novel approaches to understand the disorders.</p>
Professor Yuji Nakatsuji	<p>[Guidance content]</p> <ul style="list-style-type: none"> • Investigation of the pathomechanisms of multiple sclerosis/NMO, and establish new therapeutic strategies. • Development of new prophylaxis and therapies against neurological diseases by means of intestinal immunity. • Investigation of biomarkers for the diagnosis and treatment of neurological diseases.
Emergency and Disaster Medicine	<p>[Research content]</p> <p>Research on Emergency Medicine and Disaster Medicine is based on systematic review of social system and field work with close relationship on human safety.</p>
Professor Hiroshi Okudera	<p>[Guidance content]</p> <ol style="list-style-type: none"> 1) Education of cardiopulmonary resuscitation for citizen 2) Development of education of basic trauma care 3) Evaluation of severe conscious disturbance 4) Development of Japan Triage and Acuity scale 5) Investigation on standard of Disaster Medicine education 6) Research on Patient Safety and related crisis management

Psychology	[Research content] [Guidance content]
N/A	
Biostatistics and Clinical Epidemiology	[Research content] We have been involved in several cohort studies on diabetes mellitus, heart disease, and stroke (JDCP, J-RHYTHM, MAGIC, SEASON, etc.); cross-sectional survey on quality of life; severity scale development in SAH; clinical practice guideline development and evaluation in diabetes; evaluating clinical research and education (J-CLEAR).
Professor Hideki Origasa	[Guidance content] <ul style="list-style-type: none"> • Statistical analysis of clinical research data on diabetes mellitus, heart disease, and stroke (sub-analysis, predictive modeling, meta-analysis) • Quality of life evaluation • Evaluating clinical research and education • Research on statistical education • Research on drug safety and utilization
Behavioral Physiology	[Research content] "Mind" is one of many brain functions. The brain receives and processes various types information necessary for the emergence of mind. An individual's behavior is the final output of brain function. Even with today's technology, it is difficult to directly study "mind", but analyses of brain and behavior contribute to elucidate the principles of "mind". Our laboratory aims to resolve the cellular and molecular mechanisms of "mind", including memory, learning, and emotion, using behavioral genetics, optogenetics, and pharmacologic and physiologic techniques. With these techniques, we also aim to resolve the pathophysiology of neuropsychiatric disorders and to develop treatments for these diseases. In addition, we are working to develop mouse models of nervous system diseases, and new reproductive technologies.
Professor Keizo Takao	[Guidance content] <ol style="list-style-type: none"> 1. Behavioral analyses of genetically engineered mice 2. Gene manipulation in mice using virus vectors 3. Regulation of neural activity using optogenetics 4. Gene expression pattern analyses using bioinformatics 5. Production of genetically engineered mice 6. Reproductive and developmental technology
Clinical Oncology	[Research content] Cancer or leukemia is the worst prognostic diseases in Japan. The development of new strategy for cancer is indispensable. Recent technology in molecular biology reveals the mechanisms of cancer development and provide the very effective treatment. Cancer immunotherapy is one of the most promising strategy for cancer management. We are engaged in research for the mechanisms of cancer immunology. On the other hand, cancer patients are suffered from the physical or mental symptoms. To resolve these problems, we also conduct clinical study for palliative care for cancer patients.
Professor Ryuji Hayashi	[Guidance content] <ol style="list-style-type: none"> (1) The relationship between myeloderived suppressor cells and cancer progression. (2) The effect of Sirt1, longevity gene, on cancer immune cells. (3) The role of physical activity in cancer patients. (4) The effectiveness of palliative therapy for cancer patients.