An Outline of
Niigata University

School of Medicine, Faculty of Medicine

Graduate School of Medical and Dental Sciences (Medicine)

2024 - 2025

CONTENTS

PHILOSOPHY AND GOAL IN EDUCATION

Philosophy

Contribute to human well-being through medical science

Goal

Develop human resources that

1. contribute holistic medical care with rich humanity and high ethical nature
2. contribute as a leader of highly specialized medical teams
3. contribute as medical researchers and educators with a wide perspective and great interest in learning
4. contribute to health, medical care, social well-being and welfare administration
5. contribute to local health care and global medical activities
6. maintain inquiring minds, research minds, self-learning attitudes continuously

Contents and Features in Education

The Medical Program in the School of Medicine educates future medical practitioners and researchers who will be involved in fields related to medical science. In addition to providing students with sufficient knowledge, we also help them become doctors with rich humanity and high ethical nature, and we implement the following professional education in order to contribute to human well-beings through medicine:

- an integrated educational program from fundamental to clinical medicine in accordance with international standards
- the introduction of active learning in the curriculum for all students
- a medical research practicum to experience cutting-edge medical research
- participation-style training (clinical clerkship) for diagnosis and treatment where students learn from primary care to highly advanced medical technology by joining medical teams at the Niigata University Medical and Dental Hospital and the affiliated hospitals
- an international exchange program to foster international sense (English conversation, short periods of study abroad, etc.)

We Expect Our Students to

- be strongly interested in study and scientific research in order to become good medical practitioners and researchers
- have good educations and kind hearts and act in harmony with others
- think broadmindedly and have positive attitudes

MESSAGE

Continuing to Be a Medical School Paving the Way to the Future

SATO Noboru
Dean
Faculty of Medicine, Niigata University

Since its founding as the Niigata Technical School of Medicine in 1910, the Niigata University School of Medicine, Faculty of Medicine has sent more than 10,000 graduates out into society. The philosophy of the Niigata Technical School of Medicine was that educating doctors required more than a technical school, meaning that students should go beyond learning medical knowledge and clinical skills to practice medicine as doctors to also study a wide range of academic subjects to further their development, have a heart for the sick and their families, the community, and society, and pursue the ideal of a medical professional, and be full of the determination and spirit to aim high as medical professionals. Today, the Niigata University School of Medicine, Faculty of Medicine continues this tradition. Under the philosophy of contributing to the happiness of mankind through medicine, we promote medical research and the development of human resources who can work in medicine all over Japan and the world. We have the important mission of contributing to the citizens of Japan, the local community, and the international community.

As Japan faces an unprecedented super-aging society, medical needs will change dramatically. We will also be forced to address unexpected and frequent natural disasters as well as to expect that unknown challenges to humanity, such as COVID-19 that emerged at the end of 2019, will continue to emerge in the future. To respond to these changes in the social structure and environment, or to approach unknown areas in medicine and healthcare, developing medical research by fully using new technologies such as digital technology and artificial intelligence is increasingly important. Many of the changes that will come in the future will include challenges we have never seen before. To tackle these unknown challenges, cultivating unique and diverse human resources who share a sense of purpose as well as those with rich problem-solving abilities is essential. To do so, we need to overcome many challenges and collaborate with institutions and people from all over the world who have different backgrounds. Faculty and staff will work as one to cherish the intellectual curiosity of young people who will lead the way into the future, sending out doctors and medical researchers who are compassionate and grateful into society.

Although academia may have an unapproachable image in society, medicine is a field that has a great relationship with the local community and society through its actual practice. We would like to express our gratitude once again for the great support we have received from many people for our work, and we would like to give back to society as much as possible through medical research and human resource development. Located on the Echigo Plain, a rich and fruitful area created by the Shinano and Agano Rivers, Niigata was one of the five ports opened under the Treaty of Amity and Commerce between the United States and the Empire of Japan, and has a long history of international exchange. We will exchange opinions and share information with you more than ever before, continuing to further develop as a medical school that transmits education and information from here to the world.

Aiming to Nurture Leaders in Advanced Life Sciences and Highly Specialized Medical Professionals for Advanced Medical Care

NAKAMURA Kazutoshi
Vice Dean
Graduate School of Medical and Dental Sciences, Niigata University

Niigata University has the Graduate School of Medical and Dental Sciences, which is a graduate school integrating medicine and dentistry. The Graduate School breaks down the conventional barriers between the medical and dental schools and between departments, and conducts education and research that can respond to changes in the environment surrounding medicine and medical care. The Graduate School aims to train researchers who will lead advanced life science research in the 21st century, physicians and dentists who can provide advanced medical care supported by the results of this research, and highly specialized medical professionals such as public health physicians who can practice preventive medicine activities in local and international communities. The Graduate School of Medical Science consists of three departments, which provide education and research guidance to graduate students with the following characteristics and educational philosophy.

1) Molecular and Cellular Medicine Course: Conducts research to analyze diseases using molecular and cell biological methods, develops methods to prevent and treat diseases, and trains researchers and highly specialized medical professionals in advanced life sciences related to molecular and cellular medicine.

2) Biofunctional Regulatory Medicine Course: Conducts research to analyze biological functions and pathological conditions by comprehensively understanding the living body in terms of organs and systems, develops preventive and therapeutic methods for diseases, and trains researchers and highly specialized medical professionals in advanced life sciences related to biofunctional regulatory medicine.

3) Community Disease Control Medicine Course: Conducts research to analyze diseases in relation to time, space, and society, and develops methods to prevent and control community-based diseases in response to the declining birthrate, aging population, and information society, and trains researchers and highly specialized medical professionals in advanced life sciences related to community disease control medicine.

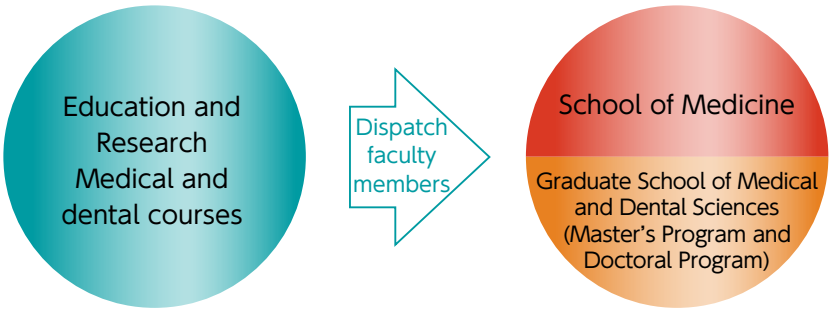
Distinctive research areas of the Graduate School of Medical Science include neurology and brain research, kidney disease research, big data and AI research, and international health research. In the area of Neuroscience and Brain Research, a number of basic and clinical departments conduct a wide range of basic and clinical research in neuroscience in collaboration with the Brain Research Institute of Niigata University, the only brain research institute among national university corporations. For renal disease research, the Renal Research Center (Basic: renal molecular pathology, renal structural pathology; Clinical: renal and collagen disease internal medicine, pediatrics, renal and urological pathology; Endowed: functional molecular medicine, renal medical center) attached to the Graduate School conducts basic and clinical renal disease research. In addition, big data research by the Medical AI Center aimed at prevention and treatment of chronic diseases and international health research for global control of infectious diseases are vigorously conducted.

Furthermore, as part of our international exchange and contribution, we are actively promoting the acceptance of international students and developing an educational system for them. Our School has been promoting medical exchange with universities and research institutions around the world for more than 30 years, and is actively engaged in bidirectional exchanges through double degree programs and short-term study abroad programs.

Based on the education and research conducted at the Graduate School, we expect to produce many leaders in advanced life sciences and highly specialized medical professionals who can contribute to the local and international communities.

ORGANIZATION

Our university has the Education and Research Institute. All faculty in charge of the undergraduate and graduate schools are members of the Institute, which dispatches faculty to the undergraduate and graduate schools to teach and research.



School of Medicine Courses

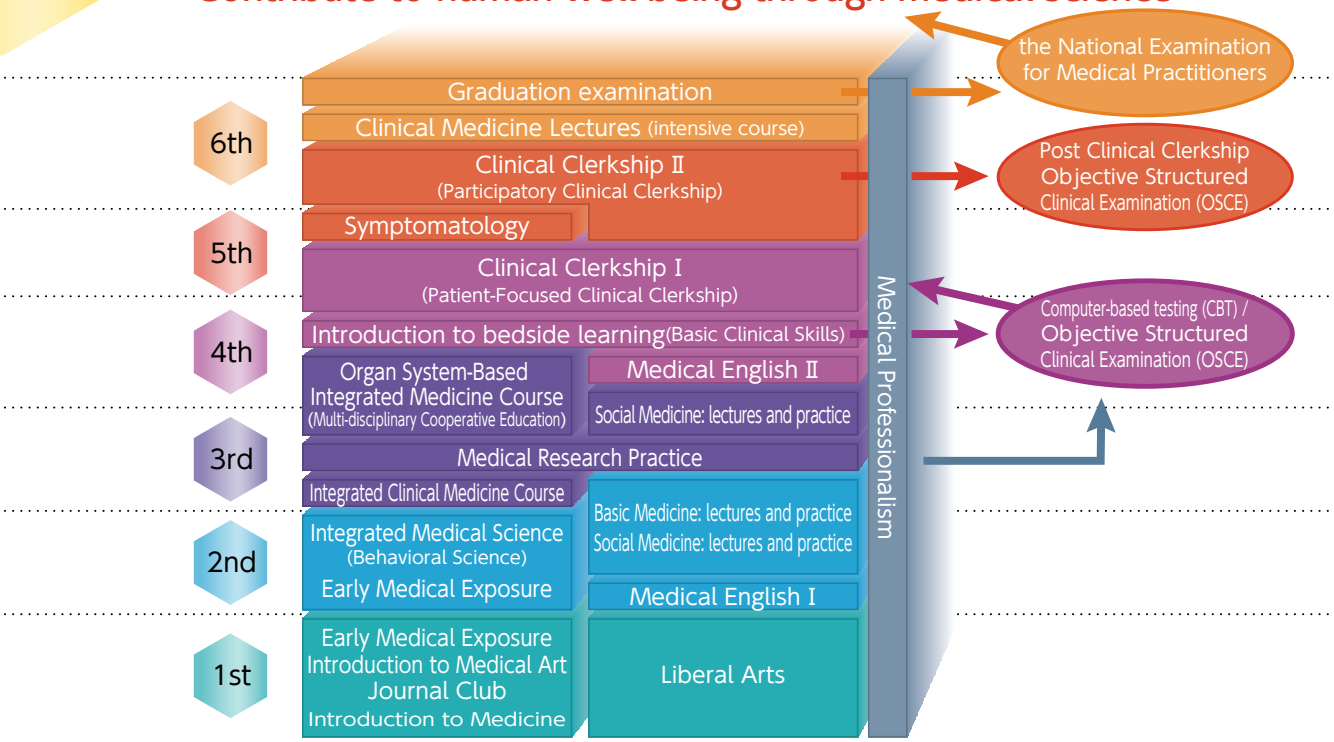
Field	Representative teacher	
Anatomy	Professor	SATO Noboru
Neurobiology and Anatomy	Professor	TAKEBAYASHI Hirohide
Microscopic Anatomy	Professor	SHIBATA Shinsuke
Neurophysiology	Professor	HASEGAWA Isao
Developmental Physiology	Professor	SUGIYAMA Sayaka
Systems biochemistry	Professor	MATSUMOTO Masaki
Neurobiochemistry	Associate Professor	NAKATSU Fubito
Pharmacology	Professor	HIRASHIMA Masanori
Molecular Pathology		
Bacteriology	Professor	MATSUMOTO Sokichi
Virology	Professor	ABE Takayuki
Preventive Medicine	Professor	NAKAMURA Kazutoshi
International Health	Professor	SAITO Reiko
Immunology and Medical Zoology	Professor	KATAKAI Tomoya
Forensic Medicine	Professor	TAKATSUKA Hisakazu
Cellular Physiology		
Medical Education	Professor	OKAZAKI Fumiko
Cardiovascular Medicine	Professor	INOMATA Takayuki
Hematology, Endocrinology and Metabolism	Professor	SONE Hirohito
Respiratory Medicine and Infectious Diseases	Professor	KIKUCHI Toshiaki
Gastroenterology and Hepatology	Professor	TERAI Shuji
Psychiatry		
Pediatrics	Professor	SAITOH Akihiko
Digestive and General Surgery	Professor	WAKAI Toshifumi
Thoracic Surgery	Professor	TSUCHIDA Masanori
Orthopedic Surgery and Rehabilitation	Professor	KAWASHIMA Hiroyuki
Plastic, Reconstructive and Aesthetic Surgery	Professor	MATSUDA Ken
Pediatric Surgery	Professor	KINOSHITA Yoshiaki
Dermatology	Professor	ABE Riichiro

Field	Representative teacher	
Urology	Professor	TOMITA Yoshihiko
Ophthalmology	Professor	FUKUCHI Takeo
Otolaryngology/Head and Neck Surgery	Professor	HORII Arata
Radiology	Professor	ISHIKAWA Hiroyuki
Obstetrics and Gynecology	Professor	YOSHIHARA Kosuke
Anesthesiology	Professor	BABA Hiroshi
Emergency and Critical Care Medicine	Professor	NISHIYAMA Kei
Medical Oncology		
Clinical Pathology	Professor	OHASHI Riuko
Neurosurgery (Brain Research Institute)	Professor	FUJII Yukihiko
Neurology (Brain Research Institute)	Professor	ONODERA Osamu
Cell Biology (Kidney Research Center)	Professor	KAWACHI Hiroshi
Clinical Nephrology and Rheumatology (Kidney Research Center)		
Bioinformatics (Medical AI Center)	Professor	OKUDA Shujiro
Medical Education Center	Professor	SATO Noboru
Disaster Medical Education Center	Specially Appointed Prof.	TAKAHASHI Masashi
Niigata Regional Medical Support Center Medical Branch Office	Specially Appointed Assistant Professor	TSURUMA Hayato
Cause of Death Education Center	Professor	TAKATSUKA Hisakazu
Center for Research Promotion	Professor	SATO Noboru
Center for Community Health Professions Education in Hokuetsu Niigata Branch	Branch manager	TAKAHASHI Masashi
General Medicine Course	Professor	KAMIMURA Kenya

- Administration Office
  - Academic Planning Section
  - General Affairs Section
  - Accounting Section
  - Student Affairs Section
  - Entrance Examination and Clinical and Practicum Section

THE SIX-YEAR MEDICAL PROGRAM

Contribute to human well-being through medical science



Niigata University was the first university in Japan to undergo the medical education field evaluation trial in 2013 as one of the six partner universities (Niigata University, Tokyo Medical and Dental University, University of Tokyo, Chiba University, Jikei University School of Medicine and Tokyo Women's Medical University) in the Ministry of Education, Culture, Sports, Science and Technology's University Reform Promotion Project: Establishing a medical education accreditation system meeting international standards. With the accreditation of the Japan Accreditation Council for Medical Education in March 2016 by the World Federation for Medical Education (WFME) as an institution evaluating medical education fields, Niigata University's medical education was officially recognized as meeting international standards in April 2017. The results of the new curriculum from 2014 were evaluated in the second round of the medical education field evaluation in 2022, and Niigata University was recognized as providing appropriate education.

The features of our education are as follows:

(1) Adequate liberal arts education from the first year
To become a doctor, one must focus on one's humanity; the liberal arts are particularly important. Students can take language courses and liberal arts courses at the Igarashi campus.

(2) Early community medical training in diverse settings
First year students practice at local medical institutions and learn what doctors, patients and multi-professional collaboration are as well as what kind of region Niigata is. Beginning in 2025, second year students will receive practical training in nursing and welfare. Specifically, they will work in geriatric health care facilities and special needs schools, interacting with the elderly and children who require medical care, and learn what living in the community with a chronic illness is like. Beginning in 2026, third year students will learn through visiting nursing stations and learning what it means to receive medical care at home. Students will thus learn about the diversity of settings in which medical care is required in their early years in medical school.

(3) Cultivating a research mindset
Niigata University has the Brain Research Institute, Kidney Research Center, and Medical AI Center. Research is conducted in both basic and clinical medicine. Third year students are assigned to a laboratory for eight weeks, where they conduct their own research and present their findings in a poster session. They acquire the skills necessary as both a clinical doctor and as a research doctor to ask questions, conduct research to solve them, and show the research results.

(4) Productive clinical education
Niigata University has a fulfilling simulation education program; sufficient skill simulation, clinical examinations, and medical interviewing practice are conducted before clinical training. We also teach with simulated patients and provide multiple training programs for students. After sufficient prior learning, clinical practice begins. In the first year, students learn the basics of clinical practice mainly at the university hospital, and review the necessary knowledge. For half a year from January of the fifth year to July of the sixth year, students practice in one clinical field which they wish to learn about for four weeks in a variety of clinical settings including hospitals in Niigata Prefecture.

(5) International exchange
Niigata University has partner schools in many regions around the world. We offer short-term study abroad programs of 10 days in the summer for second to fifth year students, 8 weeks of research study abroad for third year students assigned to laboratories, and 4 to 6 weeks of clinical training abroad for sixth year students. English language education outside of the curriculum for this purpose is also available, and support for the USMLE examination is also provided.

We have established a fund to provide the best medical education in Japan and are striving to further improve our education.

HISTORY

Before National Niigata Medical College

1869 A pharmaceutical institution (Shiran Pharmaceuticals) and a vaccination center (Niigata Prefecture Medical Office) were established on the grounds of Shofuku-ji Temple located in Gono-cho (present Nishibori-dori 7), Tera-machi, Niigata City (May 12)

1870 Niigata Temporary Hospital (Kyoritsu Hospital) established

1873 Opened Niigata Hospital at Yoko-sanban-cho, Niigata

1876 Control of Niigata Hospital transferred to Niigata Prefecture and renamed Niigata Prefectural Hospital Medical School

1879 Niigata Prefectural Hospital Medical School changed its name to Niigata Prefectural Medical School (B-type Medical School)

1883 Renamed Prefectural A-type Niigata Medical School

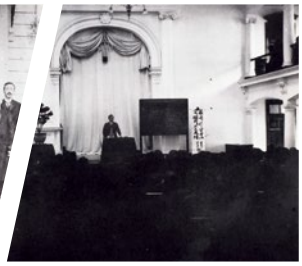
1888 Abolished Prefectural A-type Niigata Medical School

1910 National Niigata Medical College established (April 6)
The college received 728 applications by the end of May, which was the application deadline. The inaugural class of 70 students was admitted after the entrance examination.


Niigata Medical College from the 1914 graduation album


Graduation album of 1915


Doctors


A lecture by Dr. Hideyo Noguchi from the 1916 graduation album

1915 Dr. Hideyo Noguchi visited our school and lectured (October)

1922 National Niigata Medical College became the National Niigata Medical University

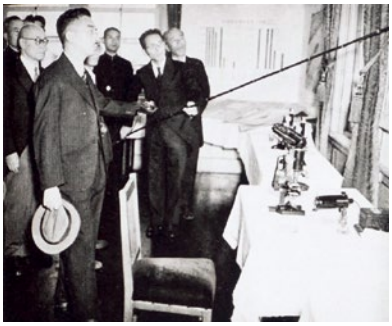
1923 Niigata Medical University Relief Team formed after the Great Kanto Earthquake and the team visited Tokyo to provide relief

Nippori Nagaku-yama Hongyo-ji Temple from the 1924 graduation album

1939 The four-year Temporary Medical Specialty Department affiliated with Niigata Medical University was established in accordance with Royal Decree No. 315

1944 Renamed as an affiliated Medical Specialty College on March 31 in accordance with Royal Decree No. 200

1947 Emperor Showa (Hirohito) visited our university (Professor Tatsuji Ito and Professor Yasuichi Ito lectured about scrub typhus and Professor Mizuho Nakada about brain tumors)


Emperor's visit from the 1950 graduation album

1949 Niigata University (Faculty of Humanities, Education, Science, Medicine, Engineering and Agriculture) was established in accordance with the proclamation of the National School Establishment Act (Law No. 150 of 1949)

1955 The first 98 students graduated from Niigata University School of Medicine (March)

1956 Outpatient building (4-story reinforced concrete) of affiliated hospital was completed

1960 The 50th anniversary of Niigata University School of Medicine

1967 Niigata University Brain Laboratory established (April)

1973 Affiliated Kidney Research Center and affiliated Animal Laboratory Facility of Niigata University School of Medicine established (April)

1982 The current affiliated Asahi-machi library branch completed

1985 The 75th anniversary of Niigata University School of Medicine
The Yujin Memorial Hall completed as part of the 75th anniversary commemoration project

1999 Department of Health Sciences of Medical School established (October)

2001 Graduate School of Medical and Dental Sciences established (April)

2003 Niigata University Medical and Dental Hospital established (October 1)

2004 Became the Niigata University, National University Corporation in line with National Corporation Law

2005 New building of Medical and Dental Hospital completed (August)

2010 The 100th anniversary of Niigata University School of Medicine

2012 Outpatient building of Medical and Dental Hospital completed (April)

2014 Redevelopment project of Medical and Dental Hospital completed (June)

Graduation photo from the 1955 graduation album

Affiliated hospital from the 1956 graduation album

Yujin Memorial Hall from the 1990 graduation album

FIELD INTRODUCTION

Anatomy

Professor SATO Noboru

We have active research programs with area of morphogenesis and provide education programs in human gross anatomy through osteology and dissections.

We are researching morphogenesis from the embryological perspective. Neurons go through a series of processes such as production, migration, differentiation, and cell death to form initial neural circuits. We are studying this phenomenon in central and peripheral nerves. We also conduct comparative anatomical analysis of the musculoskeletal formation of the trunk and limbs and study the evolution of vertebrates. Using experimental model animals such as genetically modified mice, birds, and small fish, we study making full use of morphological research methods as well as advanced molecular biological methods. In terms of education, we handle general anatomy and gross anatomy, and we conduct osteology and human anatomy training. We also handle the work related to body donation, which is indispensable for this education. We cooperate with the Niigata White Chrysanthemum Association, a philanthropist group, to receive dissected bodies from the Niigata University School of Medicine and Dentistry and on related events. We interact with the general public, such as medical students, philanthropists, and their families, through anatomy education.

Neurobiology and Anatomy

Professor TAKEBAYASHI Hirohide

We are investigating the developmental mechanism of the nervous system and the pathophysiology of intractable neurological diseases. We are also trying to develop treatment methods for the neurological diseases.

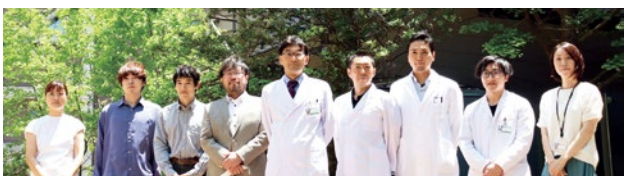
The nervous system develops under the influence of both genetics and the environment. One of our goals is to elucidate the developmental mechanism of this complex and sophisticated nervous system. In the developing brain, neural stem cells give rise to neurons and glial cells. These cells form neural circuits after migration and differentiation. After birth, the brain receives information from the sensory organs and develops. In the nervous system, many intractable neurological diseases are caused by abnormalities in neurons and glial cells. We investigate the pathogenesis of these intractable neurological diseases and the developmental mechanisms of the nervous system using experimental methods at the molecular, cellular, and systemic levels. We can apply the knowledge obtained in neurodevelopment to regenerative medicine, and we are also focusing on developing treatment methods for intractable neurological diseases. International students also join our laboratory. We are committed to creating a research environment where lab members can learn and progress daily. We also teach human embryology and neuroanatomy in the Medical school.

Microscopic Anatomy

Professor SHIBATA Shinsuke

We are trying to reveal the detailed structure and function of the cells and the tissues by using various kinds of cutting-edge microscopic technology, including electron microscope and light microscope.

We are researching to visualize the structure and function of biological samples by imaging them in our laboratory. We use microscopes for observation and develop sample preparation methods for optimal imaging in our research. Optical microscopes, including stereomicroscopes, fluorescence microscopes, and super-resolution microscopes beyond the resolution limits of light, are used to visualize specific molecules along with general histological structural analysis. Among electron microscopes that use electron imaging with much higher resolution than light, transmission electron microscopes can observe the fine internal structure of samples such as cells and tissues, and scanning electron microscopes can observe the fine surface morphology of samples. Combining molecular biological approaches using light microscopy with very high-resolution imaging techniques using transmission electron microscopy and scanning electron microscopy provides a comprehensive understanding of cells and tissues as well as providing possibilities to apply to structural analyses in a wide range of fields. We are conducting numerous joint research projects with researchers around the world by applying these cutting-edge imaging technologies.

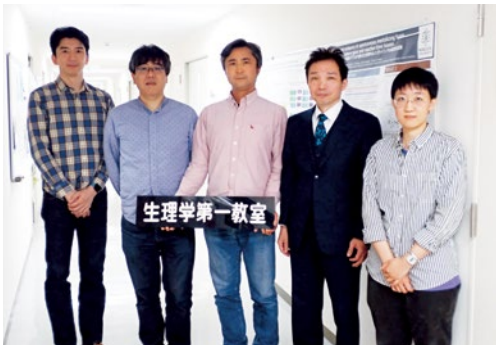


Neurophysiology

Professor HASEGAWA Isao

We clarify physiological mechanisms by which the cerebral network produces intelligence.

Where does our intelligence come from? We aim to clarify the mechanisms of the global brain network creating human intellectual abilities such as visual imagery, linguistic comprehension, and social interactions. To achieve this goal, we build hypotheses on neural network operations underlying these functions, and generate innovative human and non-human primate paradigms to test the hypotheses. Specifically, we record the global brain network activity with a millisecond time resolution. To capture the brain-wide neural activity, we have specifically developed a flexible mesh electrocorticographic (ECoG) electrode array and minimally-invasive surgical procedures to gently place it on the brain surface. Researches of heterogeneous backgrounds such as animal neurophysiology, engineering, and clinical medicine work together to promote interdisciplinary medical-engineering collaborating projects.



Developmental Physiology

Professor SUGIYAMA Sayaka

We visualize neural circuits and behavior to decipher the mechanisms that enable children's brains to grow flexibly

Can babies see and feel? When asked, some students answer that they are the same as adults, but the baby's brain is immature; the brain's neural circuits are formed depending on the environment and experiences. The experience of listening and speaking is necessary for mastering your native language, and the experience of seeing is also important for improving your eyesight. The time when the neural network of the brain grows significantly by absorbing experiences is called the critical period. There are many unknowns in the mechanism of the critical period. In our laboratory, we fully use molecular biology, histology, and physiology to elucidate the genes necessary for the critical period and the function of the neural network created during the critical period. Recently, there has been talk about an increase in mental disorders such as autism. Miswiring of neural networks during critical periods predisposes us to mental illnesses in the future. If our research reveals the mechanism of flexible wiring of neural networks, it will be useful in the treatment of brain diseases.

Systems biochemistry

Professor MATSUMOTO Masaki

We comprehensively analyze proteins to understand the operating principles of biological systems.

Proteins are important functional elements involved in all life phenomena. Our laboratory has developed techniques for exhaustively and quantitatively measuring protein expression levels, post-translational modifications, and protein-protein interactions, and has applied them to research on diseases such as cancer. We are currently developing and applying technologies to quantitatively analyze protein expression and its dynamics and functions. Utilizing these proteomics techniques in a complex manner, we are working to unravel the complexity of the proteome and understand a wide range of biological phenomena and diseases, such as cancer, aging, and even neurodegenerative diseases from the perspective of molecular network structures.

Neurobiochemistry

Associate Professor NAKATSU Fubito

We use the latest technology to pursue the molecular mechanisms of nerve growth, axon regeneration, and lipid transport and metabolism at the molecular to individual levels.

We have studied the molecular basis of growth cones required for nerve growth and regeneration, and identified: 1) the major molecular composition of growth cones; 2) the elucidation of a new mechanism of movement in which membranes and the cytoskeleton are linked using super-resolution microscopy; 3) specific phosphorylation sites of growth cone proteins and specific antibodies as molecular markers for neural growth 4) the synthesis of long-chain fatty acids involved in neurite formation and mediated by lipid rafts; and 5) the adjustment of chondroitin sulfate levels improving diabetic neuropathy.

We also conduct basic medical research on lipid transport and metabolism. We have discovered that the membrane contact region, where various organelles partially contact each other within a cell, is the core hub that controls lipid transport and metabolism, and plays an important role in lipid homeostasis and signal transduction within the cell. Disruption of this membrane contact region is involved in cancer, inflammatory diseases, and intractable neurological diseases.

Pharmacology

Professor HIRASHIMA Masanori

We are studying molecular mechanisms underlying the formation and maintenance of the vascular system.

The vascular system comprises blood vessels and lymphatic vessels, which efficiently transport cells and substances to serve as a lifeline throughout the body. Blood vessels are known to be essential for sustaining life, but much is unknown about lymphatic vessels. Therefore, their role in the onset and progression of diseases such as lymphedema (swelling), Alzheimer's disease, and glaucoma is expected to be elucidated. In our laboratory, we are studying molecular mechanisms of lymphatic vascular development, using transgenic mice generated by CRISPR/Cas9 genome editing. We are also studying the relationship between abnormal embryonic vascular development and the risk of developing diseases later in life, and the blood vessels and lymphatic vessels associated with tumor or inflammatory diseases. These studies are conducted in collaboration with experts in various fields both on and off campus.

Molecular Pathology

We promote the comprehensive pathology for the future medicine with two pillars: Advanced Molecular Tumor Pathology; innovative research for Novel Diagnostic and Therapeutic Technology.

The course specializes in tumor pathology, and the basic pathology field promotes research to elucidate the key molecular mechanisms of invasion and metastasis of malignant tumors, mainly focusing on intractable cancers, for clinical diagnosis and application. Remembering that elucidating the mechanisms of tumor resistance against advanced drugs is also an important issue, we have created a practical pathological research system that integrates molecular and histopathological analyses. Our goal is to find clues for overcoming cancer that can be applied to clinical practice. With the aim of applying the research to cancer therapeutics, all members are working together to implement a variety of approaches, such as non-invasive cancer imaging/therapy technology using tumor-homing peptides as an innovative medical technology for next generation tumor medicine. We believe this research is quite unique in pathological department. Our department aims advanced and comprehensive tumor pathology through crosstalk with the forefront of cancer medicine in the 21st century.

Bacteriology

Professor MATSUMOTO Sokichi

Analysis of pathogenicity and longevity of Mycobacterium tuberculosis, and development of treatments, diagnostic methods, and vaccines for mycobacterial diseases

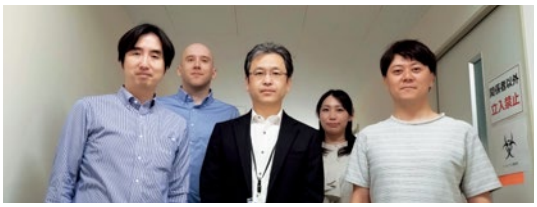
Tuberculosis is an infectious disease that has claimed the lives of over one billion people. In contrast to the elimination of comparable diseases, such as smallpox, no country has been able to eradicate tuberculosis once it has occurred. The number of deaths from tuberculosis is still the second highest among infectious diseases after COVID-19, and the tuberculosis pandemic is still continuing. A certain number of patients always occurring (10 million cases annually) due to asymptomatic infection of dormant bacteria in 2 billion people complicates controlling it. We research based on the idea that preventing the onset with vaccines and killing dormant bacteria with drug development will lead to eradicating tuberculosis. We conduct research on measures against nontuberculous mycobacteria (NTM), which are similar to tuberculosis and have become intractable in recent years. We are also conducting research to explore the secret of longevity common to all living things based on the phenomenon of bacterial dormancy. Our department has a BSL3 laboratory and is characterized by being able to carry out genetic recombination of Mycobacterium tuberculosis, an experiment approved by the Minister of Education, Culture, Sports, Science and Technology. Using cutting-edge tools, we approach the life phenomenon, and based on that, we research to suppress intractable diseases.

Virology

Professor ABE Takayuki

We conduct basic research to suppress hepatitis B and C viruses and pediatric parechovirus infections.

Antiviral drugs with high therapeutic success rates have been developed, and we are now in an era where chronic hepatitis C is treatable. In recent years, however, the emergence of drug-resistant strains and the development of liver cancer from unknown causes after hepatitis C virus elimination have become new problems. Still, no drugs or treatments that can completely eliminate the virus have yet been established for chronic hepatitis B. Understanding the detailed molecular mechanisms of the viral infection life cycle is essential to control viral infections. Our laboratory, newly established in 2024, conducts basic research aimed at controlling hepatitis B and C viruses. In addition, we are newly promoting basic research to control pediatric parechovirus infections in collaboration with laboratories in the Departments of Pediatrics and Health Sciences at Niigata University School of Medicine. At Niigata University, we are working on pediatric parechovirus infections with basic, clinical, and epidemiological perspectives in an international joint research system.



Preventive Medicine

Professor NAKAMURA Kazutoshi

We are conducting researches to prevent age-related diseases such as dementia and osteoporosis to extend healthy life spans.

Our major studies are the Murakami Cohort Study and the Dementia Omics Study. The Murakami Cohort Study is a long-term longitudinal follow-up study of approximately 14,000 local residents to search for environmental factors associated with the development of age-related diseases (dementia, osteoporosis, etc.). We are also measuring vitamin D and other parameters using stored biological samples and attempting to apply the results to disease prevention. Dementia omics research is a pioneering study to develop simple predictive markers for Alzheimer's disease through omics analysis (proteomics, etc.) using urine from the Murakami Cohort Study. In addition to these studies, we are conducting research on various other topics in preventive medicine and public health, such as international collaborative research on gallbladder cancer prevention. For more information, please visit https://www.med.niigata-u.ac.jp/hyg/index.html

International Health

Professor SAITO Reiko

We are investigating respiratory infections such as COVID-19, influenza, and respiratory syncytial virus in Japan and Myanmar.

We are developing the "Research on Influenza-like Diseases and Pediatric Meningoencephalitis in Myanmar," the AMED Emerging and Re-emerging Infectious Diseases Research Platform Project which is the only overseas research base of Niigata University. Using a next-generation sequencer, we analyze the COVID-19 genes in detail and investigate what kinds of variants are prevalent in Japan and Myanmar. We are calculating the effective reproduction number, which indicates the extent of the COVID-19 outbreak, and using this information to help with infectious disease control. We found from the data in Niigata Prefecture that vaccination with the COVID-19 vaccine can prevent infection and aggravation. We also conduct antibody titer COVID-19 surveys for medical workers and the elderly in care facilities. Regarding influenza, with the cooperation of clinicians nationwide, we are investigating what kind of virus is prevalent, drug-resistance, and antibody titers after vaccination. We are also collecting specimens from all over the country for respiratory syncytial virus, which causes colds in babies, and analyzing virus genes.

Immunology and Medical Zoology

Professor KATAKAI Tomoya

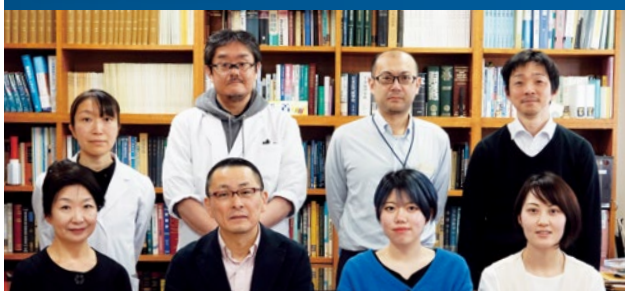
Immune responses in immune organs centering on lymph nodes, immune cell function and motility, and molecular mechanisms of stromal cell and tissue microenvironment formation

The immune system is an essential physiological system that protects the body from pathogens and foreign substances for keeping our lives. Besides infectious diseases, the immune system is also deeply associated with non-infectious diseases such as allergy, autoimmune diseases, and cancer. Our laboratory studies the interaction between immune cells and stromal cells (non-hematopoietic supporting cells) in tissue microenvironment, centering on the tissue structure and function of secondary lymphoid organs such as lymph nodes, which are necessary for inducing adaptive immunity and immunological memory. Particularly using the latest imaging techniques, we pursue the dynamic behavior of the immune system, focusing on the migration or localization of immune cells in tissues.

Forensic medicine

Professor TAKATSUKA Hisakazu

We work in cooperation with the Center for Cause of Death Investigation to conduct practical work and research in a wide range of fields related to forensic medicine.



Forensic medicine is an academic field indispensable for maintaining social order, protecting human rights, and realizing social justice. Performing autopsies and biopsies accurately and without errors is required when commissioned by organizations such as the police, the Japan Coast Guard, the Public Prosecutor's Office, and child consultation centers. In the field of forensic medicine, our focus is to "give back to society what we learned from the dead" (Thomas A. Gonzales). We work in cooperation with the Center for Cause of Death Investigation (https://ccdi.med.niigata-u.ac.jp/), which opened in July 2017 as part of the Establishment of a Base for Forensic Medicine and for Education and Research Related to the Investigation of Cause of Death project to foster highly skilled professionals who will work in forensic medicine in the future as well as to conduct research in a wide range of fields, including autopsy imaging (Ai), pathology, dentistry, toxicology, isotope science, biochemistry, and abuse, which are closely related to forensic medicine.

Cellular Physiology

We study mitophagy, a selective degradation of mitochondria by autophagy.

Mitochondria are important organelles that produce a majority of the ATP required for cellular activities, and their quantity and quality need to be properly controlled. It is believed that mitochondrial autophagy (mitophagy), a selective degradation of mitochondria by autophagy, degrades excess or dysfunctional mitochondria to maintain mitochondrial homeostasis. In recent years, mitophagy defects have been implicated in neurodegenerative diseases, and thus mitophagy is attracting a lot of attention. The aim of our study is to elucidate the detailed molecular mechanisms and physiological roles of mitophagy. We have developed systems to induce and detect mitophagy in multiple models such as mammalian cultured cells, mice and yeast. We are currently identifying factors involved in mitophagy, exploring their molecular functions and analyzing the phenotypes of mitophagy-deficient cells.

Medical Education

Professor OKAZAKI Fumiko

In collaboration with the Medical Education Center, we focus on developing educational infrastructure, evaluating and reforming curricula, and conducting institutional research (IR) related to education.

The Medical Education Department is responsible for preparing the necessary infrastructure for medical education including lectures and practical training. In addition to the university hospital, Niigata Prefecture has many excellent hospitals and facilities. We are developing practical training sites suitable for educating medical students and preparing them to promote further studies. To assess the effectiveness of the implemented curriculum, we conduct surveys among both faculty and students, and submit the findings to the Curriculum Evaluation Committee. If it is concluded that improvements are needed, Committee will enhance the educational content accordingly. Additionally, we collect long-term data to analyze the impact of our improvements, which is a part of educational IR. Another important task of the department is to conduct ongoing research to evaluate whether our graduates are effectively contributing to society in the long term, thereby fulfilling our commitment to society and the public.

Cardiovascular Medicine

Professor INOMATA Takayuki

We strive to educate inquisitive physicians who can provide highly specialized medical care for severe cardiovascular disease and medical care that supports the lives of patients.

The Department of Cardiovascular Medicine at Niigata University is a traditional department established in 2012 as a result of the reorganization of the Department of Internal Medicine, based on the former First Department of Internal Medicine, established in 1910. We are committed to providing highly specialized and community-supportive medical care for cardiovascular diseases, which have been increasing in recent years, as well as the research and education that serve as the foundation for such care. Each of the three groups, cardiovascular catheter treatment, heart failure, and arrhythmia, provide highly specialized treatment: more than 250 coronary artery catheter treatments, more than 100 endovascular treatments and catheter treatments for structural heart disease, and more than 200 arrhythmia catheter ablations per year. In addition, we work on advanced treatments such as transcatheter aortic valve implantation (TAVI) and mitral regurgitation surgery (MitraClip), multidisciplinary treatment for cases of secondary cardiomyopathy with specific treatments, cases of pulmonary hypertension, and cases requiring considering heart transplantation and auxiliary artificial hearts, left atrial appendage closure devices (Watchman), and lead extraction. We are one of the leading groups in Japan in the number of implantable cardiac devices, and work with multiple departments and professions to provide supportive medical care centered on emergency cardiovascular care and cardiac rehabilitation. We hope to convey the joy of cardiovascular care through lectures and practical training.

Hematology, Endocrinology, and Metabolism

Professor SONE Hirohito

We are researching in a wide range of fields from lifestyle diseases to tumors, basic experiments to big data analysis and AI, including nutrition, exercise, clinical examination.

Our department develops prevention, diagnosis, and treatment methods for hematologic diseases (leukemia and malignant lymphoma), endocrine diseases (thyroid and adrenal glands) and metabolic diseases (diabetes, obesity, dyslipidemia, and hypertension). We provide four related endowed courses: “Health Life Extension and Lifestyle Disease Prevention and Treatment Medicine Course,” "Prevention of Lifestyle-related Diseases and Medical Checkups," "Regional Medicine and Health Studies," and “Next Generation ICT Medical Science Course.” With the Niigata University Health Education Innovation Center, we are active in industry-government-academia collaboration.

In hematologic diseases, we are involved from protocol creation to multicenter joint research. We are also searching for new prognostic factors based on data gathered over many years. In endocrine and metabolic diseases, we have secured a large amount of scientific evidence useful for on-site treatment and prevention for both lifestyle therapy and pharmacotherapy through big data analysis. Along with basic research aimed at elucidating the pathology in both fields, we are developing tools such as apps through industry-academia joint research.

We widely accept medical professionals other than doctors, and researchers outside medicine (biology, science and engineering, informatics, statistics, psychology, food science, body mechanics, sociology, government, general companies, etc.) to increase the depth and quality of research.

Respiratory Medicine and Infectious Diseases

Professor KIKUCHI Toshiaki

Our department conducts active clinical and basic research on a wide variety of respiratory and infectious diseases.

Respiratory and infectious diseases are diverse and divided into research groups of diffuse lung diseases, respiratory tumors, allergic diseases, respiratory physiology and infectious diseases.

The Diffuse Lung Disease Group uniquely focuses on rare diseases such as interstitial pneumonia and pulmonary alveolar proteinosis.

The Respiratory Oncology Group has designed and implemented a number of independent clinical trials as well as conducting basic research on anti-tumor immunotherapy in mouse models and developing immunotherapy biomarkers using human samples.

The Allergic Disease Group surveys asthma treatment and COPD patients throughout Niigata Prefecture as well as surveying and conducting research on athlete asthma, and conducting basic research using a mouse model of bronchial asthma.

The Respiratory Physiology Group conducts clinical research focusing on sleep apnea syndrome and uses pulmonary rehabilitation to conduct research on perioperative respiratory management.

In infectious diseases, we conduct basic research on iron metabolism and antibacterial therapy as well as on infectious disease treatment and control.

For more information, please visit the Respiratory and Infectious Diseases website (https://www.med.niigata-u.ac.jp/resp/welcome.html).

Gastroenterology and Hepatology

Professor TERAI Shuji

We are developing diagnostic and therapeutic modalities to overcome intractable diseases and to improve pathophysiological conditions in the upper and lower gastrointestinal tracts, liver, gallbladder and pancreas.

The mission and vision of our department are to change the future for people by developing new diagnostic and therapeutic methods while working to conquer incurable diseases and tackling undiagnosed diseases. We are focusing on creating the next generation of leaders through training general gastroenterologists and clinician scientists. We are examining the inter-organ networks of digestive related organs, and using multiple approaches to diagnose and develop treatment methods for the homeostasis disruption of digestion, absorption, and metabolism.

Our major research topics include developing regenerative therapy to improve hepatic fibrogenesis and liver regeneration for cirrhosis using mesenchymal stem cells and exosomes (Phase I/II), developing regeneration inducers (physician-initiated clinical trial), pathological analysis of non-alcoholic steatohepatitis based on inter-organ networks and the relationship between digestive diseases and intestinal microbiota, developing new drug therapy using small fish models, developing gene therapy and gene editing therapy for intractable diseases, developing local regenerative medical preparations using bioengineered materials and exosomes for gastrointestinal stenosis and pancreatic juice leakage, exosome research for gastrointestinal cancers, elucidation of the nutrient absorption mechanism in the small intestine, and development of new medical equipment using AI and new materials. We are also working on preemptive medical care for digestive diseases associated with aging and lifestyle habits in collaboration with endowed chairs at three locations within Niigata Prefecture.

Psychiatry

We research molecular genetics and clinical pharmacology of mental disorders centering on schizophrenia and autism spectrum disorders.

We are researching molecular genetics with the goal of elucidating the molecular pathogenesis of schizophrenia and autism spectrum disorders and to develop radical treatments based on the results. Based on the findings obtained in our research, we are comprehensively analyzing the effects of risk gene mutations on neuronal development (neurite outgrowth and synapse formation) through high-content screening in collaboration with the Department of Neurochemistry.

We are also investigating brain activity in a nonverbal false belief task, working with humans (magnetoencephalography) and monkeys (electrocorticogram and needle electrodes) in collaboration with the Department of Neurophysiology to elucidate the brain basis of the disorder of Theory of Mind, which is the core symptom of autism spectrum disorder.

In addition, we are researching individual differences in responsiveness and side effects to psychotropic drugs, clinical pharmacology on the relationship between psychotropic symptoms and sex hormones and inflammatory cytokines as well as conducting large-scale investigations on perinatal mental health and pathological research on perinatal depression.

For details, please visit the website of the Department of Psychiatry, Niigata University School of Medicine (https://www.niigata-dp.org).

Pediatrics

Our research focuses on the diagnosis, treatment, and prevention of pediatric diseases across various specialties, including infectious diseases, hematology and oncology, cardiology, endocrinology, nephrology, rheumatology, neonatology, and neurology.

Below are key research areas within each subspecialty:

Infectious Diseases: Investigating the pathogenesis of parechovirus-A3 infections in neonates and young infants, and utilizing wastewater surveillance to predict viral infectious diseases in children.

Hematology and Oncology: Developing innovative immunotherapies, CAR (Chimeric Antigen Receptor) T-cell therapy for pediatric malignancies.

Cardiology: Identifying risk factors for coronary artery aneurysms in Kawasaki disease.

Endocrinology: Conducting genetic diagnostics for unknown endocrine and metabolic disorders.

Nephrology: Exploring the role of megalin in urine as it relates to pediatric renal diseases.

Rheumatology: Evaluating novel treatments for rheumatologic conditions in children.

Neonatology: Examining the impacts of intestinal microbiota and innate immunity on prematurity.

Neurology: Performing genetic analyses of acute encephalopathy and convulsive disorders.

Digestive and General Surgery

Professor WAKAI Toshifumi

We strongly promote development research on comprehensive genomic analysis in solid tumors using next-generation sequencing.

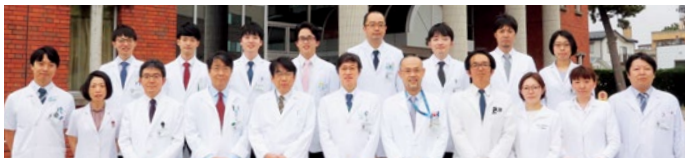
Personalized medicine and precision medicine that find the optimal treatment through comprehensive genomic analysis are starting. In our laboratory, we work with domestic and overseas research institutions and companies to establish a platform for optimal treatment based on comprehensive genomic analysis adapted to Japanese patients. In order to embody the value of new medical care as quickly as possible in Japan, we establish an academic system that combines pharmacogenomics with surgical oncology based on next-generation sequencing analysis. We promote the global activities of young researchers, strategically build an international network, and educate and enhance research and competitiveness as a world-class interdisciplinary cancer genome analysis research base. Based on genetic alterations, we focus on preventive medicine that diagnoses and predicts diseases that are likely to occur in the future so that we can then intervene. While implementing clinical research on both the results of pancreas transplantation from brain death donors and the long-term follow-up results, we are elucidating the engraftment mechanism of islet cell transplantation and researching to construct the basis for the development of transplantation treatment methods for diabetes.

Thoracic Surgery

Professor TSUCHIDA Masanori

In thoracic surgery, we conduct basic research on respiratory and cardiovascular surgery, working toward highly specialized clinical application for children and adults.

The Department of Thoracic Surgery conducts clinical and basic research in respiratory and cardiovascular surgery for children and adults. The Thoracic Surgery Group conducts clinical research such as the validity of lung cancer reduction surgery and evaluation using semi-quantitative CT evaluation methods. We are part of the Japan Clinical Oncology Group (JCOG) and strive to contribute to the development of lung cancer surgical treatment in Japan. We work with other departments on basic research such as genetic analysis using next-generation sequencers. The Pediatric Cardiovascular Surgery Group has made many presentations on the results of clinical research, including the investigation of remote outcomes of complex cardiac anomaly surgery, and has participated in a multi-institutional joint study using synchrotron radiation phase-contrast CT to successfully visualize the impulse conduction system. The Adult Cardiovascular Surgery Group conducts research on the remote outcomes of stent graft treatment for aortic aneurysms and aortic dissections, development of new surgical techniques, and the visualization of blood flow in the cardiac lumen using computer flow analysis.



Orthopedic Surgery and Rehabilitation

Professor KAWASHIMA Hiroyuki

Orthopedic surgery widely works on clinic, research and education, targeting motor organs such as bones and joints.

Orthopedic surgery deals with musculoskeletal organs like bone, cartilage, joints, muscles, tendons, ligaments and other exercisers. Our subspecialty groups are as follows; 1) spinal surgery, 2) lower extremity such as hip joint, knee joint, 3)sports medicine, 4) pediatric orthopedics, 5) osteoporosis and bone metabolism, 6) bone and soft tissue tumors, 7) hand surgery and microsurgery, 8) trauma including fractures and soft tissues, pelvis, spinal cord injury, and 9) rheumatoid arthritis and other joint disorders. Our department of orthopedic surgery is the fourth oldest in Japan and 2017 marked our 100th anniversary lecture. In clinical research, we are engaged in a lot of large-scale, high evidence-level research such as an epidemiological survey of proximal femoral fractures in all of Niigata prefecture, Matsudai knee osteoarthritis survey, the Sado project, and multicenter collaborative research on spinal deformity in patients with rheumatoid arthritis. In basic research, the tumor and rheumatoid group is conducting state-of-the-art research, fully using biomolecular procedures. Preoperative three- dimensional planning and intra-operative support using special jig for the knee and hip joint diseases, rehabilitation research and clinical research are also being conducted.

Plastic, Reconstructive and Aesthetic Surgery

Professor MATSUDA Ken

We conduct basic research on peripheral nerve regeneration, lymphatic regeneration and wound healing, and clinical research on reconstructive surgery.

In our clinical practice, we are responsible for advanced reconstructive surgery using microsurgery, treatment of congenital anomalies such as cleft lip and palate, facial palsy, facial bone fractures, extensive burns, intractable ulcers, and skin laser treatment, etc.

We are also engaged in basic research that directly leads to the development of new surgical techniques. These include research on the mechanism of plasticity in peripheral nerve regeneration for reconstructive surgery of facial nerve or brachial plexus, research on wound healing, research on simulated and model surgeries for reconstruction of the upper and lower jaw, and research using artificial intelligence. In addition to lectures about general plastic surgery, we are in charge of several lectures on dermatology and plastic surgery, lectures on musculoskeletal system, and clinical practice. We are also committed to microsurgical education and actively provide all medical students, as well as residents, and graduate students, with instruction in microscopic microvascular anastomosis and other techniques under the microscope.

Pediatric Surgery

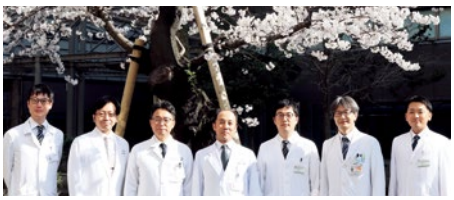
Professor KINOSHITA Yoshiaki

We research focusing on pediatric surgical diseases. We mainly study adolescent surgical diseases from newborns to 15-year-olds.

We are focusing on the research of pediatric surgical diseases for children, who are our future.

Our main research in pediatric tumors is the development of a new diagnostic system using an immunological sugar chain analysis method for pediatric solid malignant tumors, investigations into refractory hemangiomas, vascular malformations, lymphangioma, lymphangiomatosis and related diseases, as well as research to establish a treatment method using silolimus, which is a new treatment for intractable lymphatic abnormalities. For the study of the adolescent to young adult (AYA) generation, we are developing standard treatments by stratifying risks for patients with rhabdomyosarcoma and Ewing's sarcoma in the AYA generation as well as researching pregnancy for solid cancer and treatment considering late complications. We are also working on creating treatment guidelines for congenital intractable rare urogenital diseases, establishment of a nationwide registry and development of new surgical forms. As basic study, we are researching drug resistance mechanisms using hepatoblastoma cell lines and clinical specimens of hepatoblastoma as well as islet cell transplantation for type 1 diabetes that develops in childhood.

Our mission is to radically cure surgical diseases in children, from diseases that affect many children to those that are extremely rare and have poor prognoses.



Dermatology

Professor ABE Riichiro

We study the elucidation of developing mechanisms of severe drug eruptions, and the identification of the causative genes and the functions of hereditary skin diseases.

Currently, our laboratory promotes two research projects. One is the severe drug eruption group which targets severe cutaneous drug reactions, specifically toxic epidermal necrolysis and Stevens-Johnson syndrome. Although the patients suffering from these diseases can be fatal, the pathogenesis has not been fully elucidated yet. We particularly focus on the development of the novel therapeutic drugs targeting proteins and receptors related to the epidermal cell death, and the new severity predictive markers. Meanwhile, the hereditary skin disease group identifies the causative genes of genetic skin diseases and analyzes their functions.

Urology

Professor TOMITA Yoshihiko

We conduct basic and clinical research on urological tumors including renal cell carcinoma and prostate cancer as well as kidney transplants, and pediatric urological diseases.

Our laboratory focuses on research every day based on both bench-to-bedside and bedside-to-bench.

Regarding urological tumors, we are engaged in new drug development, including participating in global clinical trials on cutting-edge drugs such as immune checkpoint inhibitors.

In renal transplantation, our research focuses on developing an antibody titer measuring system using sugar chain array in ABO-incompatible kidney transplants, an anti-HLA antibody inhibitory effect by the anti-IL-6 receptor antibody, and a clinical study on bortezomib medication in chronic antibody-mediated rejection.

We are examining the diagnosis of congenital urinary-genital diseases for children as well as the treatment process and results. Most treatments for congenital urinary-genital disorders are surgical, which are plastic surgery aimed at preserving functionality. By retrospectively examining many cases, we can obtain useful information regarding the surgery timing, surgical methods and postoperative follow-up methods, which are useful for more effective medical care.

Ophthalmology

Professor FUKUCHI Takeo

We are focusing on glaucoma. Our research utilizes our experience from many clinical cases and our large number of operations which are notable in Japan.

Vision is very important for people to live. The importance of healthy aging is frequently talked about in our modern aging society. However, people develop ocular diseases with aging, which often greatly influence the daily life of the elderly. In recent years, ophthalmologic instruments and therapeutic techniques have significantly improved, so very fine lesions have been found and treated in an early stage. We introduce the forefront technology at all times and work on the treatment and research of ocular diseases of all ages from baby to the elderly. We teach the function of vision and its importance through the lecture, and our role is to have students feel the fascination of the most advanced microsurgery through practical training.

Otolaryngology/Head and Neck Surgery

Professor HORII Arata

We conduct highly specialized research in the nose, larynx, and head and neck areas, focusing on hearing and balance.

We are conducting research mainly in three groups as follows. In cooperation with the Department of Basic Medicine, we are conducting ongoing research that can be applied from basic research to clinical practice. We are also actively involved in industry-academia collaborative research.

●Dizziness and Hearing Impairment Group

Led by Professor Horii, who serves as a committee member for creating the international diagnostic criteria for psychogenic dizziness at the Barany Society, we are working to clarify the pathology of chronic dizziness, which is difficult to diagnose and treat, and develop treatment methods. In addition to clinical research, we also conduct physiological and biochemical research on animal models as well as functional analysis using functional MRI.

●Nasopharyngeal Group

We compare the effects of multiple biological agents on eosinophilic chronic rhinosinusitis and search for biomarkers that predict treatment effects. We also work in industry-academia collaboration to standardize management methods after endoscopic sinus surgery.

●Oncology Group

In basic research, we search for new invasion and metastasis control factors in head and neck cancer using molecular pathological approaches, analyze the dynamics of salivary gland stem cells, and analyze regulatory factors in salivary gland differentiation. We also participate in nationwide multi-institutional joint studies and conduct several clinical studies led by our department.

Radiology

Professor ISHIKAWA Hiroyuki

We conduct research in diagnostic radiology, radiation oncology, and medical physics.

In diagnostic radiology, we are particularly focused on medical image evaluation. We are currently working with other clinical departments on diagnostic imaging of tumors using deep learning, which is one of the artificial intelligence technologies. In radiation oncology, we mainly conduct clinical research such as research into high-precision radiation therapy, including stereotactic radiotherapy and intensity-modulated radiotherapy, for multiple brain metastases and lung cancer as well as research on high-dose-rate interstitial irradiation for prostate cancer. We also assist with clinical research led by other departments and co-medicals to help in the multidisciplinary treatment of cancer. In medical physics, our development research includes a patient-specific QA system for IMRT patients by applying deep learning and radiomics, a high-precision dose evaluation system considering the uncertainty factors of radiotherapy, a tumor control rate prediction system for patient-specific radiation therapy based on a mathematical tumor model, and ultra-high-precision irradiation position verification methods that consider the tumor control rate in stereotactic brain radiotherapy.

Obstetrics and Gynecology

Professor YOSHIHARA Kosuke

We are working on clarifying the pathogenesis of obstetric and gynecological diseases and developing new therapeutic strategies by using integrated OMICS data analysis.

We are working on clarifying the pathogenesis of obstetric and gynecological diseases and developing new therapeutic strategies by using Integrated OMICS data analysis and molecular biological analysis . Here we introduce our research on endometriosis and gynecological cancer as follow:

1. Identification of endometriosis pathogenesis

Endometriosis affects 5 to 10% of women of reproductive age in Japan, and causes chronic pelvic pain, dysmenorrhea, and infertility, leading to decreased quality-of-life (QOL). However, the pathogenesis of endometriosis remains unknown. We have performed whole exon sequencing for endometriotic epithelium and normal uterine endometrial epithelium to identify endometriosis-associated gene mutations. We are now working to further elucidate the pathogenesis of endometriosis.

2. Development of molecular targeted therapy for gynecological cancer stem cells

Cancer stem cells which are characterized by tumorigenicity, self-renewal and differentiation capacities, are involved in cancer proliferation, metastasis chemotherapy-resistance. We are working on developing novel therapeutic strategies for gynecological cancer by identifying therapeutic target molecules for gynecological cancer stem cells.

Anesthesiology

Professor BABA Hiroshi

We are studying the action mechanism of analgesics on the transmission of pain sensation information in the spinal dorsal horn and the brain, and the motor function of the spinal anterior horn cells.

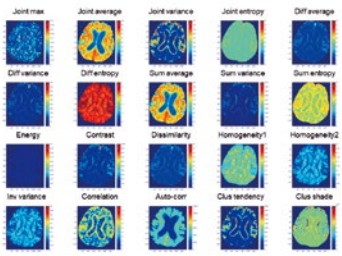
Our research uses electrophysiological techniques such as patch clamping and morphological techniques such as immunostaining. We focus on the plastic change mechanism that occurs at the spinal dorsal horn or at the brain level due to the inflammation of peripheral tissues and nerve damage as well as the action mechanism of analgesics that act at the spinal cord level. We are studying the action mechanism of drugs on motor function using the same method from the spinal anterior horn cells. Regarding the patch clamping, we also perform in vivo patch clamping if necessary, which enables us to see the reaction of the spinal dorsal horn cells to physiological stimulation. We also succeeded in visualizing the pain sensation information transmitted to the membrane potential and the intracellular Ca2 + imaging spinal dorsal horn, using a spinal cord slice as shown in the photograph. Recently, we conducted in vivo flavin protein fluorescent imaging to observe the activity of spinal dorsal horn cells and the somatosensory area of the cerebral cortex.

Emergency and Critical Care Medicine

Professor NISHIYAMA Kei

We rise to challenges from digital science to molecular biology and ethics to address acute medical care from multiple perspectives.

We are conducting data science in acute medical care in a wide range of ways from analyzing a cardiopulmonary arrest database of about 1.93 million people to artificial intelligence analysis of head CT images. We are developing and demonstrating digital transformation such as an emergency consultation support application, an information sharing system using SNS for emergency medical helicopters, and a remote ICU. In addition to participating in clinical research, we also provide guidance to other research institutes regarding the planning and implementation of clinical research. Furthermore, in collaboration with the Department of Neuroanatomy, we are working to combine the perspective of molecular biology with knowledge obtained from data science. We also preside over multicenter research to evaluate the current state of advanced care planning in acute care settings and to develop new tools.



Medical Oncology

We research into cancer pathology and chemotherapy as well as lung regeneration research using pluripotent stem cells.

Our department performs cancer chemotherapy across organs for solid tumors. We provide chemotherapy for cancer patients with complications, and provide treatment based on cancer gene testing. Based on cancer registry and cancer treatment data, we analyze the characteristics of cancer in the elderly and the effects and side effects of cancer chemotherapy. We conduct research focusing on the pathology of thromboembolism in cancer patients. In recent years, we have been working with other facilities to develop equipment that can easily measure the blood concentration of molecular targeted drugs, which have become the core of cancer chemotherapy, and to clinically apply it. Pluripotent stem cells can diverge into various tissues. In collaboration with researchers in other fields, we are conducting research on lung organ regeneration derived from pluripotent stem cells using the blastocyst complementation method in lung-deficient mice.

Clinical Pathology

Professor OHASHI Riuko

Our department is engaged in the study of human pathologies using morphological analysis and immunohistochemical / molecular biological techniques.

We focus on morphological analysis and conduct research that can be applied to routine pathological diagnosis. We observe a single lesion in detail, find regions that have different morphological changes within the same lesion, and analyze each region. There is a function change in parallel with a morphological change that can be seen macroscopically and microscopically (tissue and cell levels), and protein expression and gene changes are in the background of the morphological change. To clarify the relationship between the morphological change and the protein expression / gene mutation, we carry out protein expression analysis using immunohistochemistry and genetic analysis using molecular biological techniques.

We have stored the database of pathological diagnosis (and macroscopic photographs of surgical materials) of abundant digestive organ disease cases (about 60,000 surgical materials and about 300,000 biopsies / endoscopic resection materials) in our department, enabling various research on rare diseases and management of large-scale analysis on common diseases.

Neurosurgery (Brain Research Institute)

Professor FUJII Yukihiko

We are working on one-team neurosurgery treatment that combines tradition and cutting-edge technology, and on research topics inspired by clinical practice.

We are the oldest specialized neurosurgery department in Japan in a unique environment, being affiliated with the Brain Research Institute. We work on neurosurgery and operations and have always emphasized clinical questions. Currently, our clinical features include highly difficult neurosurgery, intra-cerebrovascular catheter therapy, and surgical treatment of epilepsy and functional disorders in collaboration with the Nishiniigata Chuo National Hospital. In terms of research, we are working on research topics that will greatly contribute to future neurosurgery treatments, such as elucidating treatment methods using cultured cells from patient-derived brain tumors, nerve axon regeneration and growth mechanisms elucidation, the development of surgical support systems and educational training systems for highly difficult neurosurgery, and the visualization of intraoperative neural activity using a non-invasive fluorescent observation method. The environment that enables us to consult closely with excellent researchers at the Brain Research Institute about experimental methods is unique among clinical departments.

Neurology (Brain Research Institute)

Professor ONODERA Osamu

Using clinical information, state-of-the-art analysis methods, and brain tissue, we are focusing on overcoming neurological diseases based on molecular mechanisms.

We have succeeded in identifying the causes and pathology of neurological diseases including Niigata Minamata disease and SMON disease that deeply impact on society. Many of our predecessors started their research by discovering something in their daily clinical practice. Working with other departments at the Brain Research Institute, we are conducting research to overcome neurological diseases, fully using genetic, biochemical, and cell biological techniques. In particular, we use neuropathological tissue samples to conduct disease-based studies that are difficult to conduct at other facilities.

In recent years, cutting-edge research in medical biology has come to require more interdisciplinary knowledge; categorizing research themes by disease name is now part of the past. We now need to approach research from a more multifaceted perspective. We are working to lead the world in overcoming neurological diseases through cutting-edge fusion pathological research.

Cell Biology (Kidney Research Center)

Professor KAWACHI Hiroshi

The Department of Cell Biology, Kidney Research Center conducts basic research to elucidate the pathogenic mechanism of kidney glomerular diseases and to develop novel therapy for nephrotic syndrome, one of the most important diseases in nephrology field.

Kidney disease is regarded as a new national disease. In our laboratory in the Basics Division of the Kidney Research Center, medical professionals such as clinicians, veterinarians, and pharmacists as well as basic biologists are working together to elucidate the pathogenesis of kidney disease and to develop new treatment methods. Currently, the most important issue we are working on is the elucidation of the pathogenesis of proteinuria. Proteinuria is both the most important symptom of renal disease and an aggravating factor that advances renal failure, and is involved in the onset of other organ diseases such as cerebrovascular and cardiovascular disorders. Suppressing proteinuria leads to reducing the number of patients with renal failure, brain stroke, and myocardial infarction. We were the first in the world to identify the site responsible for the onset of proteinuria and to elucidate its molecular structure. We are currently conducting research to develop new therapeutic methods targeting these molecular groups.

Clinical Nephrology and Rheumatology (Kidney Research Center)

Our task includes clinical practise, research and education in the area of nephrology and rheumatology.

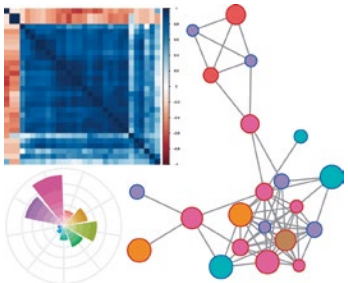
A wide range of basic and clinical investigations and education is in progress to understand pathogenesis and to develop new treatment strategies for kidney diseases and autoimmune diseases. To acomplish these purposes, we apply clinicopathological methods, as well as varieties of experimental techniques, such as molecular and cellular biology, genetic and proteomic analysis, and those with experimental animal models. Particularly, we have performed extensive research and published many papers on the development and progression of IgA nephropathy, one of the most predominant type of primary glomerulonephritis. We have also contributed greatly in the research on the influence and treatment of uremic toxins on complications in patients with end stage kidney disease. Our department belongs to the Kidney Research Center. It is the sole institute in Japan that consists of basic, translational and clinical department. Each department specializes in research about kidney disease covering from basic to clinical science, working in a coordinated fashion.

Bioinformatics (Medical AI Center)

Professor OKUDA Shujiro

We research knowledge extraction from omics data and its technology development using computers.

Bioinformatics is a field that conducts medical and biological research using computers. We process DNA and protein sequences on computers to study the genes and genomes of living organisms. Since the intestinal microbiota is closely related to human health, we search for disease-related bacteria from the intestinal environment metagenomic data. In addition, we are developing technology to realize precision medicine that enables each patient to select the optimal treatment method in cancer genomics research that investigates DNA mutations in cancer cells. In recent years, we have developed further and are engaged in developing artificial intelligence for medical use. When using a computer, the data to be handled must be neatly organized. Database construction for that purpose is also a subject of our research and development.



Medical Education Center

Professor SATO Noboru

The Medical Education Center consists of three offices: the Medical Education Promotion Office, the International Exchange Promotion Office, and the Diversity Promotion Office.

Our work in medical education encompasses the curriculum for all academic years focusing on off-campus training, communication skills, and professionalism education. We are also responsible for Objective Structured Clinical Examination (OSCE) and Computer-Based Tests (CBT). Additionally, we provide extensive student support through individual interviews at the Medical Student Support Counseling Room located on the Asahimachi Campus to provide detailed support for student concerns.

We promote international exchange by sending students to and welcoming students from the UK, Thailand, Indonesia, and China through the Summer Medical Student Exchange Program and Overseas Clinical Training. We also offer English conversation classes (MEET) to improve English communication skills and provide support for USMLE.

For diversity, we collaborate with the Niigata Medical Association and run Hitohiro no Kai, which is an organization supporting female doctors. The organization provides maternity scrubs for loan and hosts lectures to assist female doctors and all medical professionals concerned about their work styles and career paths.

Disaster Medical Education Center

Specially Appointed Prof. TAKAHASHI Masashi

With the Dean of the Faculty of Medicine as the director, this organization specializes in disaster medicine, humanitarian medical support, and education both in Japan and abroad.

Our Center is one of the few medical school organizations in Japan specializing in disaster medicine and medical treatment. We are engaged in the social implementation of disaster and humanitarian assistance in Japan and abroad, and conduct research under the theme of protecting lives and health through disaster science in collaboration with various organizations, including the Disaster Medicine and Medical Personnel Development Division of the Graduate School of Medical and Dental Sciences, Research Institute for Natural Hazards and Disaster Recovery, Niigata University, and the Future Society Co-Creation Laboratory, which was established in 2024. We are engaged in human resource development projects for multiple professions involved in disaster medicine. We also play a leading role in training Japan DMAT members and the International Disaster Relief Medical Team of JICA (Japan International Cooperation Agency). The disaster medical education model promoted by our center has been selected as a particularly excellent initiative (GP: Good Practice) in the Ministry of Education, Culture, Sports, Science and Technology's education reform for two consecutive terms, the only one in Japan. During the COVID-19 pandemic, we achieved the lowest death rate in the country in collaboration with Niigata Prefecture. We continue to lead in disaster medicine in Japan.

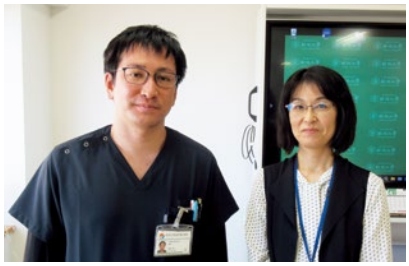
Niigata Regional Medical Support Center Medical Branch Office

Specially Appointed Assistant Professor TSURUMA Hayato

We train doctors who will be responsible for regional medical care and provide career support.

Our Center holds community medicine summer training every August for students who have received the Niigata Prefecture Medical Training Scholarship and students interested in community medicine. Students can experience the atmosphere of a local medical field, and also build face-to-face relationships with medical students from other universities, forming a network that can be utilized even after graduation. We also support career development after graduation by holding career path information sessions and matching presentations and sharing information on post-graduation work styles and training hospitals.

We hold events as necessary to deepen understanding of the current state of community medicine in Niigata Prefecture. We plan the content based on the opinions and interests of the participating students; so if you are interested, please contact us at any time. We would like to continue to encourage more students to participate in our activities so that we can convey the appeal of local medical care.

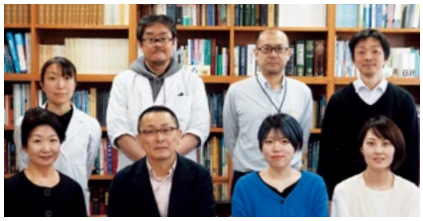


Cause of Death Education Center

Professor TAKATSUKA Hisakazu

We conduct advanced death investigations to build a safe and secure society and train professionals who will be involved in death investigations.

This center was established in July 2017 for solving social problems such as the increase in the number of deaths due to aging, overlooking crimes, and responding to large-scale disasters. Accurate investigation of the cause of death is important to protect the dignity and rights of individuals, but the system for investigating the causes of death in Japan is not perfect, and there is a severe shortage of personnel involved. This center has five departments: the Forensic Autopsy Department that performs autopsies, dissections, and pathological diagnoses, the Image Diagnosis Department that performs postmortem image diagnoses using CT, the Drug and Toxicology Biochemistry Department that analyzes alcohol, drugs and poisons, the Dental Forensic Medicine Department that uses dental examinations to confirm identities, and the Social Forensic Medicine Department that responds to abuse and other such issues. Working with related institutions inside and outside the university, we are conducting more advanced investigations of the causes of death and training the personnel involved. Strengthening the system for investigating the causes of death and improving the system quality are very important issues; this center focuses on contributing to the local community as a core center for investigating the causes of death on the Sea of Japan line and a core facility in Japan.



Center for Research Promotion

Professor SATO Noboru

We advance medical research at Niigata University School of Medicine by promoting the use of shared equipment and providing a variety of research techniques.

The Center for Research Promotion, School of Medicine, was established in 2021 to support the management and sharing of facilities and equipment in the Medical School to support and advance its research. The biochemistry laboratory, microscope room, mass spectrometry room, and P1, P2, and P1A laboratories are located on the third floor of the Joint Research Building, where research equipment ranging from general-purpose instruments to large special equipment is managed and operated. The Center also promotes sharing equipment through research technology seminars and provides education and training for safe use.

The Center has five departments: mass spectrometry, cell analysis, pathological tissue specimens (formerly the Pathological Tissue Specimen Center), electron microscopes, and pathogen experiments. Each department provides entrusted services using shared equipment such as sample preparation, data acquisition, and research consultations with specialized staff.

The use of the equipment and the operation of entrusted services are provided on a cost-based basis through the OFaRS shared equipment reservation system. Please feel free to take advantage of this service.

Center for Community Health Professions Education in Hokuetsu Niigata Branch

Branch manager TAKAHASHI Masashi

We implement a training program for medical professionals who protect the community by utilizing clinical medicine and social medicine in collaboration with Toyama University.

The new educational project, which was selected as a particularly excellent initiative (GP: Good Practice) by the Ministry of Education, Culture, Sports, Science and Technology, started in 2022 in collaboration with Toyama University with the theme of training medical professionals to protect the community by utilizing clinical and social medicine. The Center for Community Health Professions Education in Hokuetsu conducts a project for the Toyama University School of Medicine and the Niigata University School of Medicine to jointly train physicians with comprehensive skills to protect the community by forming a wide-area network spanning from Toyama Prefecture to Niigata Prefecture and sharing the educational know-how of both schools. Based on educational strategy competencies of Community Health Care Professionalism, Competence in Clinical Medicine, Competence in Social Medicine, and Competence in Information and Communication Technology (ICT) Operation, the center proposes and develops a new wide-area medical school education model that will be responsible for the future of medical care in Japan, incorporating social medicine practice and providing common educational opportunities through mutual exchange with medical students from both universities.

General Medicine Course

Professor KAMIMURA Kenya

We train doctors who have comprehensive medical skills and can handle the multiple diseases and life challenges of all patients.

We promote a General Practitioner Training Program that trains doctors to acquire a wide range of medical knowledge to examine the whole body and to provide holistic medical care considering patient feelings. In the clinical participation training, technical skills such as specialized knowledge and skills are taught in cooperation with medical institutions in Niigata Prefecture. We have also prepared an environment for learning human skills such as leadership, management, and communication by preparing online and on-demand learning. Using this education system, the Niigata Method, we would like to provide the skills necessary for team medical care and leadership, and continue to develop general practitioners who protect the community in collaboration with multi-professionals.

We are working to train general practitioners in Niigata who emphasize the stance of clinical examination, community protection, and patient consideration. We hope to gather many people who will work with us from all over Japan.

Please be sure to visit our website.

Our Web

Collaborative Research Laboratory

Applied Molecular Medicine Specially Appointed Prof. SAITO Akihiko
Biofluid Biomarker Center Specially Appointed Assoc Prof. YAMAMOTO Keiko
Clinical Nutrition Science Specially Appointed Assoc Prof. HOSOJIMA Michihiro

Donated Fund Laboratory

Community Medicine **Division of Human Resource Development for Community Medicine** Professor KAMIMURA Kenya
Community Medicine **Division of Community Medicine** Specially Appointed Prof. IGUCHI Seitaro
Community Medicine **Division of Disaster Medicine and Medical Professionals Development** Specially Appointed Prof. TAKAHASHI Masashi
Health Promotion Medicine Specially Appointed Assoc Prof. ITO Yumi
Laboratory Medicine and Clinical Epidemiology for Prevention of Non-communicable Diseases Specially Appointed Prof. KATO Kiminori
Advanced Cardiopulmonary Vascular Therapeutics Specially Appointed Assoc Prof. KASHIMURA Takeshi
Community Psychiatric Medicine Specially Appointed Assoc Prof. SUGIMOTO Atsunori
Health Sciences for Prevention and Management of Non-communicable Diseases Specially Appointed Assoc Prof. FUJIHARA Kazuya
Inter-Organ Communication Research Specially Appointed Assoc Prof. WAKASUGI Minako
Familial and Hereditary Oncology Specially Appointed Assoc Prof. NISHINO Koji
Preemptive Medicine for Digestive Diseases and Healthy Active Life Specially Appointed Assoc Prof. YOKOO Takeshi
Community Medicine and Clinical Data Analysis Specially Appointed Assoc Prof. KITAZAWA Masaru
Advanced Treatment and Prevention for Vascular Disease and Embolism Specially Appointed Prof. HANZAWA Kazuhiko
Musculoskeletal Science for Frailty Specially Appointed Assoc Prof. KOGA Hiroshi
Department of Network Medicine for Digestive Diseases Specially Appointed Assoc Prof. KAMIMURA Hiroteru
Department of Preventive and Minimally Invasive Medicine for Digestive Diseases, School of Medicine, Niigata University Specially Appointed Assoc Prof. HAYASHI Kazunao
Division of Comprehensive Musculoskeletal Medicine, Niigata University Graduate School of Medical and Dental Sciences Specially Appointed Prof. IMAI Norio
Department of Active Ageing (donated by Tokamachi city, Niigata Japan) Specially Appointed Prof. SHOBUGAWA Yugo
Next-generation care medicine for Information and communication technology (ICT) Specially Appointed Assoc Prof. OSAWA Taeko
Internal Disability Rehabilitation Studies for Regional Collaboration Specially Appointed Assoc Prof. OBATA Hiroaki

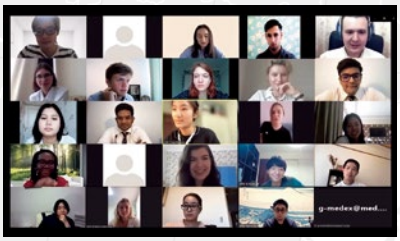
INTERNATIONAL EXCHANGE

Niigata University is located near the Port of Niigata which was one of the first five ports (Niigata, Hakodate, Kanagawa, Hyogo, and Nagasaki) opened its doors to the world from an early age in Japan under the Treaty of Amity and Commerce between the United States and Japan (1858). Niigata University actively promotes international exchange in education and research with a lot of universities around the world.

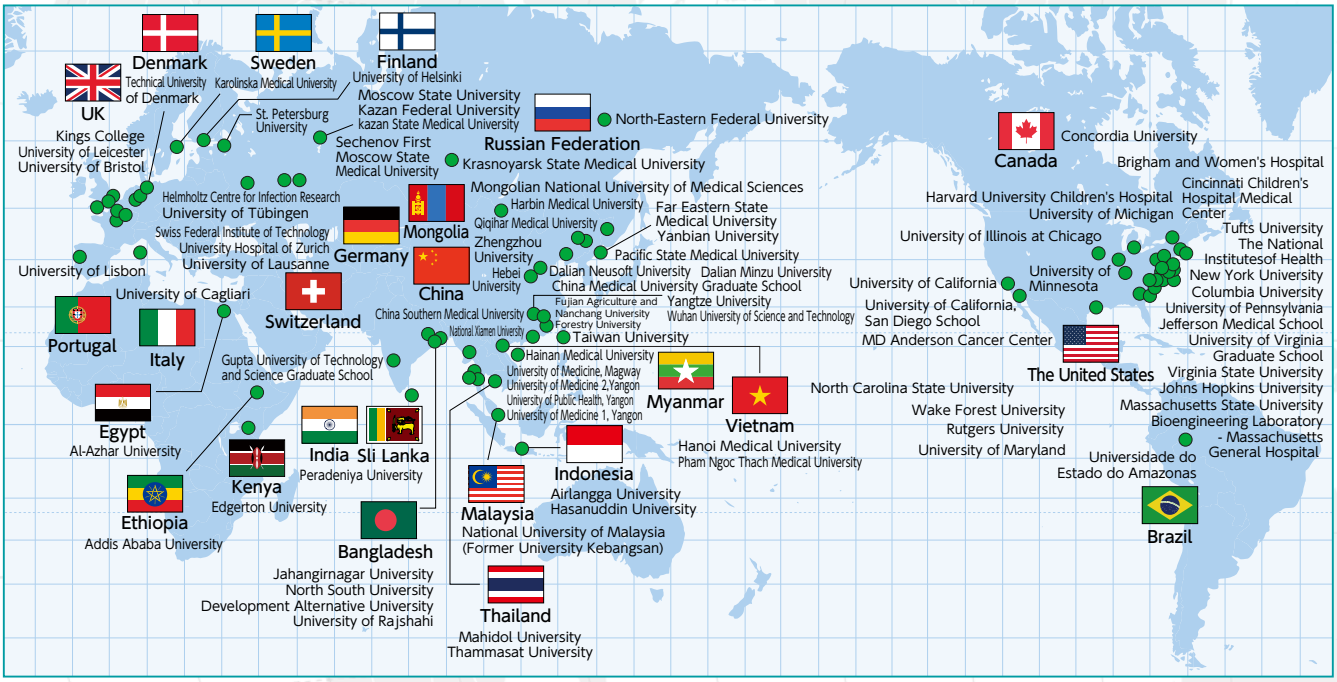
Undergraduate and graduate students are provided with a variety of opportunities to study abroad. We also welcome international students from a wide variety of countries all over the world every year.

One of the main features of international exchange in Niigata University is that we have strong connection not only with Western countries, but also with neighboring countries, using Niigata's geographical and historical advantages. Even during the COVID-19 pandemic, when face-to-face exchanges were stagnant, online exchanges among students were actively conducted with many universities abroad.

Through our international exchange activities, we place the utmost importance on fostering global medical professionals and researchers who can play active roles on the world stage.



Exchange partner schools of the Faculty of Medicine



【Characteristic activities】

(1) Europe and America

We are implementing exchange programs for studying abroad with multiple universities, including the University of Leicester in the UK, in which we mutually exchange students for the clinical training. In medical research training, more than ten students participate in cutting-edge basic research for about two months at various European and American universities.

The School of Medicine has been vigorously working to improve practical English skills by offering English conversation classes taught by native speakers specializing in medical English since 2014. In order to support students who intend to work as doctors overseas, we actively provide information on preparation for the United States Medical Licensing Examination (USMLE). As a result, 17 students have passed the USMLE in the past few years, including three 2021 graduates. In addition, we invite top physicians and researchers who are active in Japan and abroad to give lectures on the current state of the world's top level medical care and diverse career paths.

(2) Southeast and Southwest Asia

We are participating in educational and research exchanges in the field of infectious diseases and global health, focusing on influenza, and severe pneumonia and diarrhea in children. In Myanmar, we collaborate with top-level institutions such as the National Institute of Health, University of Medicine 2, Yangon, and Mandalay University etc. In 2015, we were selected to participate in the Japan Initiative for Global Research Network on Infectious Diseases (J-GRID) program of the Japan Agency for Medical Research and Development (AMED), and we established an overseas research base in Yangon. In 2020, we were also selected as one of the projects on the Emerging and Re-Emerging Infectious Diseases at Overseas centers (Global

Research Infrastructure, Collaborative Research via Overseas Research Centers), and are continuing to work on infectious disease research in Myanmar. In 2019, short-term summer training program started in Myanmar for undergraduate students. Niigata University has accepted a number of students from Myanmar in cooperation with other universities in Japan. Furthermore, with the cooperation of the Universiti Kebangsaan Malaysia (National University of Malaysia), we are conducting interactive exchanges between Malaysian and Niigata University's faculties, graduate students, and undergraduate students. We also provide short-term dispatch training for undergraduate students both in Malaysia and in Japan. In Myanmar and Malaysia, we conduct social epidemiological surveys on the health of the elderly and conduct international comparative research with Japan where the aging population is increasing.

International Priority Graduate Programs for advanced graduate course support for international students sponsored by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japanese government. In 2018, Developmental Psychiatry program started to foster the leaders from the Southeast Asian (ASEAN) region. In 2021, a program to foster medical and biological specialists in neuroscience and system medicine was adopted, targeting ASEAN and Southwest Asia. Together with a lot of international students from many countries, we are actively engaged in mutual exchange programs in the clinical and research fields.

Country	University/Facility	Undergraduates		Graduates	
		Dispatched	Accepted	Dispatched	Accepted
The United States	University of Illinois at Chicago	3			
	Wake Forest University	2			
	MD Anderson Cancer Center			1	
	University of California	4			
	University of California, San Diego School	5			
	Columbia University	2			
	Jefferson Medical School	1			
	Johns Hopkins University	1			
	Cincinnati Children's Hospital Medical Center	6			
	Tufts University	1			
	New York University	1			
	North Carolina State University	1			
	Harvard University Children's Hospital	8			
	Virginia State University			1	
	University of Virginia Graduate School			1	
	Brigham and Women's Hospital	7			
	The National Institutes of Health	4			
	University of Pennsylvania	1			
	Bioengineering Laboratory - Massachusetts General Hospital			1	
	Massachusetts State University	1			
	University of Michigan	8		2	
	University of Minnesota	10			
	University of Maryland	1			
	Rutgers University	8			
Canada	Concordia University				1
Brazil	Universidade do Estado do Amazonas				1
United Kingdom	Kings College	1			
	University of Bristol	2			
	University of Leicester	14	9		
Portugal	University of Lisbon	1			
Italy	University of Cagliari	1			
Germany	University of Tübingen	2			
	Helmholtz Centre for Infection Research	1			
Switzerland	Swiss Federal Institute of Technology	5			
	University Hospital of Zurich	3			
	University of Lausanne	2			
Denmark	Technical University of Denmark	1			
Sweden	Karolinska Medical University	2			
Finland	University of Helsinki	2			
Myanmar	University of Medicine 1, Yangon				2
	University of Medicine 2,Yangon	7			1
	University of Public Health, Yangon				1

(3) China and Russia

The coastline of Niigata Prefecture facing the Sea of Japan reaches 330 km on the mainland coastline, excluding remote islands such as Sado Island. Niigata Port, located in the center of the coastline, has a long history of exchanges with countries on the opposite coastline, such as China, South Korea, and Russia. Niigata University has also become a gateway for international exchanges between universities in these countries. Taking advantage of this location, we have long history of activated medical education and medical care exchanges with various universities in China such as Harbin Medical University as well as medical universities in the Far East and Siberia. To date, approximately 400 students have mutually visited, and more than 70 Chinese and Russian doctors and nurses have studied medicine at our faculty.

Number of international students (2011 - 2023)

Country	University/Facility	Undergraduates		Graduates	
		Dispatched	Accepted	Dispatched	Accepted
Myanmar	University of Medicine, Magway				2
Malaysia	National University of Malaysia (Former University Kebangsan)	36			7
India	Gupta University of Technology and Science Graduate School				1
Bangladesh	Jahangirnagar University				1
	Development Alternative University				1
	University of Rajshahi	1			
Sli Lanka	Peradeniya University		7		
Thailand	Mahidol University				2
	Thammasat University	4	1		
Indonesia	Airlangga University		2		2
	Hasanuddin University	2	5		7
Vietnam	Hanoi Medical University				1
	Pham Ngoc Thach Medical University				1
China	National Xiamen University		1		
	Taiwan University	1			
	Qiqihar Medical University				1
	China Medical University Graduate School				2
	China Southern Medical University				1
	Harbin Medical University	24	42		10
	Yangtze University				2
	Wuhan University of Science and Technology				1
	Fujian Agriculture and Forestry University				1
	Dalian Neusoft University		1		1
	Dalian Minzu University		1		
	Yanbian University				1
	Zhengzhou University		1		
	Hebei University				1
	Hainan Medical University				1
	Nanchang University				1
Russian Federation	Far Eastern State Medical University	33	30	2	10
	Krasnoyarsk State Medical University	36	27	5	14
	Pacific State Medical University	21	28	2	9
	kazan State Medical University		4	2	5
	Kazan Federal University		5		
	St. Petersburg University		8		
	North-Eastern Federal University	3	5		
	Moscow State University		4		2
	Sechenov First Moscow State Medical University		4		
Egypt	Al-Azhar University				1
Ethiopia	Addis Ababa University				1
Kenya	Edgerton University				1

"COVID-19 Vaccine Development Using Recombinant BCG (rBCG) Technology" AMED Drug Discovery Support Promotion Project (2020-2021)

MATSUMOTO Sohkichi
Research representative
Niigata University Graduate School of Medicine,
Department of Bacteriology

Amid the COVID-19 pandemic, an inverse correlation between the BCG vaccination and the incidence and mortality of COVID-19 was indicated. As the results of large-scale epidemiological studies and several effects of the BCG vaccination against viral infections and SARS-CoV-2 infections by double-blind tests were later reported several times, there has been growing interest both at home and abroad in using BCG to combat COVID-19.

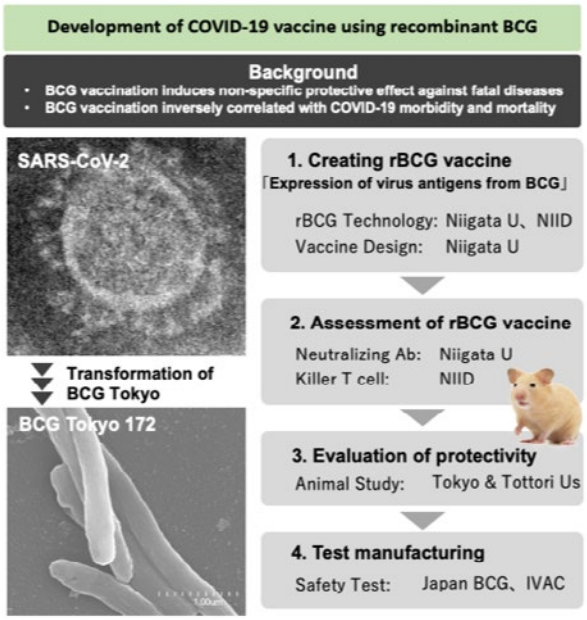
The BCG is an attenuated strain of mycobacterium tuberculosis and is a live tuberculosis vaccine. Since it survives in the body for several years after inoculation, it can provide long-term immune stimulation and has a strong adjuvant activity necessary for vaccines. It is also highly safe and can be manufactured at a low cost, as evidenced by the record of having been administered to the greatest number of people so far.

Niigata University possesses this BCG and virus recombination technology, and has the bioinformatics know-how to track virus mutations. In cooperation with University of Tokyo, the National Institute of Infectious Diseases, Japan BCG Laboratory, we have developed a plan to express the SARS-CoV-2 spike protein from BCG and create a COVID-19 vaccine. This project was implemented from 2020 with the support of the Japan Agency for Medical Research and Development.

Previously, rBCG used drug resistance markers for genetic engineering. Since this is inappropriate for human application, we succeeded in creating marker-free rBCG in a short period of time. Although BCG substrains exist, we proceeded with preparation based on Japanese BCG (Tokyo strain), which has a reputation for stability and antigenicity and is a WHO international reference product. By analyzing the gene expression pattern of the BCG Tokyo strain, we found that the MPB70 protein gene was the most expressed in the BCG Tokyo strain. Therefore, we used MPB70 to establish rBCG-70C2, a marker-free recombinant BCG, which secretes the RBD spike protein.

rBCG-70C2 boosted antibody responses to the RBD and maintained them for a long time upon inoculating spike protein RBD-immunized animals. A vaccine booster test in hamsters confirmed that the hamsters tended to recover quickly after viral infection. We created a non-clinical formulation of rBCG-70C2 and conducted toxicity tests to confirm its safety. The prototype clinical trial formulation was produced by the Institute of Vaccines and Medical Biology (IVAC) in Vietnam in an international collaboration.

Another feature of this project is that research support departments at Niigata University, such as the Clinical and Translational Research Center, URA, and the Institute for Research Promotion, supported the development research. We expect that the results based on Niigata University's technology and know-how will contribute to controlling intractable diseases, including COVID-19.



Niigata Method: General Practitioner Training Program

KAMIMURA Kenya
Professor
Department of General Medicine, Niigata University School of Medicine

This project is to educate human resources who can look at multiple diseases and life-related issues of individual patients and protect the community (life and lifestyle) through collaboration with multiple professions, which is based on the Niigata Method of the General Practitioner Training Program in the All-Niigata system, a project of the Ministry of Health, Labor and Welfare that selected Niigata University to participate.

Specifically, we are working to train general practitioners in Niigata who emphasize the stance of clinical examination, community protection, and patient consideration. We hope to gather together many people who will work with us from all over Japan.

General practitioners referred to here are physicians who specialize in general medical care and physicians who can treat patients with sufficient general medical care skills even if they are organ-specific specialists. Niigata University, Niigata Prefecture, the Medical Association, and medical institutions will work together to train these doctors.

We have started clinical-participation training in general practice to acquire the ability to examine the whole body, grasp the patient's lifestyle and background from a broad perspective, and provide comprehensive medical care. Students and supervising physicians communicate with each other to improve the training and learn better. We use our own on-demand teaching materials and virtual simulators to teach medical interviews and procedures to provide an environment for postgraduate and recurrent education to learn medical technical skills (specialized knowledge and skills).

Another feature of the Niigata Method is providing online, on-demand learning programs for human skills that are important in medical care. For example, we hold online seminars to teach team building and psychological safety, which are important in multi-disciplinary collaboration, communication skills to implement work smoothly, and medical management. These abilities will lead to protecting and creating the region by ensuring and improving the quality of medical care in Niigata.

We are working daily with organizations both inside and outside the university that help us achieve the goals of our project. We are working to build our project to be a sustainable business model by increasing the number of physicians with comprehensive medical skills, securing the next generation human resources, and developing human resources to protect the community,

Summary of practical training that connects inside and outside the university online

DATA

Number of Students (Undergraduate)

(As of May 1, 2024)

Year		1st	2nd	3rd	4th	5th	6th	Total
School of Medicine	Admission Quota	140	140	133	127	127	127	794
	Enrollment	142	149	139	120	127	134	811
		(42)	(38)	(30)	(25)	(33)	(35)	(203)

( ) indicates female students

Number of Students (Graduate)

(As of May 1, 2024)

		Year	1st	2nd	Total
Graduate School of Medical and Dental Sciences (Master Course)	Course for Biomedical Sciences	Admission Quota	20	20	40
		Enrollment	17	35	52
			(11)	(18)	(29)

(As of May 1, 2024)

		Year	1st	2nd	3rd	4th	Total
Graduate School of Medical and Dental Sciences (Doctor Course)	Course for Molecular and Cellular Medicine	Admission Quota	22	22	22	22	88
		Enrollment	22	21	20	52	115
			(4)	(11)	(6)	(14)	(35)
	Course for Biological Functions and Medical Control	Admission Quota	37	37	37	37	148
		Enrollment	42	40	35	67	184
			(7)	(12)	(8)	(18)	(45)
	Course for Community Disease Control	Admission Quota	14	14	14	14	56
		Enrollment	8	5	7	7	27
			(1)	(0)	(1)	(3)	(5)
	Total	Admission Quota	93	93	73	73	332
		Enrollment	89	101	62	126	378
			(23)	(41)	(15)	(35)	(114)

( ) indicates female students

Number of Foreign Students

(As of May 1, 2024)

	Year	1st	2nd	Total
Graduate School of Medical and Dental Sciences (Master Course)	Course for Biomedical Sciences	3	4	7

(As of May 1, 2024)

	Year	1st	2nd	3rd	4th	Total
Graduate School of Medical and Dental Sciences (Doctor Course)	Course for Molecular and Cellular Medicine	3	4	1	0	8
	Course for Biological Functions and Medical Control	3	2	6	6	17
	Course for Community Disease Control	3	3	4	2	12
	Total	12	13	11	8	44

Number of Graduates

Period	Number of Graduates
College of Medicine (Old Educational System)(Nov., 1914 – March, 1924)	964 (0)
Medical College (March, 1926 – March, 1954)	1,974 (3)
Attached Medical Special Course (Sept., 1942 – March, 1952)	661 (15)
University (New Educational System) (March, 1955 – March, 2022)	7,261 (1,262)
Total	10,860 (1,280)

( ) indicates female students

Number of Degrees Conferred (Master of Biomedical Science)

Period	Graduates
March, 2004 – March, 2022	284

Number of Degrees Conferred
Doctor of Philosophy(Medical Science), Doctor of Philosophy

Period	The Whole Course Completed	Thesis Presented	Total
Doctors(Old Educational System) (Dec., 1923 – March, 1960)	1,888		1,888
Doctors(New Educational System) (March, 1959 – March, 2022)	2,391	1,830	4,221
Total	4,279	1,830	6,109

Successful Candidates of the National Medical Practitioners Qualifying Examination

	2019	2020	2021	2022	2023
Applicants	135	129	133	128	119
Passed	129	118	129	124	116
Pass ratio (%)	95.6%	91.5%	97.0%	96.9%	97.5%

Staff

(As of May 1, 2024)

Divisions	Teaching Staff					Office Personnel			
	Professors	Associate Professors	Lecturers	Assistant Professors	Total	Clerical Officials	Technical Officials	Medical Technical Staff	Total
School of Medicine	36	32	10	59	137	18	15	0	33
(Female)	(4)	(2)	(0)	(18)	(24)	(4)	(6)	(0)	(10)
(From Abroad)	(0)	(1)	(0)	(7)	(8)	(0)	(0)	(0)	(0)

External Funding

Category		2020 Items	2021 Items	2022 Items	2023 Items
Grant-in-Aid for Scientific Reserch	Grant-in-Aid for Scientific Research on Innovative Areas	4	4	4	4
	Grant-in-Aid for Scientific Research(A)	6	4	6	4
	Grant-in-Aid for Scientific Research(B)	24	34	24	34
	Grant-in-Aid for Scientific Research(C)	48	62	48	62
	Grant-in-Aid for challenging Exploratory Research	11	12	11	12
	Grant-in-Aid for Young Scientists(A)	–	–	–	–
	Grant-in-Aid for Young Scientists(B)	1	–	1	–
	Grant-in-Aid for Young Scientists	30	35	30	35
	Grant-in-Aid for Transformative Research Areas(A)	1	2	1	2
	Grant-in-Aid for Research Activity start-up	2	4	2	4
	Fund for the Promotion of Joint International Research (Fostering Joint International Research)	1	5	1	5
	Grant-in-Aid for JSPS Fellows	2	0	2	0
	Subtotal	130	162	130	162
Health and Labor Sciences Research Grant		14	12	14	12
Joint research		24	16	24	16
Commissioned research		72	65	72	65
Donations		469	404	469	404
Total		709	659	709	659
Total Amount (Unit: ¥1,000)		2,261,877	1,865,756	2,261,877	1,865,756

Number of Autopsies and Body Donors

Divisions	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Systematical	64	59	55	54	56	50	43	48	47	36
Pathological	41	31	25	25	42	33	14	18	21	21
Total	105	90	80	79	98	83	57	66	68	57

International Exchange

Countries	Foreign University	Date Concluded
United Kingdom	University of Leicester	February 28, 2017
People's Republic of China	Harbin Medical University	April 6, 1998
Russian Federation	Pacific State Medical University	July 23, 1993
	Far Eastern State Medical University	August 26, 1998
	Krasnoyarsk State Medical University	September 11, 1998
Malaysia	National University of Malaysia	December 31, 2019
Republic of the Union of Myanmar	The Myanmar Ministry of Health	September 16, 2005
	University of Medicine 2, Yangon	October 22, 2013
	University of Medicine 1, Yangon	July 27, 2020
Mongolia	Mongolian National University of Medical Sciences	July 14, 2014
Canada	Concordia University	December 12, 2013
Bangladesh	Jahangirnagar University	December 15, 2016
	North South University	May 27, 2018
Indonesia	Airlangga University	May 1, 2017
	Hasanuddin University	July 25, 2018
Switzerland	University Hospital of Zurich	March 25, 2024
The United States	Oregon Health & Science University	April 23, 2024

BUILDING LAYOUT

School of Medicine, Faculty of Medicine

1 East Wing Building
2 West Wing Building
3 North Wing Building
4 East Lecture Building
5 West Lecture Building
6 Auditorium
7 Student Practicum Building
8 Joint Research Building
9 Niigata Medical Professionals Development Center
10 Kidney Research Center

The Hippocrates Tree

How to reach the School of Medicine from Niigata Station

【By bus】

Get off the train at JR East Niigata Station Bandai Exit

Take one of the following Niigata Kotsu buses at the bus terminal in front of Niigata Station

- ▶ Terminal C2 Hamaura-cho Line: Get off at Asahimachi-dori Niban-cho (takes 15 – 20 minutes)
  About a 3-minute walk from the bus stop
- ▶ Terminal B1 Bandai-bashi Line, W2 Nishi-kobari Line, W1 Ariake Line
  Terminal C3 or S5: Get off the bus at Higashi-nakadori or Shiyakusho mae (takes 15 – 20 minutes)
  About an 8-minute walk from the bus stop
- ▶ Terminal C8: Get off the bus at Niigata University Hospital on Shindai Hospital Line (takes 15 – 20 minutes)
  About a 5-minute walk from the bus stop

【By taxi】

10 – 15 minutes from JR East Niigata Station Bandai Exit

An Outline of Niigata University
School of Medicine, Faculty of Medicine
Graduate School of Medical and Dental Sciences (Medicine)

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