

APPLICATION OUTLINE (2021)
FOR
THE JAPANESE GOVERNMENT (MONBUKAGAKUSHO: MEXT)
SCHOLARSHIP PROGRAM

**Training Program for Innovative Leaders in
Preemptive Medicine
(Doctoral Course)**
- October 2021 Admission -

Graduate School of Medical Sciences
Graduate School of Advanced Preventive Medical Sciences
KANAZAWA UNIVERSITY

The Ministry of Education, Culture, Sports, Science and Technology of the Japanese Government (Monbukagakusho: MEXT) is accepting applications for the Training Program for Innovative Leaders in Preemptive Medicine (Doctoral Course) in the Graduate School of Medical Sciences and the Graduate School of Advanced Preventive Medical Sciences at Kanazawa University. MEXT Scholarship will be awarded to successful applicants who pass Kanazawa University entrance examination and assessment by MEXT.

1. Research Field and Number of Students

- (1) Research field: Medical, pharmaceutical, and health sciences, or related research fields.
- (2) Number of students: 8 (international students)

2. Application Requirements

(1) Nationality:

The Applicant must be a national of countries or regions recognized by the Japanese government. He/ she must be residing in the country of origin immediately before the date of admission.

(2) Age:

The applicant must have been born on or after April 2, 1986.

(3) Educational Background:

The applicant must satisfy one of the following requirements:

- ① Has successfully completed (or expects to complete) an 18-year course of school education by the end of September 2021, with a degree in medical, pharmaceutical, dental, or veterinary science.
- ② Has obtained a Master's degree, or expects to obtain a Master's degree by the end of September 2021.
- ③ Has spent two years or more at a university or research institution after graduating from a university or completed a 16-year course of school education.
Be deemed by the Graduate School of Medical Sciences or the Graduate School of Advanced Preventive Medical Sciences at Kanazawa University to have academic ability equal to or higher than a Master's degree holder, based on results of research reported in submitted documents.
- ④ Be deemed by the Graduate School of Medical Sciences or the Graduate School of Advanced Preventive Medical Sciences at Kanazawa University to have academic ability equal to or higher than a Master's degree holder, based on submitted documents. Also, be 24 (years old) or elder as of September 30, 2021.

(4) Health:

The applicant should be certified as being physically and mentally healthy by a qualified and recognized physician.

(5) Language:

A person whose English proficiency is CEFR B2 level or higher. The lowest scores acceptable are as follows.

*Exemption from those from countries where English is the official or sub-official language
TOEFL-iBT 72, TOEIC (L&R) 785, IELTS 5.5, Cambridge English FCE (160⁺)

(6) Academic Achievement

A person whose Grade Point Average (GPA) of the degree-seeking course (last two years) is 2.30 or more. In principle, GPA is calculated in each academic year. If you are in the middle of the fiscal year, do not include that grades. However, if the semester system is adopted and the results for the previous term/semester are known, calculate the GPA for the last two years whose results are known. In addition, when calculating from the results of multiple universities etc., calculate standards according to [How to Calculate GPA] below.

[How to Calculate GPA]

Find GP according to the chart below, and calculate GPA using by the following formula.

Category	Evaluation Grade				
		Excellent Outstanding	Good	Satisfactory	Fail Poor
4 grades evaluation		A	B	C	F
		100-80	79-70	69~60	50-
	S	A	B	C	F
5 grades evaluation	A	B	C	D	F
	100-90	89-80	79-70	69-60	59-
	Grade Point (GP)	3	3	2	1

[Formula]

$$\frac{(\text{GP3 No. of Credits} \times 3) + (\text{GP2 No. of Credits} \times 2) + (\text{GP1 No. of Credits} \times 1) + (\text{GP0 No. of Credits} \times 0)}{\text{Total No. of Credits Registered}}$$

(Note 1) If the course you have taken was not credit system, calculate by replacing the number of credits with the number of courses.

(Note 2) If you transfer university, target the credit after transfer. However, if the grade evaluation before transfer is not included in the credits of post-transfer studies of the last two years, it (the credits at the school you enrolled just before the current university) should be calculated based on the grade evaluation before transfer.

(Note 3) Do not include grade evaluations (e.g., "certified", "pass", etc.) that are not listed in the above table.

(Note 4) If fractional numbers appear in GPA, truncate the third decimal place or less.

(Note 5) Calculate the GPA based on the results of the last 2.5 years in the case where the academic record of the currently enrolled university is less than two years, and the university evaluates academic record semi-annually, and if a fraction of less than one year occurs because the university of your previous enrollment calculated your academic achievement annually.

(7) Others:

- ① Those who were granted a Japanese Government Scholarship in the past will not be selected unless he/she has had at least three years of research or teaching experience after returning to his/her home country.
- ② Those who are selected to receive financial support from their government or other organization are not eligible for this scholarship.
- ③ Those who already reside in Japan are not eligible.

3. Period of Scholarship

- (1) From October 2021 to September 2025 (4 years)

Graduate School of Medical Sciences
-Division of Medicine

-Division of Pharmacy
Graduate School of Advanced Preventive Medical Sciences
-Division of Advanced Preventive Medical Sciences

(2) From October 2021 to September 2024 (3 years)

Graduate School of Medical Sciences
-Division of Pharmaceutical Sciences
-Division of Health Sciences

4. Scholarship and Benefits

(1) **Stipend:** 145,000 yen per month (subject to change)

(2) Travel Expenses

- ① Onward travel: An economy class air ticket from the international airport closest to the student's home to Narita, Kansai, Komatsu or Toyama International Airport will be provided, if the flight to these international airports is economical.
- ② Return travel: An economy class air ticket from Narita, Kansai, Komatsu or Toyama International Airport to the international airport closest to the student's home will be provided to those who successfully complete the doctoral course during the period of scholarship.

(3) School Fees

Entrance examination fee (30,000 yen), admission fee (282,000 yen), and tuition fee (535,800 yen/year) will be waived.

5. Selection and Notification of Result

- (1) A selection committee will be established, in which will review applications on the basis of applicants' academic achievements of undergraduate or graduate course, English proficiency, and result of interview(s) (online interviews are acceptable).
- (2) Based on the recommendation by Kanazawa University, MEXT will approve candidates for receiving scholarship support.
- (3) Results will be announced to applicants in 2 stages.
1st stage: The result of Kanazawa University entrance examination will be announced by the end of March 2021.
2nd stage: An official notice from MEXT regarding successful scholars will be announced by mid-July 2021.

6. Date of Enrolment

October 1, 2021

The applicant must arrive in Japan in the 4th week of September 2021.

7. Program Description

(1) Objective and outline

The extension of healthy life expectancy is an urgent issue not only in Japan but also worldwide. From the perspective of reducing medical expenses and improving the quality of life, "preemptive medicine" is drawing attention because it prevents the onset of disease

by understanding different environmental and genetic factors for each individual, and by performing appropriate early intervention.

In this program, we accept excellent international students for 3 or 4 years from other countries with which we have had deep interaction. International students acquire the expertise necessary for preemptive medical care and practice research on the relationship between environment/genetic factors and diseases by using advanced technologies such as omics analysis.

In addition, international students will participate in field work; for example, the one conducted in Noto area of Ishikawa prefecture where super-aged society is progressing, and experience preemptive medical care.

(2) Image of human resources trained in this program

We will nurture human resources who can promote preemptive medicine by being a bridge between their home country and Japan and doing further international collaborative research after graduation. Specifically, we will nurture those who [1] clarify interaction between environmental factors and genetic factors, and relationship with disease; [2] develop tools of diagnostic imaging methods, biomarkers, therapeutic agents, etc. which are necessary for preemptive medical care, and make use of researchers of preemptive medicine and their knowledge and lead to the practice of advanced medicine as a preemptive medical personnel.

8. Application Procedure

Applicants must submit the following application documents (in **pdf data**) to the section in charge described on page 7, **no later than January 15, 2021**. They must submit these documents through a professor at Kanazawa University who will accept to be their academic supervisor. We will ask candidates who pass the screening to submit original documents on later date.

***All documents must be prepared in English or have English translation attached.**

- (1) Cover Sheet Use the format specified
- (2) Application for MEXT Scholarship form (double-sided printing)
Use the format specified
- (3) Field of Study and Study Program form (double-sided printing)
Use the format specified
- (4) Certificates of graduation or photocopies of diploma for both graduate and undergraduate studies, or a certified letter stating the expected date of graduation
- (5) Official academic transcripts of all applicable undergraduate and post graduate courses from the institution including GPA and/or ranking in the institutions
- (6) Photocopy of passport (photo page)
If currently not available, a photocopy of the birth certificate or certificate of citizenship
- (7) Letter of Recommendation
Written by a president, dean or director of your institution, addressed to the President of Kanazawa University Use the format specified
- (8) A photograph (4.5 × 3.5 cm) taken within the past 6 months; full frontal view of the head and shoulders, without a hat

The photograph must be attached to the specified place on the application form with the applicant's name and nationality written on the back. In addition, a photo data (jpg) must be submitted by e-mail.
- (9) Abstract summary of the latest thesis for a degree
If any for the Division of Medicine and the Division of Advanced Preventive Medical Sciences, all applicants for the other Divisions

- (10) Provisional acceptance letter written by a prospective academic supervisor from Kanazawa University (Printed email message that states acceptance is also acceptable.)
- (11) An official score report of TOEFL (iBT), Cambridge English (ESOL), TOEIC (R&L), or IELTS. No document is required for those whose country's official or sub-official language is English.
- (12) Letter of Release
 *A letter that must be issued by the employer for an applicant who wishes to remain employed during the enrollment period at Kanazawa University. This letter recognizes the applicant's right to apply for and enroll in a doctoral course at Kanazawa University after passing the entrance exam.
 The letter must be issued in the name of president-class of the applicants' affiliated institution. If the Letter of Recommendation was issued in the same name, there is no need to submit the Letter of Release.
- (13) Certificate of Health
 Use the format specified
- (14) Pledge to the President (as per the attached form to) that the successful applicant will surely enroll in Kanazawa University
 Use the format specified
- (15) Pledge to the Dean that the successful applicant will surely enroll in the Graduate School
 Use the format specified
- (16) Research achievements (if any for the Division of Medicine and the Division of Advanced Preventive Medical Sciences; for all applicants of the other Divisions)
- (17) Certificate of employment period
 Only for those who satisfy the application requirement of educational background by adding his/her research history at a research institution (place of employment)

[NOTE]

- * Field of study and study program form will be used as one of the most important references for selection. All applicants are advised to maintain close contact with the expected academic supervisor or host professor at Kanazawa University in order to formulate a research plan.
- * Application documents must be printed on A4-size papers.
- * Application documents that are incomplete, incorrectly (falsely) written, or submitted after the deadline will not be processed.
- * Application documents will not be returned to the applicant.
- * Prospective applicants must have an interview with an expected academic supervisor before getting provisional acceptance. The interview may be done over the internet.

9. Miscellaneous

- (1) The scholarship will be terminated if:
- ① Any of the information supplied in the application is later found to be false;
 - ② The pledges declared are broken;
 - ③ The applicant is subjected to a disciplinary action or judged by the faculty as not being able to continue the program. This scholarship may be suspended if the student is off campus for prolonged period without permission; and
 - ④ After enrollment, the GPA at each point in a year is less than 2.3 or the grading standard set by the university
- (2) Applicants are advised to familiarize themselves with Japanese customs, climate, and culture before their arrival in Japan. Although the course and research will be conducted in English, the applicant will be required to learn basic Japanese language in order to cope with daily life.

【Inquiries】

Program Name	Training Program for Innovative Leaders in Preemptive Medicine
Degree Course	Doctoral Course (4 Years or 3 Years)
Graduate School and Division	Graduate School of Medical Sciences
	Division of Medicine (4-year course) ※1
	Division of Pharmacy (4-year course) ※2
	Division of Pharmaceutical Sciences (3-year course) ※2
	Division of Health Sciences (3-year course) ※3
Graduate School of Advanced Preventive Medical Sciences	
Division of Advanced Preventive Medical Sciences (4-year course) ※1	

(NOTE) Inquiries regarding this program should be directed to the address below※1, ※2 or ※3.

- ※1 : Graduate Student Affairs Section (Med.), Student Affairs Division,
Kanazawa University
13-1 Takara-machi, Kanazawa, Ishikawa 920-8640, Japan
Fax: +81-(0)76-234-4208
E-mail: t-daigakuin@adm.kanazawa-u.ac.jp
URL: <http://www.med.kanazawa-u.ac.jp/EN/admission/education.html>
- ※2 : Pharmacy Student Affairs Section, Faculty of Pharmacy and Cancer
Research Institute Support Division, Kanazawa University
Kakuma-machi, Kanazawa, Ishikawa 920-1192, Japan
Fax: +81-(0)76-234-6844
E-mail: y-gakumu@adm.kanazawa-u.ac.jp
URL: <http://www.p.kanazawa-u.ac.jp/e/>
- ※3 : Student Affairs Section, Faculty of Health Sciences Support Division,
Kanazawa University
5-11-80 Kodatsuno, Kanazawa, Ishikawa 920-0942, Japan
Fax: +81-(0)76-234-4351
E-mail: t-igaku2@adm.kanazawa-u.ac.jp
URL: <http://mhs3.mp.kanazawa-u.ac.jp/eng/>

GRADUATE SCHOOL OF MEDICAL SCIENCES

DIVISION OF MEDICINE

The Division of Medicine structures a curriculum to encourage acquirement of interdisciplinary and academic sophistication, knowledge and skills, and develops a basis for world-class research for the purpose of nurturing medical specialists and researchers who are also global leaders and can contribute to the each field of biomedical sciences with insight and global point-of-view. The Division trains individuals who are equipped with a wide range of medical knowledge, who has been educated to have the essential ability to clarify diseases mechanisms and pathology, and who can make quick and appropriate diagnosis and develop effective and quality treatment with minimal burden for the patients.

Department of Neuroscience

Medical Neuroscience

KAWASAKI Hiroshi, M.D. & Ph.D., Professor

1. Genetic and environmental factors regulating the formation of the brain
2. Mechanisms regulating the formation of higher brain structures that are specific to higher mammals
3. Pathophysiology of neurodevelopmental disorders

Histology and Cell Biology

NISHIYAMA Masaaki, M.D. & Ph.D., Professor

1. Functional analysis of causative candidate genes in autism spectrum
2. Control mechanisms of aging and cancer by chromatin remodeling
3. Mechanisms of spermatogenesis and male infertility

Functional Anatomy

OZAKI Noriyuki, M.D. & Ph.D., Professor

1. Mechanisms of inflammation and neuropathic pain occurred in various parts of the body such as skin, viscera, muscle, joints, etc.
2. Development of novel animal model of functional pain disorders such as Functional Dyspepsia and myofascial pain syndrome
3. Neuroanatomy and physiology of somatic and visceral pain systems

Integrative Neurophysiology

MIEDA Michihiro, Ph.D., Professor

1. Neural network of the central circadian clock
2. Inputs and outputs of the central circadian clock
3. Disturbance of the circadian rhythm and disorder

Neuroanatomy

HORI Osamu, M.D. & Ph.D., Professor

1. Identification and characterization of glia-derived stress-related genes
2. Roles of the endoplasmic reticulum (ER) stress response in brain ischemia and in neurodegenerative diseases
3. Screening of chemical compounds which can regulate glial activities
4. Role of glial cells in neuropsychiatric diseases

Developmental Neurobiology

SATO Makoto, Ph.D., Professor

1. Formation of neuronal circuits in the visual system
2. Functional analysis of visual processing circuits
3. Molecular mechanisms of neuronal migration disorders

Neurology and Neurobiology of Aging

YAMADA Masahito, M.D. & Ph.D., Professor

1. Studies on brain aging, dementia, and amyloidosis
2. Studies on neuroimmunology and infection
3. Studies on neurodegenerative diseases
4. Studies on cerebrovascular disorders

Psychiatry & Behavioral Science

KIKUCHI Mitsuru, M.D. & Ph.D., Professor

1. Clinical and biological studies of pervasive developmental disorders, in collaboration with some major academic programs of Kanazawa University
2. Clinical and biological studies of schizophrenia and allied psychosis
3. Clinical and biological studies of drug-abuse and allied psychosis

Clinical Cognitive Neuroscience

MATSUI Mie, Ph.D., Professor

1. Neuropsychological studies in patients with higher brain dysfunction
2. Lifelong development of brain structure/function and neuropsychological function
3. Cognitive remediation and neuroplasticity in schizophrenia

Department of Cancer Medicine

Molecular and Cellular Pathology

N/A due to absence of a professor

1. Analysis of signal transduction of receptor tyrosine kinases in human solid carcinomas
2. Detections of gene amplifications of CCNE1, CCND1 and CDK6 in solid carcinoma
3. Analysis of tumor angiogenesis-associated genes in the tumor microenvironment
4. Identification of cancer morphology and invasive related factors

Immunology and Stem Cell Biology

WATARAI Hiroshi, M.D. & Ph.D., Professor

1. Molecular mechanism of self-renewal in ES cells
2. Switching mechanism from the undifferentiated state to the differentiated state
3. Mechanism of ES cell differentiation into a certain lineage cells
4. Comparison of characteristics between ES and cancer stem cells

Human Pathology

HARADA Kenichi, M.D. & Ph.D., Professor

1. Pathogenesis of primary biliary cholangitis (cirrhosis), IgG4-related diseases, non-alcoholic steatohepatitis, biliary atresia, hepatolithiasis, and idiopathic portal hypertension
2. Carcinogenesis of primary liver cancers
3. Functional analysis of cholangiocyte in physiological and pathological conditions
4. Pathogenesis congenital biliary malformation and establishment of animal model

Global Cancer therapy and Research

YANO Seiji, M.D. & Ph.D., Professor

1. Advanced course for global cancer therapeutics
2. Advanced surgical medicine for cancer therapy
3. Molecular diagnosis of neoplasm
4. Advanced photonic therapeutics for cancer
5. Psychological care for cancer patients

Molecular Virology & Oncology

N/A due to absence of a professor

1. Molecular mechanism of tumor invasion and metastasis
2. Screening of genes associated with tumor invasion and metastasis
3. Extracellular matrix metabolism
4. Epstein-Barr virus-associated tumors

Cancer Cell Biology

GOTO Noriko, M.D. & Ph.D., Professor

1. Molecular mechanisms of cancer initiation, progression and metastasis
2. Identification of new biomarkers and molecular targets of lung cancers by systems biology approach
3. Signal transduction mechanisms through receptor tyrosine kinases (RTKs) for tumorigenesis and stem cell maintenance

Translational and Clinical Oncology

MINAMOTO Toshinari, M.D. & Ph.D., Professor

1. Molecular mechanism underlying oncogenic signaling networks
 - (1) Deregulated Wnt/ β -catenin signaling
 - (2) Glycogen synthase kinase 3 β (GSK3 β)-mediated signaling
2. Molecular basis of gastrointestinal and refractory cancers for clinical translation
3. Establishment of tissue material resources of human gastrointestinal cancer

Immunology and Molecular Biology

SUDA Takashi, Ph.D., Professor

1. Role of the NLR family and related proteins in tumor cells
2. Molecular mechanism of pyroptosis
3. Role of RYNOD
4. Search for novel activator and inhibitors for the inflammasome

Oncology and Molecular Biology

TAKAHASHI Chiaki, M.D. & Ph.D., Professor

1. The RB tumor suppressor gene product that has been implicated in control of cell cycle and terminal differentiation
2. Analysis of oncogenic signals that induce malignant behaviors in cancer cells through metabolic reprogramming
3. Development of in vivo & in vitro cancer stem cell models

Molecular Bioregulation

MUKAIDA Naofumi, M.D. & Ph.D., Professor

1. To elucidate the roles of endogenously produced chemokines and pro-inflammatory cytokines in the processes
2. The pathophysiological roles of serine/threonine kinase, Pim-3, a proto-oncogene expressed selectively in carcinogenesis

Molecular cell Signaling

YOSHIOKA Katsuji, Ph.D., Professor

1. Mechanisms and roles of scaffolding proteins for mammalian MAPK cascades in the specificity of the signaling pathways
2. Characterization of genetically engineered mice for the scaffolding proteins JSAP1 and JLP
3. Functional analysis of the scaffold proteins JSAP1 and JLP in the developing brain

Functional Genomics

SUZUKI Takeshi, Ph.D., Professor

1. Identification of novel cancer genes using retroviral insertional mutagenesis in mice
2. Functional analysis of histone methyltransferases and demethylases in the initiation and malignant progression of cancer
3. The role of three families of enzymes in DNA demethylation pathway on cancer development

Genetics

OSHIMA Masanobu, D.V. M. & Ph.D., Professor

1. Mechanism for malignant progression
2. Tumor microenvironment for cancer development
3. Analyses using human cancer tissues

Tumor Dynamics

MATSUMOTO Kunio, Ph.D., Professor

1. Significance of Met dynamics in invasion-metastasis and drug resistance
2. Structure-based drug discovery targeting HGF-Met protein-protein interaction
3. Discovery of artificial small HGF and its application to regenerative medicine
4. Physiological role of HGF-MET pathway in innate immunity
5. Structural biology for Met activation

Molecular Genetics

HIRAO Atsushi, M.D. & Ph.D., Professor

1. Molecular mechanisms of stem cell self-renewal
2. Molecular mechanisms of tumor suppression regulated by cell cycle check point system
3. Identification of cancer stem cells

Medical Oncology

YANO Seiji, M.D. & Ph.D., Professor

1. Phase I/II investigator initiated trials to assess the efficacy and safety of alectinib in lung cancer patients with RET-fusion gene (ALL-RET)
2. Researches to clarify the molecular mechanisms of targeted drug resistance in central nervous system, utilizing *in vivo* imaging models of several tumor types

Department of Cardiovascular Medicine

Molecular Vascular Physiology

N/A due to absence of a professor

1. The physiological and pathophysiological roles of the lipid mediator sphingosine-1-phosphate (S1P)-Edg, G protein-coupled receptor axis in vascular development and homeostasis, cardiovascular pathophysiology including angiogenesis, atherosclerosis and cardiac hypertrophy-fibrosis, and tumor biology including tumor invasion, metastasis and angiogenesis
2. The physiological and pathophysiological roles in angiogenesis, vascular permeability regulation, the normal vascular tone regulation, and hypertension of the lipid kinase class II phosphoinositide 3-kinase (PI3K-C2 α) that we discovered

Pharmacology

OGAWA Kazuhiro, M.D. & Ph.D., Associate Professor

1. Heme catabolic pathway as a defense mechanism: heme oxygenases (HOs) as key enzymes
2. Drugs and food chemicals modulating heme metabolism

Cellular and Molecular Function Analysis

ANDO Hitoshi, M.D. & Ph.D., Professor

1. Elucidation of the mechanisms underlying the association between impaired circadian clock and the development of lifestyle-related diseases, and the development of therapeutic agents
2. Chronopharmacology
3. Basic pharmacological research
4. Clinical pharmacological research

Biochemistry and Molecular Vascular Biology

YAMAMOTO Yasuhiko, M.D. & Ph.D., Professor

1. Vascular biology – the molecular basis of vascular homeostasis and of vascular cell responses against various pathologic insults
2. Vascular medicine – the mechanisms of the development and prevention of diabetic vasculopathy, angiogenesis diseases, and hypertensive vascular derangement
3. Neuroscience – the mechanisms of Alzheimer's disease and vascular dementia
4. Cellular and molecular immunology – the impact of immunological changes and inflammation in diabetic complications, atherosclerosis, angiogenesis, and obesity

Circulatory Emergency and Resuscitation Science

N/A due to absence of a professor

1. Analysis of modifiable factors related to survival of out-of-hospital cardiac arrests
2. Medical control in emergency medical service system
3. Pathophysiology of ischemia-reperfusion injury
4. Pathophysiology of disturbance of microcirculation

Clinical Development

MURAYAMA Toshinori, M.D. & Ph.D., Professor

1. Study management
2. Compensation for bodily health damage of study participants
3. Management of safety information
4. Management of data monitoring committee of investigator-initiated trials
5. The strategic coordination among researcher education, research associates nurturing, and medical technology excavation

Clinical Pharmacokinetics

SAI Yoshimichi, Ph.D., Professor

1. Molecular biopharmaceutical study on metabolic enzymes and drug transporters as a molecular determinant of inter- and intra-individual variability of drug efficacy, toxicity and disposition
2. Clinical pharmacokinetic study on monitoring and avoidance of adverse effect of drugs
3. Clinical pharmacological study for proper use of drug to improve QOL of patients
4. Research on ensuring subject safety in clinical trials

Department of Social and Environmental Medicine

Molecular Genetics

KURACHI Makoto, M.D. & Ph.D., Professor

1. Molecular immunology and biology
2. Molecular mechanism of T-cell memory and exhaustion
3. Molecular mechanism of antiviral factors
4. Physiological and pathological role of deaminase super family

Immunology

HANAYAMA Rikinari, M.D. & Ph.D., Professor

1. What are the molecular mechanisms of exosome secretion?
2. What are the physiological functions of exosomes?
3. How do exosomes travel from secretory cells to the target cells *in vivo*?

Parasitology

TOKORO Masaharu, M.D. & Ph.D., Associate Professor

1. New strategy for the development of chemotherapeutic drugs against *Cryptosporidium* infection
2. Study of intra-species diversity in *Giardia intestinalis*
3. Genetic diversity of clinical isolated *Acanthamoeba* spp. From keratitis cases in Japan
4. Comprehensive identification method: Utilization of molecular taxonomy for identification of pathogenic/non-pathogenic protozoan parasites
5. Genetic identification of various trichomonads species isolated from humans and related mammals in Indonesia

Bacteriology

FUJINAGA Yukako, Ph.D., Professor

1. Study on the structure and function of the botulinum neurotoxin complex, which must pass down the digestive tract and cross the epithelial barrier lining the intestine to cause food-borne botulism

Environmental and Preventive Medicine

NAKAMURA Hiroyuki, M.D. & Ph.D., Professor

1. The innovative methods using new concept of “super-preventive medicine”, which compasses preventive methods in all levels of the 0th, 1st, 2nd and 3rd dimensions
2. Interactions between genetic and environmental factors in etiology of lifestyle-related diseases, and allergic disorders and epigenetics
3. The effect of environmental chemicals and Asian dust on allergic diseases
4. Epidemiology of development of health behavior and dietary habit in children
5. Health economics epidemiology towards the optimization of the cost for the expenses for medical and long-term care with a focus on the analysis of factor influencing QOL and disease structure in the elderly

Viral Infections and International Health

ICHIMURA Hiroshi, M.D. & Ph.D., Professor

1. Viral and host factors associated with disease progression in HIV-infected children
2. Molecular epidemiology of drug-resistant HIV
3. Impact of ART on the immune status of HIV-infected children
4. Role of HBV and HCV co-infections in AIDS progression
5. Impact of HIV infection of the other infectious diseases

Forensic Medicine and Pathology

ZUKA Masahiko, M.D. & Ph.D., Professor

1. Evaluation of the causes of different criminal or sudden unexpected death cases by medico-legal autopsies and close examinations
2. Forensic pathological investigation on the mechanism of atherosclerotic change of the intima of vessels and biochemical issues of cerebrospinal fluids, and their application to forensic case work
3. Medico-legal expert witness of complicated criminal affairs and medical malpractice
4. Research of central nervous system focused on ER stress using rat models conditioned with methamphetamine

Hygiene

N/A due to absence of a professor

1. Molecular mechanisms underlying adaptation to environment and regulation of signal transduction
2. Alteration in gene regulation according to proliferation, differentiation, aging, carcinogenesis, etc.
3. Function of epidermis, hair and appendages as a barrier
4. Molecular mechanisms of intoxication/detoxication against environmental pollutants
5. Alcohol and drug abuse; Molecular mechanisms developing tolerance, addiction, etc.

Physiology and Metabolism

INOUE Hiroshi, M.D. & Ph.D., Professor

1. Regulation of organ interaction to maintain hepatic energy metabolism
2. Investigation of the crosstalk between the cell proliferation and cell metabolism in the liver
3. Therapeutic development for hepatic energy disorders by the application of mechanism of the CNS/liver crosstalk

Cell Metabolism and Nutrition

YAMASHITA Tatsuya, M.D. & Ph.D., Associate Professor

1. Research into liver diseases relevant to nutrient metabolism disorders and lifestyle-related diseases
2. Research into public health interventional measures for liver diseases
3. Research into chronic liver diseases and liver cancers in West-Pacific region

Bioinformatics and Genomics

TAJIMA Atsushi, Ph.D., Professor

1. Genetics and genomics of complex human diseases
2. Epigenomics of health and disease in human populations and model organisms
3. Bioinformatics for integrative genomics and epigenomics analyses

Molecular Pathology of Skin

MATSUSHITA Takashi, M.D. & Ph.D., Professor

1. Research on regulatory mechanisms of fibrosis in patients with systemic sclerosis and model mice for systemic sclerosis
2. Role of adhesion molecules and chemokines in pathogenesis of skin diseases
3. Role of growth factors in wound healing
4. Role of B cells and complements in pathogenesis of inflammatory diseases
5. Immunological changes in patients with systemic sclerosis

Healthcare Management and Medical Informatics

NAGASE Keisuke, M.D. & Ph.D., Professor

1. Management studies on healthcare organizations
2. Healthcare Marketing (Modeling of patient visit pattern)
3. Application of artificial intelligence in healthcare services and its management
4. Studies on Healthcare policy (International patient referrals and service exportation)
5. Studies on Healthcare human resources (Modeling of healthcare human resource supply)

Global Health

N/A due to absence of a professor

1. Our laboratory conducts the research and practical activities for solving the problems in the global health field from the aspect of health sector administration through participating various overseas projects
2. We introduce the scenes of project activities and encourage students bearing the future of Japan to jump into the global contribution activities by international organization such as WHO, UNICEF and JICA for making Japanese sympathizers globally

Health Promotion and Medicine of the Future

YONEDA Takashi, M.D. & Ph.D., Professor

1. Establishment of precision medicine using genome and epigenome information and OMICS analysis
2. Establishment of telemedicine and health promotion system using AI and ICT
3. Research for pharmaceutical approval of diagnostic tests and medical devices

Department of Internal Medicine

Gastroenterology

KANEKO Shuichi, M.D. & Ph.D., Professor

1. Molecular pathology in obesity and diabetes
2. Clinical research for diabetes and its complications
3. Gene and protein expression profiling and genome sequencing of gastrointestinal and metabolic diseases
4. Molecular basis of interferon treatment of chronic hepatitis and prevention of hepatocellular carcinoma
5. Molecular analysis of hepatocarcinogenesis and the prevention research

Endocrinology and Metabolism

TAKAMURA Toshinari, M.D. & Ph.D., Professor

1. Hepatokine-mediated networks among insulin-targeting organs to make pathophysiology of diabetes/obesity and its complications
2. Molecular pathology and clinical research in diabetes/obesity and its complications
3. Cross-talks among glucose-, protein-, and lipid-metabolism pathway to keep energy homeostasis

Nephrology and Laboratory Medicine

N/A due to absence of a professor

1. Establishment of novel mechanisms involved in development, progression, remission and regression of kidney diseases and diabetic complications
2. Application of newly developed methods for clinical nephrology and other aspects
3. Approach to elucidate immune status of the host with hepatocellular carcinoma using gene expression profile of blood cells

Cardiovascular and Internal Medicine

TAKAMURA Masayuki, M.D. & Ph.D., Professor

1. Pathological analysis using disease-specific iPS cells
2. Novel therapy using gene-correction
3. Regeneration therapy for heart failure, cardiomyopathy, and arrhythmia
4. Development of coronary stent using EPC
5. Comprehensive gene analysis of dyslipidemia

Rheumatology

KAWANO Mitsuhiro, M.D. & Ph.D., Associate Professor

1. Pathogenetic analysis of IgG4-related disease
2. Development of new treatment using mouse model of IgG4-related disease
3. Pathogenetic analysis of SLE using lupus mouse model
4. Clinical study of Sjogren's syndrome

Hematology

NAKAO Shinji, M.D. & Ph.D., Professor

1. Immune pathophysiology of hematopoietic failure
2. Graft-versus-leukemia effect
3. Minimal residual disease of multiple myeloma
4. Disseminated intravascular coagulation
5. Anti-phospholipid syndrome

Respiratory Medicine

KASAHARA Kazuo, M.D. & Ph.D., Associate Professor

1. Driver mutation analysis in circulating-free DNA as surrogate tumor tissue
2. Prediction of gene abnormality in the drug resistance using pre-treatment tumor tissue
3. Growth factor and sensitivity for cytotoxic anticancer agents
4. Association in immune checkpoint and DNA mismatch repair
5. Mechanisms of cough induced by broncho-constriction

Radiology

GABATA Toshifumi, M.D. & Ph.D., Professor

1. Diagnosis and treatment of malignancy of hepatocellular carcinomas
2. Diagnosis of hepatobiliary and pancreatic diseases with CT and MRI
3. Diagnosis of cerebral tumor and neurovascular diseases with MRI
4. Diagnosis of IgG4-related disease with CT and MRI
5. Transcatheter embolization for hepatocellular carcinomas

Nuclear Medicine

KINUYA Seigo, M.D. & Ph.D., Professor

1. Pre-clinical investigation of targeted radiotherapy and its clinical application
2. 1-131-MIBG therapy for neuroendocrine malignancies
3. Pharmacokinetic modeling to analyze nuclear images
4. Assessment and prediction of therapeutic responses of tumors with radiotracers
5. Functional assessment of the heart with multimodal images

Department of Surgery

Cardiovascular Surgery

TAKEMURA Hirofumi, M.D. & Ph.D., Professor

1. Pathophysiology of ischemic, valvular and congenital heart diseases
2. Hematological research of extracorporeal circulation
3. Cell biology of lung cancer and analysis of factors affecting prognosis
4. Pathophysiological study of lymph node metastasis
5. Development of procedure of esophageal reconstruction and its clinical introduction
6. Basic and clinical research in chemotherapy against gastrointestinal cancer

Thoracic Surgery

MATSUMOTO Isao, M.D. & Ph.D., Associate Professor

1. Transplantation, reconstruction and regeneration of respiratory organs
2. Innovative development of procedures and equipment for less-invasive surgery
3. Generation of new multimodal treatments for lung cancer, malignant mesothelioma and thymic epithelial tumors
4. Cell biology of thoracic malignant tumors and analysis of factors affecting prognosis
5. Development of functional imaging diagnosis using dynamic digital radiography for thoracic surgery

Gastroenterological Surgery

FUSHIDA Sachio, M.D. & Ph.D., Associate Professor

1. Esophageal carcinogenesis and inflammation
2. Surgical stress and immunonutrition
3. Prevention of organ fibrosis in peritoneal carcinomatosis of gastric cancer
4. Interaction between cancer cell and stromal cell in the cancer microenvironment

Hepato-Biliary-Pancreatic Surgery

N/A due to absence of a professor

1. Immuno-nutritional approach for perioperative management in high-risk patients
2. Molecular pathology in cancer microenvironment of digestive disease
3. Development of pathogenesis and new therapies for organ failure due to sepsis
4. Histopathology of liver regeneration after small graft transplantation
5. Pathogenesis of extravasated platelet aggregation in post chemotherapeutic liver

Orthopedic Surgery

TSUCHIYA Hiroyuki, M.D. & Ph.D., Professor

1. Development of the antibacterial custom-made prosthesis
2. Identification and analysis of characteristics of cancer stem cell in osteosarcoma
3. Analysis of anti-tumor effect PPAR γ in giant cell tumor of bone and soft tissue
4. Muscle-skeletal regenerative medicine with adipose-derived stem cell
5. Novel antibody therapy for osteosarcoma

Physical and Rehabilitation Medicine

YAHATA Tetsutaro, M.D. & Ph.D., Associate Professor

1. Inactivity and physical deconditioning: Effectiveness of physical reconditioning
2. Muscle dystonia and spasticity: Advancing of focal control
3. Analysis of swallowing kinetics using videofluorography: Kinetic analysis of larynx and hyoid bone; Device for oral pharmaceutical formulation; Device for contrast bolus; Safety analysis for radiation exposure during examination
4. Development of locomotive analysis: Evaluating daily essential behaviors; Quantitative evaluating for muscle activity

Integrative Cancer Therapy and Urology

MIZOKAMI Atsushi, M.D. & Ph.D., Professor

1. Early diagnosis for bladder cancer: detection of new markers
2. Identification of metastasis-related factors in urogenital cancer
3. Mechanism of hormone-refractory status in prostate cancer
4. Molecular target in treatment for hormone refractory prostate cancer
5. Chemotherapy for hormone refractory prostate cancer

Ophthalmology

SUGIYAMA Kazuhisa, M.D. & Ph.D., Professor

1. Structure-function relationships in glaucoma
2. Long term predictability of glaucomatous visual field loss progression
3. Disturbance in fundus blood flow in glaucoma
4. Relationship between diurnal variation of intraocular pressure and clock genes
5. Blood flow in the optic nerve head in rat eyes

Otolaryngology – Head and Neck Surgery

YOSHIZAKI Tomokazu, M.D. & Ph.D., Professor

1. Basic and clinical research of head and neck cancer
2. Impact of allergic inflammation on carcinogenesis and tumor progression
3. Research about hearing loss and speech therapy
4. Kanazawa-method for profound deaf children
5. Cochlear implant for deaf patients

Anesthesiology and Intensive Care Medicine

TANIGUCHI Takumi, M.D. & Ph.D., Professor

1. Study of preoperative management: Study of the effects of various drugs were administered preoperatively during operation; Study of the improvement of resuscitation skill
2. Study of intraoperative management: Study on the therapeutic effects of various anesthetics for septic shock; Study of the correspondence in the abrupt change during operation
3. Study of intensive care: Development of new blood purification and studies on the effect of sedatives (sepsis, liver failure, kidney failure and multiple organ failure) in various pathological conditions

Neurosurgery

NAKADA Mitsutoshi, M.D. & Ph.D., Professor

1. Integrated neurosurgery for malignant glioma
2. Innovative chemotherapy for malignant brain tumor
3. Exploration of biomarkers for the malignant glioma
4. Network of higher brain function revealed by awake surgery
5. Expansion of endovascular surgery for stroke

Oral and Maxillofacial Surgery

KAWASHIRI Shuichi, D.D.S. & Ph.D., Professor

1. Analysis of the mechanism of invasion and metastasis of oral cancer
2. Analysis of the mechanism of temporomandibular joint disease (TMD) synovitis development
3. Analysis of association between TMD during the growth phase and jaw deformity
4. Regeneration of dental pulp

Department of Reproductive and Developmental Medicine

Transgenic Animal Science

DAIKOKU Takiko, Ph.D., Professor

1. Analysis of the molecular and genetic signaling pathways involved in endometrial cancer in gene-mutated mice
2. Analysis of the molecular and genetic signaling pathways involved in pregnancy in gene-mutated mice
3. Collaborative research to generate gene-manipulated mice

Pediatrics

WADA Taizo, M.D. & Ph.D., Professor

1. Pathogenesis of genetically-determined diseases involving multi-organ systems
2. Ontogeny of immune system and its abnormality, in particular, primary immune-deficiency diseases
3. molecular pathogenesis of vascular diseases autoimmune diseases and auto-inflammatory illnesses
4. Epidemiological and pathological analysis of food-induced allergy during infancy
5. Immune dysregulation and tumor pathogenesis in association with EBV infection

Obstetrics and Gynecology

FUJIWARA Hiroshi, M.D. & Ph.D., Professor

1. Gynecologic oncology: Analysis of tumor stem cells; Analysis of circulating tumor cells
2. Reproductive medicine: Analysis of mechanisms for human embryo implantation by the immune system; Analysis of endometrial epithelial cell function
3. Perinatology: Analysis of mechanisms for human placentation; Analysis of function of novel trophoblast-specific peptidase, laeverin

GRADUATE SCHOOL OF MEDICAL SCIENCES

DIVISION OF PHARMACY

The Division of Pharmacy aims to foster the latest knowledge in the medical academic discipline, to conduct practical research as a medical professional and also to develop a strong sense of ethics and global vision, centered on pharmacy and the capability. In an interdisciplinary environment unique to the graduate school that coordinates across the three medical disciplines of pharmaceutical, medical and health sciences, the School aims to develop highly professional leaders of pharmaceutical education and research, as well as medical experts who combine the discipline of natural science and excellent research abilities through education covering various fields from the basics of pharmacy to clinical pharmacy. Specifically, the school accepts those who are engaged in highly technical practice and aim to be active on the front lines, such as pharmacists who play a leading role in clinical practice; pharmaceutical faculty members who are in a position to lead the medical pharmaceutical education and research; public administrators engaged in the fields of medical, public welfare, pharmaceutical affairs and the environment; and researchers of new drug development and clinical testing.

Clinical Pharmacy and Healthcare Sciences

MATSUSHITA Ryo, Professor

ISHIZAKI Junko, Professor

TSUBOI Hirohito, Associate Professor

SUGA Yukio, Associate Professor

YOSHIDA Naoko, Assistant Professor

ISHIDA Natsuko, Assistant Professor

1. Establishment of the pharmaceutical care at the medical front or community in pharmaceutical approaches
2. Pharmacokinetic and clinical pharmacological research of pharmacotherapy and side effect monitoring
3. Establishment and application of scientific evidence for pharmacists contributing to pharmacotherapy
4. Research of quality and rational use of pharmaceutical products related to internet pharmacies and falsified medicines
5. Socioeconomic determinants and related psychosocial factors on oxidative and inflammatory biomarkers, Comparison of International Health Outcomes

Membrane Transport and Pharmacokinetics

TAMAI Ikumi, Professor

SHIRASAKA Yoshiyuki, Associate Professor

KOMORI Hisakazu, Assistant Professor

1. Food effect on transporters and application to health
2. ADME-PK research for drug discovery and development
3. Mechanism to regulate uric acid

Molecular Pharmacotherapeutics

KATO Yukio, Professor

MASUO Yusuke, Assistant Professor

ARAKAWA Hiroshi, Assistant Professor

ISHIMOTO Takahiro, Assistant Professor

1. Quantitative kinetics research that integrates drugs' effectiveness and side effects with molecular recognition of drugs
2. Research related to the cell specificity of biomembrane drug penetration mechanism and effects on pharmatherapy
3. Research related to molecular discrimination of nutrients and foreign substances by the mutual interaction among protein substances

Drug Metabolism and Toxicology

NAKAJIMA Miki, Professor

FUKAMI Tatsuki, Associate Professor

NAKANO Masataka, Assistant Professor

1. Study focusing on drug metabolism to promote drug development and appropriate drug use in clinical
2. Study for post-transcriptional regulation mechanisms of drug-metabolizing enzymes
3. Study for elucidation of mechanisms of drug-induced toxicity and establishment of evaluation systems to predict toxicity

Host Defense and Responses

KURASHI Takayuki, Associate Professor

HORI Aki, Assistant Professor

1. Mechanism and significance of the phagocytic removal of altered own cells
2. Mechanism of the induction of innate immune reactions
3. Study on the interaction between microbes and hosts

Human Molecular Genetics

MATSUNAGA Tsukasa, Professor

WAKASUGI Mitsuo, Associate Professor

1. Analysis of DNA repair mechanisms using chemical biology approaches
2. Development of anticancer drugs targeting DNA damage response mechanisms
3. Mechanistic analysis of novel DNA damage induction pathways and cellular responses in quiescent cells

Bioorganic Chemistry

KUNISHIMA Munetaka, Professor

MISHIRO Kenji, Assistant Professor

FUJITA Hikaru, Assistant Professor

MATSUMOTO Takuya, Assistant Professor

1. Development of new reactions, reagents, and functionalized molecules for application in medicinal chemistry and life sciences
2. Study on a specific chemical transformation of biomolecules for elucidation of their functions
3. Creation of organic catalysts and synthetic methodology based on the characteristics of biomolecules

Vaccinology and Applied Immunology

YOSHIDA Shigeto, Professor

IYORI Mitsuhiro, Associate Professor

TAMURA Takahiro, Assistant Professor

1. Development and research of the next-generation malaria vaccines that activate innate immunity
2. Development of liver-directed gene delivery system
3. Development of biomarkers of mosquito exposure for evaluating malaria vector control

Synthetic Organic Chemistry

MATSUO Junichi, Professor

YOSHIMURA Tomoyuki, Associate Professor

1. Development of new organic reactions with small ring cleavage
2. Total synthesis of bioactive molecules
3. Research related to new reactive organic intermediates

Molecular Pharmacology

KANEDA Katsuyuki, Professor

DEYAMA Satoshi, Assistant Professor

NISHITANI Naoya, Assistant Professor

1. Development and stress-induced modulation of drug addiction

2. Addictive drug-induced effects on recognition, memory and sociality
3. Pathogenic Mechanisms of psychiatric disorders and exploration of therapeutic drugs for the disorders

Pharmaceutical and Organic Chemistry

OHMIYA Hirohisa, Professor

NAGAO Kazunori, Assistant Professor

SUMIDA Yuto, Assistant Professor

1. Development of New Reactions
2. Design of Catalysts
3. Drug discovery

Hygienic Chemistry

SUZUKI Ryo, Professor

NAGATA Yuka, Assistant Professor

1. Research on molecular and cellular mechanisms of allergic diseases
2. Study of intra- and extra-cellular factors regulating allergic inflammation
3. Research on regulation of allergic responses aimed at clinical application

Clinical and Analytical Sciences

OGAWA Kazuma, Professor

KIWADA Tatsuto, Assistant Professor

1. Development of molecular probes for cancer theranostics
2. Development of imaging probes for diagnosing various diseases
3. Development of platinum anticancer agents

Molecular Pharmacognosy (Medicinal Plant Garden)

NAKAGAWA-GOTO Kyoko, Associate Professor

SASAKI Yohei, Associate Professor

SAITO Yohei, Assistant Professor

ANDO Hirokazu, Assistant Professor

1. Discovery and development of drug candidates through synthetic modifications of bioactive natural products and the study of mechanisms of action
2. Identification of novel bioactive natural molecules from rainforest plants
3. Quality evaluation and natural resources of traditional herbal medicines

Physical Chemistry

FUKUYOSHI Shuichi, Assistant Professor

1. Development of methodologies based on big data in healthcare and life sciences
2. Data-mining based on machine learning and biostatistics from life science databases
3. Computational studies on structures of proteins

Uchiyama Research Group

UCHIYAMA Masahiko, Associate Professor

1. Development of environmentally benign synthetic reactions
2. Research related to the synthesis of bioactive natural products

DIVISION OF PHARMACEUTICAL SCIENCES

This program aims to foster the latest knowledge and skills, as well as superior research abilities in the academic disciplines, including pharmaceutical sciences, medical and health sciences, centered on pharmaceutical sciences. Through advanced and developmental education and research approaches of the pharmaceutical sciences, the school trains independent and genuine researchers equipped with superior creativity, deep insight, great research planning abilities, strong leadership and global competitiveness. Specifically, the school cultivates human resources who play an active role as professionals engaged in the development and planning of new drugs in the pharmaceutical industry, faculty members at universities, researchers of public institutions, administrative officers in the area of medical care, public welfare, pharmaceutical affairs and the environmental sciences. The Division of Pharmaceutical Sciences accepts any students regardless of previous experience in an academic discipline if they strive to succeed in these types of jobs in the future.

Human Molecular Genetics

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WAKASUGI Mitsuo, Associate Professor

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ANDO Hirokazu, Assistant Professor

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FUKUYOSHI Shuichi, Assistant Professor

1. Development of methodologies based on big data in healthcare and life sciences
2. Data-mining based on machine learning and biostatistics from life science databases
3. Computational studies on structures of proteins

Uchiyama Research Group

UCHIYAMA Masahiko, Associate Professor

1. Development of environmentally benign synthetic reactions
2. Research related to the synthesis of bioactive natural products

Collaborative Research Group with the Institute of Nature and Environmental Technology

TANG Ning, Professor

1. Behavioral analysis of environmental pollutants
2. Evaluation of health effects of environmental pollutants

Membrane Transport and Pharmacokinetics

TAMAI Ikumi, Professor

SHIRASAKA Yoshiyuki, Associate Professor

KOMORI Hisakazu, Assistant Professor

1. Food effect on transporters and application to health
2. ADME-PK research for drug discovery and development
3. Mechanism to regulate uric acid

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ISHIMOTO Takahiro, Assistant Professor

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2. Research related to the cell specificity of biomembrane drug penetration mechanism and effects on parmaththerapy
3. Research related to molecular discrimination of nutrients and foreign substances by the mutual interaction among protein substances

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FUKAMI Tatsuki, Associate Professor

NAKANO Masataka, Assistant Professor

1. Study focusing on drug metabolizing to promote drug development and appropriate drug use in clinical
2. Study for post-transcriptional regulation mechanisms of drug-metabolizing enzymes
3. Study for post-transcriptional regulation mechanisms of drug-metabolizing enzymes

Clinical Pharmacy and Healthcare Sciences

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YOSHIDA Naoko, Assistant Professor

1. Research related to internet pharmacies and falsified medicines
2. Socioeconomic determinants and related psychosocial factors on oxidative and inflammatory biomarkers, Comparison of International Health Outcomes
3. Research related to the access, quality and rational use of pharmaceutical products

Host Defense and Responses

KURAIISHI Takayuki, Associate Professor

HORI Aki, Assistant Professor

1. Mechanism and significance of the phagocytic removal of altered own cells
2. Mechanism of the induction of innate immune reactions
3. Study on the interaction between microbes and hosts

GRADUATE SCHOOL OF MEDICAL SCIENCES

DIVISION OF HEALTH SCIENCES

The Ideas and Goals Underlying the Division of Health Sciences

The Doctoral program in the Health Sciences works to deepen basic research in the fields of nursing science, healthcare-related sciences and rehabilitation science and to facilitate comprehensive and multi-disciplinary research in the health sciences, with a goal of establishing knowledge that can lead the health sciences in the 21st century as well as to cultivate new academic fields. A basic idea underlying this division is to contribute to advancing the health sciences and improving human health and welfare by developing high-level professionals who have qualities of leadership, deep and extensive expert knowledge, and keen analytic ability that leads to the resolution of problems, as well as being internationally oriented researchers and educators with strong research capabilities.

The goals of the Doctoral program, in more concrete terms, are: (1) to develop high-level health science researchers with deep and extensive knowledge and high research capabilities, (2) to facilitate flexible and multi-faceted education and research on important issues in the increasingly complex healthcare and welfare services through cooperation among the fields of nursing science, healthcare-related sciences and rehabilitation science, (3) to develop educators and researchers capable of conducting education and research on new fields (not belonging to any of conventional fields of health sciences or technology) and important topics in borderline areas, (4) to develop educators and researchers who can contribute to the countries around the Sea of Japan and the global community at large, and (5) to personnel who can lead the society through high problem-resolving and research capabilities so that the social needs to advances in sophistication of healthcare and welfare services can be satisfied.

● indicates a teacher planning to retire in March 31, 2022.

Graduate Course of Nursing Science

Field of Chronic Care and Wound Management Nursing

SUGAMA Junko, Professor

1. Prevention and nursing management for pressure ulcers
2. Basic research on pressure ischemic wounds

OKUWA Mayumi, Professor

1. Development of wound care in nursing
2. Lower-leg ulcers and elements of nursing care

TASAKI Keiko, Professor

1. Professional nursing skill to enhance interdisciplinary team care for diabetes patients
2. Practice and evaluation in diabetes education conducted by nurses

OE Makoto, Professor

1. Prevention of diabetic foot ulcers using a thermography
2. Introduction of diabetic foot ulcer prevention clinics in Indonesia
3. Development of DMIST for monitoring healing of diabetic foot ulcers

Field of Gerontological, Rehabilitation and Mental Health Nursing

KATO Mayumi, Professor

1. Inquiry of issues related to Gerontological, Rehabilitation Nursing
2. Development of care programs related to Gerontological, Rehabilitation Nursing

TANAKA Koji, Professor

1. Study of psychiatric and mental health nursing
2. Study of psychiatric liaison nursing
3. Development of therapeutic nursing care

Field of Woman's Health and Environmental Child Development

TABUCHI Noriko, Professor

1. Study on maternal care of infant cries
2. Study on practice ability of student midwives
3. Development of a scale for sense of hardship with regard to the crying of an infant

MAIDA Yoshiko, Professor

1. Medical biology of postnatal women
2. Molecular biology of gynecologic malignancies

TSUDA Akiko, Professor

1. Study on role of Nursery Nurse for support of developmental disorder children
2. Study on parent-child relationship and lifestyle of children

Field of Public Health and Home Care Nursing

TSUKASAKI Keiko, Professor

1. A study on home health care for patients and their care givers

OMOTE Shizuko, Professor

1. Evaluation of community health-care project
2. Development of support system for people living with young onset dementia

Graduate Course of Medical Science and Technology

Field of Processing and Analysis for Biofunctional Imaging

KAWAI Keiichi, Professor

1. Radioprobe-based molecular imaging for diagnosis of metabolic function
2. Regulation of pharmacokinetics
3. Evaluation of radiopharmaceutical for cancer detection and image-guided planning treatments

MIYATI Tosiaki, Professor

1. Development of noninvasive bio-functional imaging
2. Development of analytical methods in MRI

ICHIKAWA Katsuhiko, Professor

1. Development of new technologies for medical display
2. Image analysis for computed tomography (CT)
3. New measurement method of resolution property for digital radiography

Field of Clinical Quantitative Technology

ONOGUCHI Masahisa, Professor

1. The construction of database criteria using a novel phantom toward the standardization of the myocardial SPECT image
2. Development of cardiac anthropomorphic phantom for myocardial ECG gated SPECT
3. Fundamental and clinical research using semiconductor detectors in nuclear
4. Quantitative analysis of organ perfusion, metabolism and function using small animal SPECT-PET/CT system
5. Quantitative accuracy of standardized uptake value for xSPECT bone technology using novel supine phantom

KAWASHIMA Hiroko, Professor

1. Diagnostic imaging of breast cancer

KOBAYASHI Satoshi, Professor

1. Study of hepatic microcirculation
2. Diagnostic imaging of the liver
3. Research of New embolic material
4. Non-invasive haemodynamic analysis of Visceral organ
5. Analysis of therapeutic effect of molecular targeting therapy
6. Fundamental research of Functional MR contrast agent

TAKEMURA Akihiro, Professor

1. Effects of setup errors obtained in image guided radiation therapy to dose distribution
2. Research of medical image processing and image registration method
3. Research on gel dosimeters for radiotherapy
4. Research related to radiotherapy

MATSUBARA Kosuke, Professor

1. Radiation dose analysis of patients and healthcare workers from diagnostic and interventional imaging procedures
2. Monte Carlo simulations for radiation dose assessment
3. Research on radiation protection and radiation safety management in medical facilities
4. Development of quality control technologies for diagnostic imaging equipment

Field of Molecular Biology for Laboratory Medicine

INAZU Akihiro, Professor

1. Anti-atherogenicity of CETP deficiency
2. Molecular genetics of combined hyperlipidemia of VLDL, LDL and HDL
3. Lipid lowering, HDL elevating therapy

OKAMOTO Shigefumi, Professor

1. Molecular microbiological study for pathogenicity of pyrogenic group of streptococci
2. Metagenomic study for exchange of microbiome in a host (dysbiosis) and influence of the dysbiosis on the health disorders and an onset of diseases
3. Epidemiological study for the influence of poor oral hygiene and oral frailty on the onset of aspiration pneumonia

Field of Laboratory Oncology

HONDA Masao, Professor

1. Prevention of liver cancer from non-alcoholic steatohepatitis (NASH)
2. Mechanism and etiology of NASH
3. Molecular biology of hepatitis B virus (HBV)

SAKURAI Hiroshi, Professor

1. Molecular biology of cell cyclecontrol
2. Studies on mechanisms of stress response

MORISHITA Eriko, Professor

1. Mechanism of thrombosis in arteriovascular disease
2. Genetic analysis and expression studies in congenital coagulation factor deficiencies and coagulation inhibitor deficiencies

Graduate Course of Rehabilitation Science

Field of Impairment Analysis

HOSO Masahiro Professor

1. Pathological study of the musculoskeletal disorder
2. Relationship between body balance and social and cultural factors
3. Human pathology

ASAI Hitoshi, Professor

1. Functional role of pressure sensation from the sole on standing postural control
2. Perception of standing position and somatosensory

YAMAZAKI Toshiaki, Professor

1. Prevention of disuse muscle atrophy

MIAKI Hiroichi, Professor

1. Prevention of sports injuries
2. Methods of muscle function evaluation
3. Exercises for muscle preferential activation

Field of Human Ability and Recovery Science

●SOMEYA Fujiko, Professor

1. Effect of exercise on cardiorespiratory disease
2. Effects of fatigue on physical properties

●SHOSAKU Takako, Professor

1. Modulations of the synaptic transmission

SHIBATA Katsuyuki, Professor

1. Kinematics and motion analysis during activities of daily living
2. Study on splinting for the upper extremity and finger disability

NISHIMURA Seiji, Professor

1. Rehabilitation and Biomechanics of the Hand
2. Development of the orthosis and training instrument of the hand
3. The evaluation of the upper limbs and the trunk function in the activities of daily living, and development of the welfare instrument

GRADUATE SCHOOL OF ADVANCED PREVENTIVE MEDICAL SCIENCES

DIVISION OF ADVANCED PREVENTIVE MEDICAL SCIENCES

In the Division of Advanced Preventive Medical Sciences, for the purpose of nurturing specialists capable of practicing "advanced preventive medicine" aiming at personalized prevention by comprehensively covering from zero prevention to tertiary prevention, exhaustively analyze and evaluate the characteristics of individuals and the environment from omics information to macro environment information as a new methodology based on the conventional hygiene and public health fields, we are seeking the following students.

- Those with a wide range of perspectives and creativity, autonomy, ethics, strong interest in human health and motivation for research
- Those who wish to practice "Personalized Prevention" based at his/her workplace, accumulating experience at workplace such as a medical site or a health administration office, etc. as working adults

As a basic policy of selection, we comprehensively judge and select whether you have sufficient qualifications to acquire advanced knowledge and skills. We will judge "whether you have fundamental knowledge and English ability related to human health". Also, in the interview, we confirm "whether you have basic qualifications necessary for this joint division."

Division of Body Systems

Nuclear Medicine and Molecular Imaging

TAKI Junichi, M.D. & Ph.D., Associate Professor

1. Pre-clinical investigation of targeted radiotherapy and its clinical application
2. 1-131-MIBG therapy for neuroendocrine malignancies
3. Assessment and prediction of therapeutic responses of tumors with radiotracers
4. Functional assessment of the heart and brain with multimodal images

Molecular Genetics

HIRAO Atsushi, M.D. & Ph.D., Professor

1. Molecular mechanisms of stem cell self-renewal
2. Molecular mechanisms of tumor suppression regulated by cell cycle check point system
3. Identification of cancer stem cells

Genetics

OSHIMA Masanobu, D.V.M. & Ph.D., Professor

1. Mechanism for malignant progression
2. Tumor microenvironment for cancer development
3. Analyses using human cancer tissues

Nephrology and Laboratory Medicine

HARA Akinori, M.D. & Ph.D., Associate Professor

1. Establishment of novel mechanisms involved in development, progression, remission and regression of kidney diseases and diabetic complications
2. Application of newly developed methods for clinical nephrology and other aspects
3. Approach to elucidate immune status of the host with hepatocellular carcinoma using gene expression profile of blood cells

System Biology

KANEKO Shuichi, M.D. & Ph.D., Professor

1. Molecular pathology in obesity and diabetes
2. Clinical research for diabetes and its complications
3. Gene and protein expression profiling and genome sequencing of gastrointestinal and metabolic diseases
4. Molecular basis of interferon treatment of chronic hepatitis and prevention of hepatocellular carcinoma
5. Molecular analysis of hepatocarcinogenesis and the prevention research

Preventive Cardiovascular Medicine

TADA Hayato, M.D. & Ph.D., Assistant Professor

1. Genetic analyses for dyslipidemia using next generation sequencer
2. Assessment of atherosclerotic disease using coronary angiography and coronary computed tomography
3. Genotype-Phenotype association study
4. Prediction of atherosclerotic diseases using genotypic information

Division of Metabolism

Physiology and Metabolism

INOUE Hiroshi, M.D. & Ph.D., Professor

1. Regulation of organ interaction to maintain hepatic energy metabolism
2. Investigation of the crosstalk between the cell proliferation and cell metabolism in the liver
3. Therapeutic development for hepatic energy disorders by the application of mechanism of the CNS/liver crosstalk

Metabolism and Nutrition

YAMASHITA Tatsuya, M.D. & Ph.D., Associate Professor

1. Research into liver diseases relevant to nutrient metabolism disorders and lifestyle-related diseases
2. Research into public health interventional measures for liver diseases
3. Research into chronic liver diseases and liver cancers in West-Pacific region

Pharmacokinetics and Toxicology

NAKAJIMA Miki, Ph.D., Professor

1. Identification and characterization of drug-metabolizing enzymes
2. Inter- or intra-individual variability of drug metabolism
3. Regulation of drug-metabolizing enzymes by microRNA
4. MicroRNA as biomarkers for drug response and toxicity
5. Reactive metabolites associated with drug adverse events

Endocrinology and Metabolism

TAKAMURA Toshinari, M.D. & Ph.D., Professor

1. Hepatokine-mediated networks among insulin-targeting organs to make pathophysiology of diabetes/obesity and its complications.
2. Molecular pathology and clinical research in diabetes/obesity and its complications.
3. Cross-talks among glucose-, protein-, and lipid-metabolism pathways to keep energy homeostasis

Bioinformatics and Genomics

TAJIMA Atsushi, Ph.D., Professor

1. Genetics and genomics of complex human diseases
2. Epigenomics of health and disease in human populations and model organisms
3. Bioinformatics for integrative genomics and epigenomics analysis

Division of High-Order Functions

Molecular Immunology

KURACHI Makoto, M.D. & Ph.D., Professor

1. Molecular immunology and biology
2. Molecular mechanism of T-cell memory and exhaustion
3. Molecular mechanism of antiviral factors
4. Physiological and pathological role of deaminase super family

Preemptive Medicine for Dementia

HAMAGUCHI Tsuyoshi, M.D. & Ph.D., Associate Professor

1. Nakajima Project --- In the population-based cohort study, investigating the correlation between lifestyle and the prevalence of dementia since 2006 among the residents of Nakajima town
2. Rosmarinic Acid Project --- Examining the preventive effects of *Mellisa officinalis* extracts containing rosmarinic acid (polyphenol), which is expected to have anti-aggregation effect of amyloid β protein ($A\beta$)

Immune Defense

HANAYAMA Rikinari, M.D. & Ph.D., Professor

1. What are the molecular mechanisms of exosome secretion?
2. What are the physiological functions of exosomes?
3. How do exosomes travel from secretory cells to the target cells *in vivo*?

Functional Anatomy

OZAKI Noriyuki, M.D. & Ph.D., Professor

1. Mechanisms of inflammation and neuropathic pain occurred in various parts of the body such as skin, viscera, muscle, joints, etc.
2. Development of novel animal model of functional pain disorders such as Functional Dyspepsia and myofascial pain syndrome
3. Neuroanatomy and physiology of somatic and visceral pain systems

Musculoskeletal Disease Control

TSUCHIYA Hiroyuki, M.D. & Ph.D., Professor

1. Development of the antibacterial custom-made prosthesis
2. Identification and analysis of characteristics of cancer stem cell in osteosarcoma
3. Analysis of anti-tumor effect PPAR γ in giant cell tumor of bone and soft tissue
4. Muscle-skeletal regenerative medicine with adipose-derived stem cell
5. Novel antibody therapy for osteosarcoma

Division of Microbiology and Environment

Viral Infections and International Health

ICHIMURA Hiroshi, M.D. & Ph.D., Professor

1. Viral and host factors associated with disease progression in HIV-infected children
2. Molecular epidemiology of drug-resistant HIV
3. Impact of ART on the immune status of HIV-infected children
4. Role of HBV and HCV co-infections in AIDS progression
5. Impact of HIV infection of the other infectious diseases

Parasitology

TOKORO Masaharu, M.D. & Ph.D., Associate Professor

1. New strategy for the development of chemotherapeutic drugs against *Cryptosporidium* infection
2. Study of intra-species diversity in *Giardia intestinalis*
3. Genetic diversity of clinical isolated *Acanthamoeba* spp. from keratitis cases in Japan
4. Comprehensive identification method: Utilization of molecular taxonomy for identification of pathogenic/non-pathogenic protozoan parasites
5. Genetic identification of various trichomonads species isolated from humans and related mammals in Indonesia

Public Health

NAKAMURA Hiroyuki, M.D. & Ph.D., Professor

1. The innovative methods using new concept of “super-preventive medicine”, which compasses preventive methods in all levels of the 0th, 1st, 2nd and 3rd dimensions
2. Interactions between genetic and environmental factors in etiology of lifestyle-related diseases, and allergic disorders and epigenetics
3. The effect of environmental chemicals and Asian dust on allergic diseases
4. Epidemiology of development of health behavior and dietary habit in children
5. Health economics epidemiology towards the optimization of the cost for the expenses for medical and long-term care with a focus on the analysis of factor influencing QOL and disease structure in the elderly

Commensal Microbiology

TAKATORI Hajime, M.D. & Ph.D., Assistant Professor

1. Dysbiosis in patients of chronic liver disease and liver cirrhosis
2. Dysbiosis in liver cancer patient and mechanisms underlying causal relationship among gut flora and carcinogenesis
3. Dysbiosis in pancreatic cancer patients
4. Dysbiosis in inflammatory bowel disease patients
5. Mucosa-adhering flora and inflammatory bowel disease

Hygiene

DEMURA Masashi, M.D. & Ph.D., Associate Professor

1. Molecular mechanisms underlying adaptation to environment and regulation of signal transduction
2. Alternation in gene regulation according to proliferation, differentiation, again, carcinogenesis, etc.
3. Function of epidermis, hair and appendages as a barrier
4. Molecular mechanisms of intoxication/detoxication against environmental pollutants
5. Alcohol and drug abuse; Molecular mechanisms developing tolerance, addiction, etc.

Global Health

ISHIZAKI Azumi, M.D. & Ph.D., Associate Professor

1. Our laboratory conducts the research and practical activities for solving the problems in the global health field from the aspect of health sector administration through participating various overseas projects
2. We introduce the scenes of project activities and encourage students bearing the future of Japan to jump into the global contribution activities by international organization such as WHO, UNICEF and JICA for making Japanese sympathizers globally