

# Graduate School of Comprehensive Human Sciences

## Degree Programs in Comprehensive Human Sciences

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 two 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. To avoid writing your master’s thesis on a different research topic from the one you had in mind, be sure to contact the supervisor in the field of your choice. Also, if you have any questions, please consult with the following person about your choice.

For guidance, contact:

Isobe Tomonori, Chair, Master’s Program in Medical Sciences, Graduate School of Comprehensive Human Sciences, University of Tsukuba

E-mail: [frontier@md.tsukuba.ac.jp](mailto:frontier@md.tsukuba.ac.jp)

<b>Medical Sciences Basic Medicine</b>		
<b>Research Area</b>	<b>Faculty</b>	<b>Research</b>
Anatomy and Embryology	高橋 智 TAKAHASHI Satoru	<ul style="list-style-type: none"> <li>①Elucidation of molecular mechanism of pancreatic beta cell development and its application.</li> <li>②Functional analysis of large Maf transcription factor family, MafB and c-Maf in macrophage development and functions.</li> <li>③Elucidating biological roles of carbohydrates using glycosyltransferase conditional KO mice.</li> <li>④Elucidation of skeletal muscle regulatory mechanisms.</li> <li>⑤Elucidation of etiology and gene function in disease model mice.</li> <li>⑥Elucidation of the mechanism of tissue formation.</li> </ul>
Anatomy and Neuroscience	武井 陽介 TAKEI Yosuke	<ul style="list-style-type: none"> <li>①Animal model studies on synaptic dysfunction in schizophrenia and autism.</li> <li>②Cell-biological studies on synaptic dysfunction in schizophrenia and autism.</li> <li>③Studies on synaptic dysfunction caused by inflammation.</li> <li>④Studies on intracellular transport in neurons and glia.</li> </ul>
Diagnostic Pathology	松原 大祐 MATSUBARA Daisuke	<ul style="list-style-type: none"> <li>①Search for molecular targets of cancer, based on molecular markers and histomorphology, using surgical specimens and cell lines.</li> <li>②Elucidation of the molecular mechanism of abnormal differentiation (dedifferentiation, neuroendocrine differentiation, EMT, gastrointestinal epithelial differentiation, etc.) in lung cancer.</li> <li>③Study of drug sensitivity and resistance acquisition mechanism using cancer cell lines.</li> </ul>

Experimental Pathology	( )	<ul style="list-style-type: none"> <li>①Molecular mechanisms of stemness induction in cancer development</li> <li>②Cell division kinetics of cancer stem cells by application of live imaging and three-dimensional quantitative analysis</li> <li>③Glyco-profile using breast cancer cell lines and patient tissues</li> <li>④Tumor microenvironment research using mouse model</li> <li>⑤3D imaging using a low-vacuum scanning electron microscopy</li> </ul>
Neurophysiology	小金澤 禎史 KOGANEZAWA Tadachika	<ul style="list-style-type: none"> <li>①Study on the neural regulation of the cardiovascular system</li> <li>②Study on the neural regulation of the respiratory system</li> <li>③Study on the neural regulation based cardiovascular and respiratory diseases</li> </ul>
Biochemistry, Molecular Cell Biology	入江 賢児 IRIE Kenji	<ul style="list-style-type: none"> <li>①Post-transcriptional regulation of gene expression by RNA-binding proteins</li> <li>②Molecular mechanism of mRNA localization and local translation regulating cell polarity, asymmetric cell division, and cell-fate</li> <li>③Regulation of endoplasmic reticulum stress response</li> <li>④Prospore membrane formation by vesicle docking</li> </ul>
Molecular and Developmental Biology	小林 麻己人 KOBAYASHI Makoto	<ul style="list-style-type: none"> <li>①Development of hematopoietic cells and globin switching</li> <li>②Anti-aging and dietary antioxidants</li> <li>③Animal models for human diseases and drug safety test</li> <li>④Epigenetic regulation of learning and memory</li> <li>⑤Functions of supersulfides in animal development</li> </ul>
Biochemistry , Gene Regulation	久武 幸司 HISATAKE Koji	<ul style="list-style-type: none"> <li>①Molecular mechanisms of iPS cell induction</li> <li>②Mechanisms of adipocyte and chondrocyte differentiation</li> <li>③Molecular basis of epigenetics</li> <li>④Chromatin modifications and transcriptional regulation</li> </ul>
Cellular and Physiological Biology	大林 典彦 OHBAYASHI Norihiko	<ul style="list-style-type: none"> <li>①Physiological functions of the small G proteins: Rab and Arf</li> <li>②Membrane dynamics research aiming at invasion/metastasis, vascularization and pigmentation</li> </ul>
Molecular Neurobiology	榊 正幸 MASU Masayuki	<ul style="list-style-type: none"> <li>①Molecular studies on neural development and neural circuit formation</li> <li>②Molecular studies on signal transduction in the nervous system</li> <li>③Molecular studies on heparan sulfate in neural function</li> <li>④Development and function of the corticospinal tract</li> <li>⑤Regulatory mechanism of spinal motor nerve development</li> </ul>

Infection Biology (Molecular Virology)	川口 敦史 KAWAGUCHI Atsushi	①Molecular mechanism of virus replication , species specificity and pathogenicity of emerging viruses including influenza virus ②Molecular mechanism of innate immunity
Infection Biology (Bacteriology)	森川 一也 MORIKAWA Kazuya	①Infection strategies in pathogenic bacteria ②Adaptation and evolution of staphylococci
Infection Biology (Molecular Parasitology)	HO KIONG	①Understanding the mechanism of gene expression in protozoan parasites with a goal in identifying parasite-specific processes that can be exploited as targets for novel therapeutic interventions. ②Mechanism of mRNA recapping pathway in regulating gene expression. ③RNA repair - understanding of the function and mechanism behind cellular responses to RNA damage.
Immunology	澁谷 和子 SHIBUYA Kazuko	①To reveal host defense mechanisms against cancer and infectious diseases, and to develop their therapeutic manipulation ②To reveal cellular and molecular basis of inflammation, allergy and autoimmune diseases, and to develop their therapeutic manipulation
Medical Genetics	野口 恵美子 NOGUCHI Emiko	①Identification of the susceptible genes related to allergic diseases ②Genetic analysis using next generation sequencer ③Functional studies of genes involved in allergy.
Molecular and Genetic Epidemiology	川崎 綾 KAWASAKI Aya	①Identification of genomic variants associated with development and clinical characteristics of human autoimmune rheumatic diseases such as systemic lupus erythematosus and ANCA associated vasculitis ②Analysis of genomic “dark region” including <i>HLA</i> and NK receptor family genes to identify variants which account for “missing heritability” in the autoimmune rheumatic diseases
Genome Biology	村谷 匡史 MURATANI Masafumi	①Technology development and application of spatial multi-omics analysis of limited samples. ②Liquid biopsy analysis of environmental stress responses ③Promotion and organization of open science projects in space life sciences
Regenerative Medicine and Stem Cell Biology	大根田 修 OHNEDA Osamu	①Development of Stem Cell Therapy using Mesenchymal Stem Cells ②Functional Analysis of Hypoxia Inducible Transcription Factors in vivo ③Analysis of Cancer Stem Cells and Tumor Stromal Cells ④Regeneration of retinal ganglion cells

Stem Cell Biology and Biotechnology	西村 健 NISHIMURA Ken	①Functional analysis of transcription factors during cell reprogramming ②Epigenetic regulation during cell reprogramming ③Safe and efficient production of differentiated tissue cells
Laboratory Animal Science	水野 聖哉 MIZUNO Seiya	①Development of fundamental genetically modified mice for in-depth gene function analysis ②Development of genome editing technology for producing mutant mice ③Identification of redundant genes using multi-gene mutant mice
Bioinformatics	尾崎 遼 OZAKI Haruka	①Development of technologies to interpret and predict the function of genome sequences: genome (DNA), transcripts (RNA) and AI ②Development of single-cell level omics data analysis techniques: scRNA-seq and spatial transcriptome ③Automation of life science research: automation of experiment planning, experiment execution, and data analysis ④Medical data analysis: Large-scale databases such as hospital data and cohorts, databases
In silico Drug Design and Chemical Biology	広川 貴次 Hirokawa Takatsugu	①In silico drug discovery using molecular modeling and simulation ②Development of the methods based on bio-chem informatics for in silico drug discovery and design
Medical Physics	熊田 博明 KUMADA Hiroaki	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
Molecular Biology	( )	① Metabolism and methylation-regulated aging and longevity (cultured cells・C. elegans) ② Cardiorenal damage in mice with hypertension

Developmental Genetics	丹羽 隆介 NIWA Ryusuke	<ul style="list-style-type: none"> <li>①Studies on molecular mechanisms of cancer cachexia using <i>Drosophila</i> as a model</li> <li>②Mechanisms of interorgan communication in the regulation of development, stem cell proliferation, post-mating responses, and aging</li> <li>③Molecular, cellular, and systemic mechanisms of the interaction between insects and parasitoid wasps</li> <li>④Structural biology and chemical biology of insect growth control agents</li> </ul>
Biomaterials Science	( )	<ul style="list-style-type: none"> <li>①Design of Nanomedicine</li> <li>②Design of Drug Delivery System</li> <li>③Design of Materials for Degenerative Medicine</li> <li>④Design of Biointerfaces</li> </ul>
Legal Medicine	高橋 遥一郎 TAKAHASHI Yoichiro	<ul style="list-style-type: none"> <li>①Development of forensic diagnostic methods based on molecular biological techniques</li> <li>②Elucidation of the mechanisms of metabolism and poisoning of various toxicants</li> <li>③Introduction of machine learning into forensic practice</li> <li>④Research on medical jurisprudence and history of forensic medicine</li> </ul>
International Institute for Integrative Sleep Medicine (WPI-IIS) Yanagisawa/Funato Laboratory	柳沢 正史 YANAGISAWA Masashi	<p>Our lab aims at solving the mystery of sleep</p> <ul style="list-style-type: none"> <li>①Elucidation of the molecular mechanism regulating sleep/wakefulness through a forward genetic approach</li> <li>②Medicinal chemistry to develop new drug for sleep disorder</li> <li>③Visualization of neural and glial cell activity during sleep/wakefulness behavior</li> </ul>
International Institute for Integrative Sleep Medicine (WPI-IIS) Kutsumura/Saitoh Laboratory	沓村 憲樹 KUTSUMURA Noriki	<ul style="list-style-type: none"> <li>①Synthesis of novel biologically active molecules</li> <li>②Research on chemical reactions useful for drug discovery</li> <li>③Elucidation of the mechanism of action of biomolecules</li> </ul>
	齊藤 毅 SAITOH Tsuyoshi	<p>We aim at creating new drugs targeting narcolepsy, insomnia, pain, etc (drug discovery).</p> <ul style="list-style-type: none"> <li>① In silico drug design</li> <li>② Organic synthesis of designed drugs</li> <li>③ Evaluation of novel drugs using cells and mice</li> <li>④ Elucidation of molecular mechanisms of drug adverse effects for the development of side-effect-free drugs</li> </ul> <p>We welcome students from a wide range of fields including organic chemistry, biology, medical science, and informatics.</p>

International Institute for Integrative Sleep Medicine (WPI-IIIS) Sakurai (Takeshi) /Hirano Laboratory	櫻井 武 SAKURAI Takeshi	①Elucidation of physiological roles of novel neuropeptide ②Revealing the neural circuits and neural mechanisms that work in the system that regulates emotion. ③Studies on the neural circuits and neural mechanisms that play roles in the regulation of sleep/wakefulness states. ④Elucidation of neural circuits and mechanisms by which body temperature and metabolisms are regulated.
	平野 有沙 HIRANO Arisa	①Research on oscillatory mechanism of the circadian clock and the effect of disrupted rhythms on mice. ②Elucidation of molecular mechanism of phase-resetting of the circadian clock and circadian photo-reception. ③Identification and functional analysis of neural circuits regulating the circadian rhythms. ④Development of optogenetics tools.
	征矢 晋吾 SOYA Shingo	①Elucidation of neural mechanisms of social distance and behavior ②Uncovering how neuropeptide affects the emotion. ③Revealing the neural circuits that regulate thermal and metabolic regulation in exercise-induced fatigue.
International Institute for Integrative Sleep Medicine (WPI-IIIS) Greene/Vogt Laboratory	VOGT Kasper Manuel	①Measuring and understanding brain activity in waking and sleep ②Determine the effect of sleep on brain circuits ③Discover the control mechanisms for sleep depth ④Develop new technologies and mathematical tools to study sleep function
International Institute for Integrative Sleep Medicine (WPI-IIIS) Sakaguchi Laboratory	坂口 昌徳 SAKAGUCHI Masanori	①Function of sleep in memory ②Function of sleep and adult neurogenesis for memory ③Developing new therapy for PTSD via sound stimulation in sleep <a href="https://sakaguchi-lab.org/">https://sakaguchi-lab.org/</a>
International Institute for Integrative Sleep Medicine (WPI-IIIS) Lazarus/Oishi Laboratory	LAZARUS Michael	① Understanding the link between sleepiness and motivation by exploring mesolimbic glia-neuron interactions ② Sleep circuits as potential therapeutic targets for insomnia ③ Adenosine A2A receptor function in schizophrenia ④ Solving the mystery of immune regulation by sleep with single-cell RNA sequencing Website: <a href="https://iiis-lazarus-oishi-lab.org/">https://iiis-lazarus-oishi-lab.org/</a>
	大石 陽 OISHI Yo	①Sleep regulation by dopamine-related neural circuits ②Sleep mechanisms and functions using short-sleeper mice ③Neural mechanisms of sleepiness explored from antihistamines' effects

International Institute for Integrative Sleep Medicine (WPI-IIIIS) Honjoh Laboratory	本城 咲季子 HONJOH Sakiko	①The dynamics of thalamocortical system across sleep/wake cycles ②Elucidation of neural circuits underlying NREM sleep specific EEG patterns ③Analysis of vigilance state-depedent transcriptional changes ④Elucidation of the function of vigilance-state specific genes in neural activity
International Institute for Integrative Sleep Medicine (WPI-IIIIS) Toda Laboratory	戸田 浩史 Toda Hirofumi	Understanding of the molecular mechanism of how sleep is regulated using Drosophila ①Study of the mechanism of the novel sleep inducing factor ②Study of the neuronal circuit regulating stress-inducing sleep
International Institute for Integrative Sleep Medicine (WPI-IIIIS) Abe Laboratory	阿部 高志 ABE Takashi	①Development of new methods to evaluate human sleep and alertness ②Development of non-invasive methods to improve human sleep and alertness ③Neurobehavioral consequences of sleep deprivation ④Functional roles of human sleep
International Institute for Integrative Sleep Medicine (WPI-IIIIS) Sakurai(Katsu) Laboratory	櫻井 勝康 Sakurai Katsuyasu	①Functional analysis of the sleep related neural circuits ②Functional analysis of the sensory system related neural circuits
International Institute for Integrative Sleep Medicine (WPI-IIIIS) Shi Laboratory	史 蕭逸 Shi Shoi	①Theoretical biology of sleep ②Comparative biology of sleep ③Population level homeostasis in scoial insect, ants
Occupational Psychiatry / Space Psychiatry	( )	①A study of the strong qualities unexpectedly in space ②Salutogenesis and Sense of coherence ③Nature based Rehabilitation
Vascular Matrix Biology (TARA Center)	柳沢 裕美 YANAGISAWA Hiromi	①Identification and functional analysis of novel extracellular matrix proteins in the vessel wall ②Molecular mechanism of aortic aneurysm formation and rupture ③Mechanotransduction in the vessel wall ④Characterization of niche matrix associated with epidermal stem cells
	木村 健一 KIMURA Kenichi	①Molecular mechanism of aortic dissection ②The role of endothelial cells in vascular diseases ③CD73 and mesenchymal stem cells

Clinical Medicine		
Research Area	Faculty	Research
Nephrology	( )	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
Rheumatology	松本 功 MATSUMOTO Isao	①Mechanism of autoimmune diseases and allergy ②Cross talk between human autoimmunity and animal models via translational research ③T-B cell interaction in autoimmune diseases ④Approach to new treatment for suppressing autoimmunity
Laboratory Hematology	小原 直 OBARA Naoshi	①Elucidation of expansion mechanism of clonal hematopoiesis in PNH ②Elucidation of regulatory mechanism of complement activation ③Mechanism of bone marrow failure
Hemato-oncology	坂田 麻美子 Sakata Mamiko	①Bioinformatics using clinical specimens of hematological cancer patients ② Elucidation of molecular mechanisms of hematological cancers by analyzing genetically modified mice ③Cancer immunology regulated by clonal hematopoiesis harboring epigenetic abnormalities
Gastroenterology	土屋 輝一郎 TSUCHIYA Kiichiro	①Basic research about pathogenesis of intestinal epithelial cells in inflammatory bowel disease ②Basic research about pathogenesis of inflammatory bowel disease related carcinogenesis
Pulmonary Medicine	檜澤 伸之 HIZAWA Nobuyuki	①Molecular genetics of chronic inflammatory lung diseases including asthma and COPD ②Role of genetics and environmental factors in allergic diseases ③Study of interactions between genetics and environment in respiratory diseases
Cardiology	( )	①Cardiac regeneration and translational research ②Reprogramming to generate cardiomyocytes ③Molecular mechanism and new therapy for cardiovascular diseases



Metabolism and Endocrinology	( )	<ul style="list-style-type: none"> <li>①Molecular mechanism of obesity, diabetes, dyslipidemia, and atherosclerosis</li> <li>②Physiology and pathophysiology of transcription factors involved in the metabolism of carbohydrate and lipid</li> <li>③Sensing mechanism and transcriptional regulation of energy metabolism</li> <li>④Hub-metabolites and epigenetic regulation in carbohydrate, lipid, and protein metabolism</li> <li>⑤Quality aspect of fatty acids and physiology and pathophysiology of various organs</li> <li>⑥Molecular visualization at organelle level and synthetic biology</li> <li>⑦Inhibition of cholesterol synthesis, myopathy, and brain dysfunction</li> </ul>
Neurology	斉木 臣二 SAIKI Shinji	<ul style="list-style-type: none"> <li>①Development of blood biomarkers for Parkinson's disease</li> <li>②Development of anti-Parkinson's medicines by autophagy enhancement</li> <li>③Research on molecular ageing process and its modulators</li> <li>④Research on molecular pathogenesis of Alzheimer's disease</li> </ul>
Lipid Medicine	松坂 賢 MATSUZAKA Takashi	<ul style="list-style-type: none"> <li>①Role of fatty acid elongase Elovl6 in metabolic syndrome</li> <li>②Role of Elovl6 in brain, neurodegenerative disease and sphingolipidosis</li> <li>③Role of Elovl6 in cancer and stem cell</li> <li>④The structural basis of Elovl6</li> <li>⑤Development of the new Elovl6 inhibitor</li> </ul>
Infectious Diseases	鈴木 広道 SUZUKI Hiromichi 人見 重美 HITOMI Shigemi	<ul style="list-style-type: none"> <li>①Epidemiological investigation of serious infectious diseases and HIV infection.</li> <li>②Molecular investigation of pathogenic and drug-resistant factors of microorganisms.</li> <li>③Evaluation of precautions against transmissible infectious diseases.</li> <li>④Clinical studies among patients with infectious diseases</li> </ul>
General Thoracic Surgery	佐藤 幸夫 SATOH Yukio	<p>This course is programmed to investigate on</p> <ul style="list-style-type: none"> <li>1) minimal invasive thoracoscopic surgery for lung cancer, 2) angiogenesis and invasion of lung cancer, 3) leukocytes-endothelial interaction in acute lung injury, 4) novel sealant material for surgery, 5) screening of lung cancer with exhaled breath and 6) surgical simulation, and estimation of postoperative lung regeneration and function using 3D-CT.</li> </ul>

Cardiovascular Surgery	平松 祐司 HIRAMATSU Yuji	<ul style="list-style-type: none"> <li>①Development of novel microangiography system using synchrotron radiation</li> <li>②Elucidation of signal transduction in aneurysmal formation</li> <li>③Elucidation of hematological deterioration during cardiopulmonary bypass</li> <li>④Study of ischemic myocardial remodeling using knockout mice</li> <li>⑤Development of novel tissue crosslinking treatment technology</li> <li>⑥Development of vitamin K-reduced functional food</li> <li>⑦Development of valve simulation technology</li> <li>⑧Exploration of valve-sparing right ventricular outflow reconstruction</li> <li>⑨Study in rehabilitation medicine in reduced venous return</li> <li>⑩Regulation of gaseous microemboli in cardiopulmonary bypass</li> <li>⑪Regenerative medicine using stem cells</li> <li>⑫Production of 3D heart replicas</li> </ul>
	鈴木 保之 SUZUKI Yasuyuki	<ul style="list-style-type: none"> <li>①Development of new surgical procedure about congenital cardiac surgery</li> <li>②Development of cardiac assist device using artificial muscle</li> <li>③Elucidation of hematological deterioration during cardiopulmonary bypass</li> <li>④Development of the new regenerative therapy using intraoral mesenchyma system cells</li> </ul>
Pediatric Surgery	増本 幸二 MASUMOTO Kouji	<ul style="list-style-type: none"> <li>①Bioengineered tissue transfer in infants and children</li> <li>②Studies related to carcinogenesis and progression of malignant solid tumors in children</li> <li>③Pathological, molecular biological and genetic studies of congenital alimentary tract malformations</li> <li>④Studies of treatment for hypoplastic lungs in congenital diaphragmatic hernia</li> </ul>
Neurosurgery	石川 栄一 ISHIKAWA Eiichi 松丸 祐司 MATSUMARU Yuji	<ul style="list-style-type: none"> <li>① <b>Neurooncology</b> <ul style="list-style-type: none"> <li>①-1 <b>Neurooncology(Advanced Therapeutics):</b> Boron neutron capture therapy(BNCT), Proton therapy, Tumor vaccination, Gene therapy, Photodynamic diagnosis and treatment (PDD, PDT)</li> <li>①-2 <b>Neurooncology(Diagnostics):</b> Molecular marker and gene analysis of brain tumor(glioma, pediatric brain tumor, craniopharyngioma), Intraoperative neurophysiological monitoring (MEP, SEP, EEG), Imaging study(Intraoperative MRI, Tractography, PET)</li> </ul> </li> <li>② <b>Cerebrovascular disease:</b> Neuroprotection using nanoparticle and stem cell therapy for ischemic stroke. Prevention of carotid artery restenosis. Evaluation of oxidative stress in brain. Regenerative Medicine using dental pulp stem cells</li> <li>③ Analysis of <b>cerebral function, perfusion and metabolism using neuroimaging</b> (functional -MRI, MR spectroscopy, diffusion tensor imaging, PET)</li> </ul>

		<ul style="list-style-type: none"> <li>④ Neurorehabilitation using <b>Robot Suit HAL</b>, Brain machine interface</li> <li>⑤ <b>Functional neurosurgery</b> for epilepsy, involuntary movement, central pain and Headache</li> <li>⑥ <b>Gene therapy and regeneration therapy</b> using DDS (Angiogenesis, bone regeneration)</li> <li>⑦ <b>Pediatric Neurosurgery</b>: Epigenetic biomarkers from woman with neural tube defect affected pregnancies</li> <li>⑧ <b>Development of advanced medical equipment and device</b> (laser endoscope, new device of endoscopic surgery)</li> <li>⑨ Neuroendovascular Therapy: Development of new devices, functional neurovascular anatomy, Outcome research of neuroendovascular therapy</li> </ul>
Control of the Musculoskeletal System	( )	<p>Clinical and basic research on following themes:</p> <ul style="list-style-type: none"> <li>① Treatment of spinal disorders</li> <li>② Treatment of joint disorders</li> <li>③ Sports medicine</li> <li>④ Regeneration of peripheral nerve</li> <li>⑤ Functional improvement treatment using Robot suit HAL for musculoskeletal disorders</li> </ul>
Rehabilitation Medicine	羽田 康司 HADA Yasushi	<ul style="list-style-type: none"> <li>① Medicine for disabilities</li> <li>② Adapted sports</li> <li>③ Rehabilitation using robot suit HAL</li> <li>④ Development of new rehabilitation equipment through medical-engineering collaboration</li> </ul>
Urology	西山 博之 NISHIYAMA Hiroyuki	<ul style="list-style-type: none"> <li>① Cancers of genitourinary system</li> <li>② Urodynamics</li> <li>③ Andrology</li> <li>④ Urolithiasis</li> <li>⑤ Urinary tract infection</li> </ul>
Ophthalmology	大鹿 哲郎 OSHIKA Tetsuro	<ul style="list-style-type: none"> <li>① Visual science</li> <li>② Visual optics</li> <li>③ Minimally invasive ocular surgery</li> <li>④ Vision-related quality of life</li> <li>⑤ Development of artificial vitreous</li> <li>⑥ Development of new generation of OCT</li> <li>⑦ Artificial intelligence in Ophthalmology</li> </ul>
Otolaryngology & Head and Neck Surgery	田淵 経司 TABUCHI Keiji	<ul style="list-style-type: none"> <li>① Inner ear pathology</li> <li>② Research for head and neck surgery</li> </ul>
Oral and Maxillofacial Surgery	( )	<ul style="list-style-type: none"> <li>① New development of biological marker for oral cancer (p63 and GNT-V)</li> <li>② Research for clinical diagnosis and treatment of oral cancer using microRNA (miR203, miR155, miR205 and let-7)</li> <li>③ Regenerated research using dental pulp stem cell</li> <li>④ Research for oral bacterial flora involved internal medical disease (NASH, NAFLD and diabetes mellitus)</li> </ul>

Psychiatry	新井 哲明 ARAI Tesuaki	①Neuropathology of dementia and neurodegenerative disorder ②Clinical study of diagnosis, therapeutics, prevention and care of dementia ③Geriatric psychiatry ④Neuroimaging of neuropsychiatric disorders ⑤Transdisciplinary team approach for psychiatry
Disaster and Community Psychiatry	太刀川 弘和 TACHIKAWA Hirokazu	①Psychosocial study of disaster victims ②Mental health support for disaster supporters including health workers ③Development of post-disaster mental health and psychosocial support systems ④Social psychiatry of depression and suicide prevention ⑤Development of community mental health services and systems
Pediatrics	高田 英俊 TAKADA Hidetoshi	①Development of new gene therapy for genetic disorders of childhood using new Sendai virus vector ②Establishment of new vaccine modalities ③Analysis of the characteristics of immune reaction of fetuses and neonates ④Nation-wide analysis of child disorders including primary immunodeficiencies ⑤Long term analysis of therapeutic effect of childhood cancer ⑥Research of etiology and pathophysiology of diseases of childhood
Obstetrics and Gynecology	濱田 洋実 HAMADA Hiromi	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, etc.
Diagnostic and Interventional Radiology	中島 崇仁 NAKAJIMA Takahito	①Research in basic and clinical fields related to diagnostic imaging 1) Radiomics and Artificial Intelligent 2) DICOM transfer and storage system 3) Big data association with medical imaging and genomics ② Basic and clinical research about novel IVR treatments 1) Transarterial chemoembolization with balloon-occlusion 2) Cryoablation 3) Photoimmunotherapy
Radiation Oncology	櫻井 英幸 SAKURAI Hideyuki	①Research for radiosensitivity, and improvement of radioresistance ②Radiation treatment planning using multimodality imaging ③New cancer therapy using particle radiation therapy

Radiation Health Risk Science	磯辺 智範 ISOBE Tomonori	①Environmental radiation (distribution of radiation in soil, river, sea, crops and wildlife) ②Radiation exposure evaluation ③Soil and surface decontamination technology ④Dose Evaluation and Radiation Protection Technique of Medical Radiation Exposure to Eye Lens ⑤Dose evaluation of neutron exposure in radiotherapy ⑥Technical development on radiation disasters ⑦Development of new educational tool using X Reality
Anesthesiology	( )	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	( )	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	竹越 一博 TAKEKOSHI Kazuhiro	①Personalized treatment for exercise through using genetic information ②Research for anti-doping ③Exercise and hormone, especially catecholamine ④Exercise and stress marker, especially salivary Chromogranin A (collaborated with Prof. Omori)
Pharmaceutical Sciences	本間 真人 HOMMA 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	井上 貴昭 INOUE Yoshiaki	①Physiology of septic shock and shock ②Physiology of acute respiratory distress syndrome and multiple organ failure ③Physiology of Post cardiac arrest syndrome ④Scientific approach for post intensive care syndrome and delirium
Clinical and Translational Research Methodology	橋本 幸一 HASHIMOTO Koichi	①Regulatory science ②Clinical trials for functional foods ③Translational research for drug and medical device development ④Construction of seamless platform for translational research ⑤Education of experts of integrative celerity research process for translational researches

Primary Care and Medical Education	<p>前野 哲博 MAENO Tetsuhiro</p>	<p>①Clinical research in primary care ②Development of community-based medical System ③Health promotion in the community ④Clinical medical education</p>
Integrated Study on Health Information	<p>大庭 良介 OHNIWA Ryosuke</p>	<p>①Studies to unravel the activities of researchers and their communities ②Studies to understand the relationship between researchers and public society ③Studies to implement science communication ④Studies to reconsidering the scientific methodology</p>