

[List of Research Supervisor Groups]

Choose your prospective research fields from the list below and write the names in the “Prospective research fields (supervisors)” section on the application form. You can choose up to three research fields.

As a general rule, you will be assigned to a research group during the process of selecting students for admission, so please choose carefully. It is hard to determine the exact details of your prospective group’s research solely from the research themes listed below. In order to avoid having to write your Master’s thesis on a research theme different from what you had in mind, please contact the supervisor of your preferred fields or ask the contact person below for guidance about your choice. We also accept applicants who wish to decide which research group to join after they are admitted to the graduate school. In this case, write “To be determined” in the “Prospective research fields (supervisors)” section. Please note that at the time of admission you may not be accepted to a research group which received many applications.

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Medical Sciences Basic Medicine		
Research Area	Faculty	Research
Anatomy and Embryology	TAKAHASHI Satoru	<ul style="list-style-type: none"> ① Elucidation of molecular mechanism of pancreatic beta-cell development and its application. ② Functional analysis of large Maf transcription factor family, MafB and c-Maf in macrophage development and functions. ③ Elucidating biological roles of carbohydrates using glycosyltransferase conditional KO mice. ④ Study of diseases and drug discovery by development of novel imaging system.
Neurobiology	SHIGA Takashi	<ul style="list-style-type: none"> ① Roles of monoamines in the synapse formation ② Effects of environmental factors on the development of brain and behavior ③ Molecular mechanisms underlying the axon guidance ④ Effects of gravitational stress on the brain
Diagnostic Pathology	NOGUCHI Masayuki	<ul style="list-style-type: none"> 1. Study about molecular mechanisms of multistep carcinogenesis including precancerous or background lesions. 2. Applied medicine for prevention, early diagnosis and therapy of carcinoma based on the genome abnormalities detected in early carcinoma. 3. Application of fetal protein to cancer diagnosis and therapy.
Experimental Pathology	KATO Mitsuyasu	<ul style="list-style-type: none"> ① Roles of Transforming Growth Factor-β- related molecules in cancer development ② Cell division kinetics of cancer stem cells by application of three-dimensional quantitative analysis and live imaging ③ Development of anti-cancer drugs using macrocyclic peptides screening

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Kidney and Vascular Pathology	NAGATA Michio	①Mechanism of kidney diseases progression ②Podocyte biology and glomerular diseases ③Glomerular cross-talk signals ④Renal vasculogenesis
Systems Neuroscience	SHIDARA Munetaka	①Brain information processing mechanism of motivation and reward expectancy ②Research on reinforcement learning and decision-making mechanism in the brain ③Research on visual recognition mechanism in the brain ④Brain mechanism on emotional and social interaction ⑤Brain mechanism on time perception in decision-making
Cognitive and behavioral Neuroscience	MATSUMOTO Masayuki	①Roles of monoamine systems in cognitive, emotional and motivational brain functions ②Brain mechanisms underlying value-based decision making
Neurophysiology	KOGANEZAWA Tadachika	①Study on the neural regulation of the cardiovascular system ②Study on the neural regulation of the respiratory system ③Study on the neural regulation based cardiovascular and respiratory diseases
Behavioral Neuroscience and Behavioral Neuroendocrinology	OGAWA Sonoko	①Neuroendocrine basis of emotional and social behavior ②Role and molecular mechanisms of estrogen receptors in the regulation of brain functions and behavior ③Brain mechanisms of sexual differentiation in behavior and genetic and environmental modulation ④Behavioral neuroscience of functional organization of the hippocampus and amygdala
Biochemistry, Molecular Cell Biology	IRIE Kenji	①Post-transcriptional regulation of gene expression by RNA-binding proteins ②Molecular mechanism of mRNA localization and local translation regulating cell polarity, asymmetric cell division, and cell-fate ③Regulation of endoplasmic reticulum stress response ④Prosopore membrane formation by vesicle docking ⑤Autonomous regulations in exocrine cells
Biochemistry, Gene Regulation	HISATAKE Koji	①Molecular mechanisms of iPS cell induction ②Differentiation mechanisms of adipocyte ③Molecular basis of epigenetics ④Chromatin modifications and transcriptional regulation

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Physiological Chemistry	KANAHO Yasunori	①Physiological functions of the small G protein Arf6 ②Diseases caused by the disruption of signal transduction ③Studies on cellular signaling pathways regulating cell morphogenesis ④Development of novel anti-cancer drugs targeting signal transduction systems
Molecular Neurobiology	MASU Masayuki	①Molecular studies on neural development and neural circuit formation ②Molecular studies on signal transduction in the nervous system ③Molecular studies on heparan sulfate and lipid mediators in signal transduction
Molecular Virology	KAWAGUCHI Atsushi	①Molecular mechanism of virus replication and pathogenicity ②Dynamics of chromatin remodeling and its function ③Chromosome translocation and tumorigenesis ④Molecular mechanism of innate immunity
Immunology	SHIBUYA Akira	①To reveal host defense mechanisms against cancer and infectious diseases, and to develop their therapeutic manipulation ②To reveal cellular and molecular basis of allergy and autoimmune diseases, and to develop their therapeutic manipulation
Medical Genetics	NOGUCHI Emiko	①Identification of the susceptible genes related to allergic diseases ②Genetic analysis using next generation sequencer
Molecular and Genetic Epidemiology	TSUCHIYA Naoyuki	①Genomic analysis of human autoimmune rheumatic diseases for the identification of susceptibility genes and biomarkers ②Molecular mechanisms of autoimmune disease-associated genes
Regenerative Medicine and Stem Cell Biology	OHNEDA Osamu	①Elucidation of differentiation and proliferation mechanisms of ESCs and / or tissue stem cells ② Functional analysis of hypoxia inducible transcription factors in vivo ③Development of cell therapy using stem cells ④Functional analysis of tumor vessel
Stem Cell Biology and Biotechnology	NISHIMURA Ken	①Functional analysis of transcription factors during cell reprogramming ②Epigenetic regulation during cell reprogramming ③Safe and efficient production of differentiated tissue cells

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Laboratory Animal Science	SUGIYAMA Fumihiro	①Development of new technology for producing genetically modified mice. ②Development of genetically modified mice for analyzing biological function.
Medical Physics	SAKAE Takeji	①Development of techniques for high precision proton therapy ②Development of dose calculation system for neutron capture therapy ③Application of techniques for photon therapy ④Quality assurance of radiation therapy ⑤Development of new techniques for radiation measurement ⑥Study for radiation protection ⑦Basic research for acquiring information of biological function with image diagnostic techniques
Radiation Biology	TSUBOI Koji	①Biological effects of proton beams on normal and cancer cells ②Radiation induced cell death and activation of tumor immunological reactions ③Particle beam induced DNA damage and repair
Environmental Biology	KUMAGAI Yoshito	①Environmental chemicals-mediated modulation of signal transduction pathways and its regulation ②Initial response and cellular protection against environmental chemicals
Molecular Biology	FUKAMIZU Akiyoshi	①Metabolism-regulated longevity (cells·C. elegans) ②Pregnancy-associated hypertension (genetic model mice) ③Epigenetics and gene regulation (cells·C. elegans·genetic model mice) ④Methylation and neural function (cells·C. elegans·genetic model mice)
Developmental Genetics	NIWA Ryusuke	①Studies on neuro-endocrine systems to adaptively control developmental processes in response to environmental conditions ②Molecular and developmental genetics of steroid hormone biosynthesis ③Chemical biology for developing pesticides
Biomaterials Science	NAGASAKI Yukio	①Design of Nanomedicine ②Design of Drug Delivery System ③Design of Materials for Degenerative Medicine ④Design of Biointerfaces

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Neuroscience	YANAGISAWA Masashi HUNATO Hiromasa	Our lab aims at solving the mystery of sleep ①Identification of new genes involved in sleep/wake regulation through a large-scale screening of randomly mutagenized mice ②Medicinal chemistry to develop new drug for sleep disorder ③Visualization of neural and glial cell activity during sleep/wakefulness behavior
Sleep learning science	SAKAGUCHI Masanori	①The mechanisms of circuit integration of new neurons for brain regeneration ②Function of sleep in integration of new born neuron into memory circuits ③Function of sleep in memory consolidation revealed by optogenetics
Brain maturation/ evolution	HAYASHI Yu	①Elucidation of the function of sleep focusing on brain maturation and aging ②Elucidation of the evolutionary process of sleep based on molecular and developmental approaches
Systems Sleep Biology	LAZARUS Michael	①Role of adenosine and dopamine in sleep-wake regulation ②The mesolimbic brain system in the control of sleep and wakefulness ③Motivated behavior as a sleep-regulating factor
Medicinal Chemistry , Organic Chemistry	NAGASE Hiroshi KUTSUMURA Noriki	①Design and synthesis of orexin receptor agonists ②Design and synthesis of opioid receptor agonists and antagonists ③Elucidation of pharmacologies of orexin and opioid
Microbiology	MORIKAWA Kazuya	①Strategy for infection and stress response mechanism in pathogenic bacteria ②Regulation mechanism of innate immune responses in host
Molecular and Developmental Biology	KOBAYASHI Makoto	①Molecular basis of cell fate determination in hematopoiesis and organ formation ②Molecular basis of cellular defense mechanisms against oxidative and endoplasmic reticulum stresses ③Gerontological study using zebrafish ④Toxicological study using zebrafish
Occupational psychiatry/Space psychiatry	MATSUZAKI Ichiyo	①A study of the strong qualities unexpectedly in space ②Salutogenesis and Sense of coherence

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Vascular Matrix Biology	YANAGISAWA Hiromi	① Identification and functional analysis of novel extracellular matrix proteins in the vessel wall ② Investigation of matricellular proteins involved in the maintenance of vessel wall integrity ③ Phenotypic analysis of mutant mice with vascular diseases ④ Molecular mechanism of mechanotransduction in the vessel wall ⑤ Mechanism of renal calcification
Molecular Genetics (RIKEN)	ISHII Syunsuke	① Mechanism of cancer formation ② Reprogramming of somatic cells ③ Epigenetic regulation by stress ④ Transcription factors regulating development and differentiation
Glycobiology (AIST)	NARIMATSU Hisashi	① Discovery of glycol-biomarkers for cancer ② Biological function of glycans in immunity ③ Biological function of glycans in infectious diseases ④ Diagnosis and treatment for IgA nephropathy ⑤ Analysis of glycan functions using knock-out Mice ⑥ Development of technology for glycans structural analysis

Clinical Medicine		
Research Area	Faculty	Research
Nephrology	YAMAGATA Kunihiro	①Mechanism of chronic progressive kidney diseases ②Method of early diagnosis and prevention of kidney diseases ③Approach to treatment of progressive kidney diseases ④Epidemiology of acute kidney injury and chronic kidney disease ⑤Outcome research of lifestyle diseases
Clinical Immunology and Rheumatology	SUMIDA Takayuki	1) Molecular mechanism in autoimmune diseases such as rheumatoid arthritis and connective tissue diseases 2) Specific regulation of autoimmune diseases 3) Approach to genetic therapy and disease-specific iPS cells therapy in autoimmune diseases
Hematology	CHIBA Shigeru NINOMIYA Haruhiko	①Mechanism of leukemogenesis/lymphomagenesis ②Mechanism of bone marrow failure ③Translational research on stem cell therapy ④Megakaryocyte and platelet production ⑤Laboratory hematology for hematopoietic disorders
Medical Oncology and Gastroenterology	HYODO Ichinosuke	①Basic and clinical research on medical oncology ②Development of molecular targeted agent and novel therapy
	YANAKA Akinori	①Pathophysiology of H.pylori and NSAIDs-related GI disorders ②Studies in chemoprevention against GI cancers
Pulmonary Medicine	HIZAWA Nobuyuki	Molecular genetics of chronic inflammatory lung diseases including asthma and COPD
	SATOH Hiroaki	①Study of chemotherapy for lung cancer ②Clinical application of carbohydrate antigens for respiratory diseases
Pulmonary medicine, infection, and allergy	ISHII Yukio	①Elucidation of cellular and molecular mechanisms of pulmonary host responses to environmental stimuli, including cigarette smoke, antigens, chemical carcinogens, and microorganisms. ②Exploring the bio-markers in inflammatory and allergic lung diseases.

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Cardiology	AONUMA Kazutaka MIYAUCHI Takashi KOIKE Akira HONMA Satoshi	① Establishment of mechanism and treatment of arrhythmia ② Establishment of evaluation of hemodynamics ③ Establishment of new treatment strategy of heart failure ④ Relation between arteriosclerosis and endothelial function ⑤ Exercise physiology and cardiac rehabilitation in cardiac patients ⑥ Medical quality assurance and risk management
Metabolism and Endocrinology	SHIMANO Hitoshi	① Molecular understanding of diabetes, dyslipidemia, obesity and insulin resistance ② Molecular mechanism and gene therapy for atherosclerosis ③ Making of pathological animal models by gene engineering ④ Sensing mechanism and transcriptional regulation of energy metabolism ⑤ Hub-metabolites and epigenetic regulation in carbohydrate, lipid, and protein metabolism ⑥ Brain fatty acid metabolism and higher brain functions ⑦ Regenerative medicine for pancreatic beta cells ⑧ Physiology and pathophysiology of different organs in the quality aspect of fatty acids ⑨ Novel approach to life-related diseases by nano-technology
Neurology	TAMAOKA Akira	① Molecular pathogenesis of Alzheimer's disease ② Pathology and biochemistry of neuromuscular disorders ③ Neurobiology of degenerative disorders ④ Neuro-ophthalmology of neurological disorders ⑤ Clinical and epidemiological studies of organoarsenic intoxication
General Thoracic Surgery	SATOH Yukio	① Thoracoscopic surgery for lung cancer ② Multimodality therapy for lung cancer ③ Genetic alterations of lung cancer ④ Multimodality therapy for mediastinal tumor ⑤ Multimodality therapy for pleural mesothelioma ⑥ Mechanism of acute lung injury

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Cardiovascular Surgery	HIRAMATSU Yuji	<ul style="list-style-type: none"> ①Development of novel microangiography system using synchrotron radiation ②Elucidation of signal transduction in aneurysmal formation ③Elucidation of hematological deterioration during cardiopulmonary bypass ④Study of ischemic myocardial remodeling using knockout mice ⑤Development of novel tissue crosslinking treatment technology ⑥Development of vitamin K-reduced functional food ⑦Development of valve simulation technology ⑧Exploration of valve-sparing right ventricular outflow reconstruction ⑨Study in rehabilitation medicine in reduced venous return ⑩Regulation of gaseous microemboli in cardiopulmonary bypass ⑪Regenerative medicine using stem cells ⑫Production of 3D heart replicas.
Pediatric Surgery	MASUMOTO Koji	<ul style="list-style-type: none"> ①Bioengineered tissue transfer in infants and children ②Studies related to carcinogenesis and progression of malignant solid tumors in children ③Pathological, molecular biological and genetic studies of the alimentary tract malformations ④Studies of treatment for hypoplastic lungs in congenital diaphragmatic hernia

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Organ Transplantation	OHKOHCHI Nobuhiro	1) Platelet and regenerative medicine: To clarify the mechanisms of liver regeneration by platelet function and aging platelet. 2) Drug delivery system : To investigate the mechanisms of liver injury and to develop a method of prevention by the use of a novel DDS. 3) Surgical metabolism and wound healing: To develop a novel treatment for minimizing intestinal damage under surgical stress. 4) Multipotential stem cells and regenerative medicine: To develop a gastroenterological tissue or organ bud in micro-environment with placental or/and other tissue derived stem cells for transplantation trials. 5) CancerComprehensive elucidation of cancer genesis and metastasis by analyzing cancer stem cells, local microenvironment (incl. fibroblast and platelets), and niche in metastatic site (liver Kuppfer cells, platelets). Paying special interest on cancer specific glyco-proteins, which will confer bran-new therapeutic strategy that specifically target cancers by glycan-lectin interaction: 6) Computer assisted Surgery (CAS): To develop and apply the system of the CAS and the novel surgical education system through the medical-engineering collaboration.
Neurosurgery	MATSUMURA Akira	Neurooncology Research Unit 1) Boron Neutron Capture Therapy, Proton Therapy 2) Immunotherapy, Antiangiogenic therapy, Molecular targeted therapy, Viral therapy Neuroradiology Research Unit 1) Magnetic resonance Imaging; f-MRI, MRS, DTI, intraoperative MRI 2) Molecular Imaging; PET, SPECT Cerebrovascular Disease Research Unit 1) Cerebral Protection using stem cells, Nanoparticles, Nanocomposite 2) Neurorehabilitation using HAL robot and other BMI Modalities Intraoperative Monitoring 1) Neurophysiological monitoring (SEP, MEP, etc) 2) Intraoperative MRI
Control of the Musculoskeletal System	YAMAZAKI Masashi	Clinical and basic research on following themes: ①Treatment of spinal disorders ②Treatment of joint disorders ③Sports medicine ④Regeneration of peripheral nerve

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Urology	NISHIYAMA Hiroyuki	①Cancers of genitourinary system ②Urodynamics ③Andrology ④Urolithiasis ⑤Urinary tract infection
Ophthalmology	OSHIKA Tetsuro	①Visual science ②Visual optics ③Minimally invasive ocular surgery ④Vision-related quality of life
Otology & Equilibrium Research	HARA Akira	Study on theories and methods for pathophysiological, electrophysiological and biochemical research in otology and cochleoneural path way.
Oral and Maxillofacial Surgery	BUKAWA Hiroki	①New development of biological marker for oral cancer (p63 and GNT-V) ②Research for clinical diagnosis and treatment of oral cancer using microRNA (miR203, miR155, miR205 and let-7) ③Regenerated research using dental pulp stem cell ④Research for oral bacterial flora involved internal medical disease (NASH, NAFLD and diabetes mellitus)
Psychiatry	ARAI Tesuaki	①Molecular neuropathology of neurodegenerative disorder ②Epidemiological study of dementia ③Neuroimaging of neuropsychiatric disorders
Molecular Embryology and Child Development	SUMAZAKI Ryo	①Developmental biology of pancreas, liver and bile duct for regenerative medicine ②Molecular mechanism of metabolic diseases through childhood ③Development of animal models for metabolic diseases using the embryo engineering technologies
Obstetrics and Gynecology	SATOH Toyomi	Basic and clinical researches about diagnosis, treatment, and prevention of diseases/disorders in the field of obstetrics and gynecology are conducted. Major subjects are gynecological malignancy, infertility, reproductive endocrinologic disorder, fetal genetic disease/malformation, fetomaternal infection, maternal, natal, and puerperal complications, menopausal disorders, etc. On-going studies include cervical cancer prevention, molecular biology of gynecological cancers, novel therapeutic strategies for gynecological cancers, thromboembolism, prenatal diagnosis, fetal gene therapy, pregnancy-induced hypertension-related genes, fetal magnetocardiography, etc.

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Diagnostic Radiology	MINAMI Manabu	<ul style="list-style-type: none"> ①New development of diagnostic imaging method using 3-dimensional CT data: esp. virtual endoscopy ②Flow analysis of the liver using angio-CT method ③Research on radiologic-pathologic correlation in various organs
Radiation Oncology	SAKURAI Hideyuki	<ul style="list-style-type: none"> ①Research for radiosensitivity, and improvement of radioresistance ②Radiation treatment planning using multimodality imaging ③New cancer therapy using particle radiation therapy
Anesthesiology	TANAKA Makoto	<ul style="list-style-type: none"> ①Effects of anesthetics and anesthetic techniques on arterial baroreflex function ②Genetic polymorphism of opioid receptor in humans ③Research on basic mechanisms of pain perception ④Effects of anesthetics and age on Bispectral Index
Clinical laboratory medicine	KAWAKAMI Yasushi	<ul style="list-style-type: none"> ①Molecular understanding of the endocrine tumor and apoprotein. ②Molecular analysis of the cell proliferating factor. ③Molecular understanding of the hormone synthesis and secretion.
Molecular Sportology	SHODA Junichi	<ul style="list-style-type: none"> ①Development of novel exercise training for obese subjects with life style-related diseases ②Imaging analysis of organ lipid accumulation in obese subjects with life style-related diseases ③Development of glycobiomarkers for obesity and life style-related diseases ④Development of novel animal models for obesity and life style-related diseases ⑤Exercise-induced activation of antioxidative streass systems ⑥Understanding of exercise-induced inhibitory mechanism against carcinogenesis
	TAKEKOSHI Kazuhiro	<ul style="list-style-type: none"> ①Personalized treatment for exercise through using genetic infomation ②Research for anti-doping ③Exercise and hormone, especially catecholamine ④Exercise and stress marker, especially salivary Chromogranin A (collaborated with Prof. Omori)

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Pharmaceutical Sciences	HONMA Masato	①Gene Polymorphism analysis for assessing drug metabolizing enzymes and transporters ②Therapeutic drug monitoring for assessing drug efficacy and adverse reactions. ③Pharmacokinetic analysis of Kampo-medicine (Japanese herbal remedies)
Emergency and Critical Care Medicine	INOUE Yoshiaki	①Molecular biology of septic shock and shock ②Molecular biology of acute respiratory distress syndrome and multiple organ failure ③Molecular biology of clinical toxicology ④Molecular biology of delirium
Clinical Research and Regional Innovation	HASHIMOTO Koichi	①Development of effective prevention treatment for lifestyle-related diseases ②Regional innovation through clinical research network ③Education of experts of integrative celerity research process for translational researches ④Development of practical management of technology ⑤Construction of seamless platform for translational research
Primary Care and Medical Education	MAENO Tetsuhiro	①Clinical research in primary care ②Development of community-based medical System ③Health promotion in the community ④Clinical medical education
Biomaterials and Tissue engineering (NIMS)	TANIGUCHI Akiyoshi	①Sensing technology for nano-biomaterials ②Tooth development and regeneration

Public Health / Human Care Science		
Research Area	Faculty	Research
International Community Care and Lifespan Development: Empowerment Sciences	ANME Tokie	①Community empowerment ②Plasticity of lifespan development and implications ③System sciences for health social services
Gerontological Nursing & Caring	MATSUDA Hitomi	①The physiological effect of a narrative care for the elderly ②Adjustment of a life rhythm for the elderly with dementia ③QOL of the family caregiver ④Infection control for the elderly
	HASHIZUME Yumi	①Gender issues and Japanese family Caregiving, Interpersonal support for the middle-aged couple ②Qualitative research method (Grounded theory approach)
Health Services Research	TAMIYA Nanako	①Health Services Research (especially older people and children) ②Cooperation of medical care and welfare in the local community ③Policy evaluation of the long-term care insurance system ④Study for the improvement of the quality of in-home care and facility care for older people and people with disability ⑤Public Health based on legal medicine (older people, child abuse, solitary death, actual state of service-related death, etc.)
Epidemiology	WAGATSUMA Yukiko	①Principles and methods in epidemiology and their applications ②Medical statistics and medical information science ③Epidemiology for diseases ④Sociological survey in the field of medicine ⑤Methods of clinical trials ⑥Strategy to control diseases in developing countries
Social Psychiatry & Mental Health	SAITO Tamaki	①Asocial problem behaviors in childhood and adolescence ②Development disorder and maladaptation ③Rehabilitation of people with mental disorder
	MORITA Nobuaki	①Mental health of victims, Psychotherapy ②Intervention and treatment for family violence (Child abuse, Domestic violence, alder abuse and parent abuse by children) ③Recovery of addiction (Substance use disorder, Pathological gambling and internet dependence) ④Forensic psychiatry, Criminology

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Forensic Medicine	HONDA Katsuya	①Research on forensic DNA testing ②Mitochondrial DNA polymorphism ③Studies on the toxicological mechanism of xenobiotics ④Research of molecular autopsy on sudden unexpected death
Global Public Health	ICHIKAWA Masao	①Global health research ②Community design & health ③Injury prevention & control
Medical Science and Welfare	YANAGI Hisako	①Preventive medicine for non-communicable diseases and frailty, Medical welfare for elderly ②Genetic counselling, Bioethics
Health care policy and Health economics	OKUBO Ichiro	1. Research on health care policies 2. Research on health and clinical economics 3. Research on evaluation of health care services
	KONDO Masahide	1. Research on demand for health care 2. Economic evaluation of health care 3. Research on financing health system
Livelihood Support Science	TOKUDA Katsumi	①Child care and guardians' support ②Beggars with disabilities ③Cemetery, graves and tombs
	MIZUNO Tomomi	①Barrier-free ②Child care and guardians' support ③Understanding persons with special needs