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:

【**Master’s Program in Medical Sciences**】Matsuzaka Takashi, Chair, Master's Program in Medical Sciences, Graduate School of Comprehensive Human Sciences, University of Tsukuba

【**Master’s Program in Public Health**】Kondo Masahide , Chair, Master's Program in Public Health, Graduate School of Comprehensive Human Sciences, University of Tsukuba

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〈Master’s Program in Medical Sciences〉

Medical Sciences Basic Medicine		
Research Area	**Faculty**	**Research**
Anatomy and Embryology	（ ）	①Elucidation of molecular mechanism of pancreatic beta cell development and its application. ②Functional analysis of large Maf transcription factor family, MafB and c-Maf in macrophage development and functions. ③Elucidating biological roles of carbohydrates using glycosyltransferase conditional KO mice. ④Elucidation of skeletal muscle regulatory mechanisms. ⑤Elucidation of etiology and gene function in desease model mice. ⑥Elucidation of the mechanism of tissue formation.
Anatomy and Neuroscience	武井 陽介 TAKEI Yosuke	①Animal model studies on synaptic dysfunction in schizophrenia and autism. ②Cell-biological studies on synaptic dysfunction in schizophrenia and autism. ③Studies on synaptic dysfunction caused by inflammation. ④Studies on intracellular transport in neurons and glia.

Diagnostic Pathology	松原　大祐 MATSUBARA Daisuke	①Search for molecular targets of cancer, based on molecular markers and histomorphology, using surgical specimens and cell lines. ②Elucidation of the molecular mechanism of abnormal differentiation (dedifferentiation, neuroendocrine differentiation, EMT, gastrointestinal epithelial differentiation, etc.) in lung cancer. ③Study of drug sensitivity and resistance acquisition mechanism using cancer cell lines.
Experimental Pathology	沖田　結花里 OKITA Yukari	①Study on the mechanisms of tumorigenesis mediated by the induction of cancer stem-like cell properties ②Study on the mechanisms underlying the acquisition of cancer invasiveness and metastasis ③Study on the mechanisms underlying tumorigenic cell proliferation
Cognitive and Behavioral Neuroscience	山田　洋 YAMADA Hiroshi	①Developing primate model for human cognitive function, and neural mechanisms for economic decision makings are examined ②Examination of neural circuitry underlying economic decision makings ③Examining how the motivation and willingness to act are emerged in the brain
Systems physiology	國松　淳 KUNIMATSU Jun	We are investigating the following topics using humans and macaque monkeys. ①　The effects of breathing on cognitive function ②　The neural circuits underlying sociality ③　The control mechanisms of voluntary breathing
Neurophysiology	小金澤　禎史 KOGANEZAWA Tadachika	①Study on the neural regulation of the cardiovascular system ②Study on the neural regulation of the respiratory system ③Study on the neural mechanisms to cause cardiovascular and respiratory diseases
Biochemistry, Molecular Cell Biology	入江　賢児 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 ④Prospore membrane formation by vesicle docking
Biochemistry, RNA Biochemistry	七野　悠一 SHICHINO Yuichi	Studies on RNA regulation using comprehensive analyses ①Molecular mechanism of local translation control ②Regulatory mechanism of mRNA localization via membraneless organelles

Biochemistry, Gene Regulation	西村 健 NISHIMURA Ken	①Molecular mechanisms of iPS cell generation ②Mechanisms of adipocyte and chondrodyte differentiation ③Epigenetics in transcriptional regulation ④Safe and efficient production of differentiated tissue cells
Molecular and Developmental Biology	小林 麻己人 KOBAYASHI Makoto	Linking development, stress, and behavior in zebrafish: ①Supersulfides in embryonic development speed ②Nrf2 activation by lysosomal damage and amino acid starvation ③Activation of antioxidant responses by bacterial factors ④Onset of feeding behavior in embryos ⑤Epigenetic control of social behavior via splicing defects
Cellular and Physiological Biology	大林 典彦 OHBAYASHI Norihiko	①Physiological functions of the small G proteins: Rab and Arf ②Membrane dynamics research aiming at invasion/metastasis, vascularization and pigmentation
Molecular Neurobiology	（ ）	①Molecular studies on neural development and neural circuit formation ②Molecular studies on signal transduction in the nervous system ③Molecular studies on heparan sulfate in neural function ④Development and function of the corticospinal tract ⑤Regulatory mechanism of spinal motor nerve development
Infection Biology (Molecular Virology)	川口 敦史 KAWAGUCHI Atsushi	①To elucidate the mechanism by which commensal bacteria acquire pathogenicity following influenza infection, leading to secondary bacterial pneumonia. ②To clarify the mechanism by which SARS-CoV-2, proliferating in the respiratory tract, overcomes the vascular wall and causes multi-organ infection. ③To investigate the mechanism by which viral infection or vaccination induces mitochondrial dysfunction, resulting in the activation of innate immune responses.
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	川﨑　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 *HLA* 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	（　　）	①Development of Stem Cell Therapy using Mesenchymal Stem Cells ②Functional Analysis of Hypoxia Inducible Transctiption Factors in vivo ③Analysis of Cancer Stem Cells and Tumor Stromal Cells ④Regenerarion of retinal ganglion 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
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
Stem Cell Therapy	水谷　英二 MIZUTANI Eiji	①Development of technology for organ generation from pluripotent stem cells. ②Generation and analysis of mouse models of human diseases using chromosome engineering. ③Elucidation of the mechanisms of mammalian embryonic development. ④Development of novel developmental engineering technologies.

Regenerative Medicine	藤田　諒 FUJITA Ryo	①Mechanisms of muscle stem cell–mediated regeneration and therapeutic applications to genetic muscle diseases ②Regulation of skeletal muscle mass and quality (myofiber type) and its application to sarcopenia ③Elucidation of the regulatory mechanisms and biological significance of muscle stem cell heterogeneity, and development of novel muscle regeneration therapies
Applied Medical Physics	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 ⑧Research on Dosimetry for FLASH Radiotherapy ⑨Research on measurement and radiation protection in proton beam therapy and BNCT
Medical Physics	熊田　博明 KUMADA Hiroaki	①Developement of techniques for the high precision delivery of proton therapy ②Development of irradiation and dosimetry techniques for Boron Neutron Capture Therapy (BNCT) ③Application of techniques for photon therapy ④Quality assurance, quality control of radiation therapy ⑤Developement of new techniques for radiation measurement ⑥Implovement study of radiation biology 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
Physiological Genetics	丹羽　隆介 NIWA Ryusuke	①Studies on molecular mechanisms of cancer progression and cachexia using *Drosophila* as a model ②Mechanisms of interorgan communication in the regulation of development, stem cell proliferation, post-mating responses, and aging ③Molecular, cellular, and systemic mechanisms of the interaction between insects and parasitoid wasps
Biomaterials Science	（　　）	①Design of Nanomedicine ②Design of Drug Delivery System ③Design of Materials for Degenerative Medicine ④Design of Biointerfaces

Legal Medicine	高橋 遥一郎 TAKAHASHI Yoichiro	①Introduction of genetic analysis into forensic practice ②Development of postmortem diagnostic methods based on molecular biological techniques ③Invention of detection devices for various toxicants ④Research on medical jurisprudence and the history of forensic medicine
International Institute for Integrative Sleep Medicine (WPI-IIIS) Yanagisawa/Funato Laboratory	柳沢 正史 YANAGISAWA Masashi	Our lab aims at solving the mystery of sleep ①Elucidation of the molecular mechanism regulating sleep/wakefulness through a forward genetic approach ②Medicinal chemistry to develop new drug for sleep disorder ③Visualization of neural and glial cell activity during sleep/wakefulness behavior
International Institute for Integrative Sleep Medicine (WPI-IIIS) Kutsumura/Saitoh Laboratory	沓村 憲樹 KUTSUMURA Noriki	①Synthesis of novel biologically active molecules ②Research on chemical reactions useful for drug discovery ③Elucidation of the mechanism of action of biomolecules
	斉藤 毅 SAITOH Tsuyoshi	We aim at creating new drugs targeting narcolepsy, insomnia, pain, etc (drug discovery). ① In silico drug design ② Organic synthesis of designed drugs ③ Evaluation of novel drugs using cells and mice ④ Elucidation of molecular mechanisms of drug adverse effects for the development of side-effect-free drugs We welcome students from a wide range of fields including organic chemistry, biology, medical science, and informatics.
International Institute for Integrative Sleep Medicine (WPI-IIIS) Sakurai（Takeshi） 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/wakefulnesss states. ④Elucidation of neural circuits and mechanisms by which body temperature and metabolisms are regulated.
	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) Hirano Laboratory	平野 有沙 HIRANO Arisa	①Research on oscillatory mechanism of the circadian clock and the effect of disrupted rhythms on physiology. ②Elucidation of moleacular mechanism of phase-resetting of the circadian clock and circadian photo-reception. ③Identificatioin and functional analysis of neural circuits regulating the circadian rhythms. ④Drug development for circadian rhythm disorders.

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) 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: https://iiis-lazarus-oishi-lab.org/
	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-IIIS) 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-IIIS) 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-IIIS) Abe Laboratory	阿部 高志 ABE Takashi	①Development, validation, and practical application of a new method for evaluating alertness levels ②Understanding the factors and consequences of decreased alertness levels in real-world settings
International Institute for Integrative Sleep Medicine (WPI-IIIS) 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-IIIS) Shi Laboratory	史 蕭逸 SHI Shoi	①Theoretical biology of sleep ②Comparative biology of sleep ③Population level homeostasis in scoial insect, ants

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
Cooperative Graduate School Medical Virology (NIID,National Institute of Infectious Diseases)	高橋 宜聖 TAKAHASHI Yoshimasa 連絡先:川口 敦史 (Sub)KAWAGUCHI Atsushi	①We aim to clarify immune evading approaches that are utilized by rapidly mutating viruses, and to clarify how the immune responses counteract the viral escapes. ②We rationally design therapeutic antibodies and vaccines by combining the immune profiling, structural biology, and computer science. Japan Institute for Health Security https://www.jihs.go.jp/index.html
Cooperative Graduate School International Medicine (NCGM、National Center for Global Health and Medicine)	濱端 崇 HAMABATA Takashi 連絡先:川口 敦史 (Sub)KAWAGUCHI Atsushi	To conduct the researches on International Medicine of global importance particularly on emerging and re-emerging infectious diseases which require international cooperation for their containment. Such socio-economic researches on human behavior or habitat, population movement, ecological or environmental factors are also indispensable for the control of the disease. Many issues for the achievement of the "Sustainable Development Goals (SDGs)" such as poverty, hunger, malnutrition, education, water safety, gender discrimination, vaccine or drug production in the context of Global Health are to be clarified and resolved to accelerate the "Universal Health Coverage (UHC)". Japan Institute for Health Security https://www.jihs.go.jp/index.html
Cooperative Graduate School Bioinformatics (RIKEN, a National Research and Development Agency)	尾崎 遼 OZAKI Haruka 連絡先: フロンティア医科学学位プログラムリーダー (Sub) Chair (Degree Program Leader)	Research (100～120 words): We work based on the idea that bioinformatics can give humanity more diverse "ways of seeing." Our goal is to develop new bioinformatics technologies that can extract understanding and interpretations of how living organisms work, as well as their diseases and abnormalities, from large-scale biological data. Furthermore, through AI biology, we aim to create an environment in life sciences research where AI and robotics are a commonplace part of everyday work. By developing, implementing, and validating these technologies in real life settings for life science research, we seek to demonstrate a range of new possibilities achievable only through non-human approaches like AI and robotics. Furthermore, we aspire to establish new theories and academic disciplines with these findings. https://www.bdr.riken.jp/en/research/labs/ozaki-h/index.html

Clinical Medicine		
Research Area	**Faculty**	**Research**
Nephrology	（　　）	①Mechanism of chronic progressive kidney diseases ②Method of early diagnosis and prevention of kidney diaseases 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 autoimuune 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 suppresiing 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	（　　）	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	石津　智子 ISHIZU Tomoko	①Establishment of heart disease-specific iPSCs and analysis of iPSC-derived cardiomyocytes ②Development of novel therapeutic targets for refractory heart failure ③Role of translational regulators in the progression of heart failure ④Mechanism of arrhythmic diseases and development of novel therapies ⑤Genetic analysis of patients with cardiovascular diseases ⑥Advancement of echocardiographic techniques for the

		assessment of heart failure, valvular heart disease, and arrhythmias
Metabolism and Endocrinology	（　　）	①Molecular mechanism of obesity, diabetes, dyslipidemia, and atherosclerosis ②Physiology and pathophysiology of transcription factors involved in the metabolism of carbohydrate and lipid ③Sensing mechanism and transcriptional regulation of energy metabolism ④Hub-metabolites and epigenetic regulation in carbohydrate, lipid, and protein metabolism ⑤Molecular visualization at organella level and synthetic biology ⑥Inhibition of cholesterol synthesis, myopathy, and brain dysfunction
Neurology	斉木　臣二 SAIKI Shinji	①Development of blood biomarkers for Parkinson's disease ②Development of anti-Parkinson's medicines by autophagy enhancement ③Research on molecular ageing process and its modulators ④Research on molecular pathogenesis of Alzheimer's disease
Lipid Medicine	松坂　賢 MATSUZAKA Takashi	①Elucidation of the role of lipid quality in organ physiology and pathophysiology ②Development of novel therapeutic strategies for lifestyle-related diseases, cancers, and neurodegenerative diseases through the regulation of lipid quality ③A novel genome editing method for the treatment of genetic diseases
Infectious Diseases	鈴木　広道 SUZUKI Hiromichi 人見　重美 HITOMI Shigemi	①Epidemiological investigation of serious infectious diseases and HIV infection. ②Molecular investigation of pathogenic and drug-resistant factors of microorganisms. ③Evaluation of precautions against transmissible infections diseases. ④Clinical studies among patients with infectious diseases
General Thoracic Surgery	佐藤　幸夫 SATOH Yukio 市村　秀夫 ICHIMURA Hideo	This course is programmed to investigate on 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.
Cardiovascular Surgery	（　　）	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
	(　　)	①Development of new surgical procedure aboout congenital cardiac surgery ②Development of cardiac assist device using artificial muscle ③Elucidation of hematological deterioration during cardiopulmonary bypass ④Development of the new regenerative therapy using intraoral mesenchyma system cells
Pediatric Surgery	増本　幸二 MASUMOTO Kouji	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 congenital alimentary tract malformations ④Studies of treatment for hypoplastic lungs in congenital diaphragmatic hernia
Neurosurgery	石川　栄一 ISHIKAWA Eiichi 松丸　祐司 MATSUMARU Yuji	① **Neurooncology** ①-1 **Neurooncology(Advanced Therapeutics):** Boron neutron capture therapy(BNCT), Proton therapy, Tumor vaccination, Gene thrapy, Photodynamic diagnosis and treatment (PDD, PDT) ①-2 **Neurooncology(Diagnostics):** Molecular maker and gene analysis of brain tumor(glioma, pediatric brain tumor, craniopharyngioma), Intraoperative neurophysiological monitoring (MEP, SEP, EEG), Imaging study(Intraoperative MRI, Tractography, PET) ② **Cerebrovascular disease:** 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 ③ Analysis of **cerebral function, perfusion and metabolism using neuroimaging** (functional -MRI, MR spectroscopy, diffusion tensor imaging, PET) ④ Neurorehabilitation using **Robot Suit HAL**, Brain machine interface ⑤ **Functional neurosurgery** for epilepsy, involuntary movement, central pain and Headache ⑥ **Gene therapy and regeneration therapy** using DDS (Angiogenesis, bone regeneration) ⑦ **Pediatric Neurosurgery:** Epigenetic biomarkers from

		woman with neural tube defect affected pregnancies ⑧ **Development of advanced medical equipment and device** (laser endoscope, new device of endoscopic surgery) ⑨ Neuroendovascular Therapy: Development of new devices, functional neurovascular anatomy, Outcome research of neuroendovascular therapy
Orthopaedic surgery	**本間 康弘** HONMA Yasuhiro	①Elucidation of the pathogenesis of idiopathic osteonecrosis of the femoral head (including pediatric Perthes disease, etc.) ②Development of bone regenerative medicine using bone marrow (including trauma, degeneration, and aging prevention) ③Quantification of surgeon's sensory perception (vision, hearing, touch, etc.) and "Takumi" (master) techniques ④Development of AI-integrated surgical instruments with sensing functions ⑤Bio-acoustic medical engineering (Next-generation/remote disease prediction, monitoring, and surgical support) ⑥Multilayered analysis to improve clinical outcomes of arthroplasty (hip, knee, shoulder, and ankle) ⑦Development of novel treatments for spinal cord injury (utilizing cells and immune antibody, etc.) ⑧Elucidation of the relationship between brain function and musculoskeletal disorders (using f-MRI, NIRS, etc.) ⑨Development of next-generation diagnostics and treatments for bone and joint infections ⑩Application of AI, robotics, and motion analysis in musculoskeletal disorders and sports medicine
Rehabilitation Medicine	**羽田 康司** HADA Yasushi	①Medicine for disabilities ②Adapted sports ③Rehabiltation using robot suit HAL ④Development of new rehabilitation equipment through medical-engineering collaboration
Urology	**西山 博之** NISHIYAMA Hiroyuki	①Cancers of genitourinary system ②Urodynamics ③Andrology ④Urolithiasis ⑤Urinary tract infection
Ophthalmology	（ ）	①Visual science ②Visual optics ③Arttificial intelligence in Ophthalmology ④Vision-related quality of life ⑤Development of artificial vitreous ⑥Development of new generation of OCT ⑦Sharpening of medical images
Otolaryngology & Head and Neck Surgery/Oral and Maxillofacial	**田渕 経司** TABUCHI Keiji	①Inner ear pathology ②Research for head and neck surgery

Surgery		③New development of biological marker for oral cancer (p63 and GNT-V) ④Research for clinical diagnosis and treatment of oral cancer using microRNA (miR203, miR155, miR205 and let-7) ⑤Regenerated research using dental pulp stem cell ⑥Research for oral bacterial flora involved internal medical disease (NASH, NAFLD and diabetes mellitus)
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 neuropschyatric disorders ⑤Transdisciplinary team approach for psychiatry
Disaster and Community Psychiatry	（ ）	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 neonatates 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	佐藤 豊実 SATOH toyomi	Basic and clinical researches about diagnosis, treatment, and prevention of diseases/disorders in the field of obstetrics and gynecology are conducted. ①gynecological malignancy ②infertility/reproductive endocrinologic disorder ③fetal genetic disease/malformation ④fetomaternal infection ⑤maternal, natal, and puerperal complications ⑥menopausal disorders
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 baloon-occulusion 2) Cryoablation 3) Photoimmunotherapy
Radiation Oncology	( )	①Research for radiosensitivity, and improvement of radioresistance ②Radiation treatment planning using multimodality imaging ③New cancer therapy using particle radiation therap
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	( )	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)
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. ③Pharamcokinetic 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 delilium
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	前野 哲博 MAENO Tetsuhiro	①Clinical research in primary care ②Development of community-based medical System ③Health promotion in the community ④Clinical medical education
Integrated Study on Health Information	大庭 良介 OHNIWA Ryosuke	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
Cooperative Graduate School Clinical Oncology (NCC) (NCC, Natinal Cancer Center)	吉野 孝之 YOSHINO Takayuki 連絡先: フロンティア医科学学位プログラムリーダー (Sub) Chair (Degree Program Leader)	Our clinical researchs/reverse TRs are aimed to develop new oncology agents including imunne-cell therapy and establish precision medicine with tissue NGS panel or liquid biopsy. We have various international collaboration studies with top cancer centers overseas, which provide cutting-edge cancer therapy into the oncology clinic. Natinal Cancer Center Hospital East http://www.ncc.go.jp/jp/ncce/index.html
Cooperative Graduate School Celluar and Molecular Biotechnology Research Institute (AIST, National Institute of Advanced Industrial Science and Technology)	久野 敦 KUNO Atsushi 舘野 浩章 TATENO Hiroaki 連絡先: フロンティア医科学学位プログラムリーダー (Sub) Chair (Degree Program Leader)	(Kuno) Molecular and Cellular Glycoproteomics Research Group Aiming to deepen understanding of molecular-based biological function and disease mechanisms, we research structural and functional insight into post-translational modifications of "functional proteins" using humans and disease model animals. In particular, we focus on the development of analytical technologies for unique "spatial omics" using tissue sections for the abovementioned application. (Tateno) Glycan Engineering Research Group We develop innovative technologies for single-cell glycomics and apply them to the analysis of the tumor microenvironment, stem cells, the microbiota, exosomes, and other biological systems. Through this approach, we aim to elucidate multicellular interactions that have previously been difficult to observe and to establish technologies for controlling these interactions, ultimately leading to the creation of novel therapeutic and diagnostic strategies for various intractable diseases. https://staff.aist.go.jp/h-tateno/en/index.html

〈Master's Program in Public Health〉

Research Area	Faculty	Research
Occupational Psychiatry / Space Psychiatry	笹原 信一朗 SASAHARA Shinichiro	①Practical research on the mechanisms of health problems caused by workplace stress factors and the risk management system ②International collaboration for stress coping capacity building ③Research on the effects of rework program in return-to-work from depression ④Elucidating the interaction between individual factors and the work environment in relation to health through large-scale epidemiological studies. ⑤Integration of AI and Occupational Medicine ⑥Study on Stress Monitoring in Closed-Environment Experiments in Space Medicine
Primary Care and Medical Education	前野 哲博 MAENO Tetsuhiro	①Clinical research in primary care ②Development of community-based medical System ③Health promotion in the community ④Clinical medical education
Gerontological Nursing & Caring	橋爪 祐美 HASHIZUME Yumi	①Gender issues and Japanese family caregiving ②Toyama-style daycare service in Mongolia ③Qualitative research method (Grounded theory approach) , mixed method
Public Health Medicine	村木 功 MURAKI Isao	①Public health practice and epidemiological evaluation of lifestyle-related disease prevention program in communities (speaking proficiency of Japanese required) ②Management of community-based genome cohort study of lifestyle-related disease ③Evaluation of the impact of health policy
Health Services Research	（ ）	①Health Services Research (clinical medicine, long-term care, prevention services) 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.)
	渡邊 多永子 WATANABE Taeko	①Health services research (research to improve the quality of medical and long-term care) ②Research on the health and quality of life of family caregivers ③Public gealth based on legal medicine (older people, child abuse, solitary death, actual state of service-related death, etc.)

Digital health	岩上 将夫 IWAGAMI Masao	①Descriptive study, prediction, and causal inference using real world data (e.g. medical claims data and electronic health records) ②Genome and omics study using biobanks ③Digital health (clinical study using medical device and AI) ④Pharmacoepidemiology ⑤Global burden of disease study
Global Health Nursing	Togoobaatar Ganchimeg	①Adolescent reproductive health ②Respectful childbirth care and doula support ③Cultural adaption and psychometric validation of research instruments ④Community health promotion
pidemiology	我妻 ゆき子 WAGATSUMA Yukiko	①Principles and methods in epidemiology and their applications ②Medical statistics and medical information science ③Epidemiology for diseases ④Methods of clinical trials ⑤Strategy to control diseases
Biostatistics	五所 正彦 GOSHO Masahiko	①Developments of novel statistical methods for medical researches ②Evaluations of the performance of statistical methods ③Database studies
Social Psychiatry & Mental Health	森田 展彰 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, gambling disorder and internet dependence) ④Forensic psychiatry, Criminology
Global Public Health	市川 政雄 ICHIKAWA Masao	①Evaluation of injury prevention interventions ②Mobility, transport, and health among older adults ③Global health research
Occupational Health	堀 愛 HORI Ai	①Countermeasure for vaccine-preventable disease ②Health impact assessment on heated tobacco products ③Health checkup among workers, workers' cohort study ④Occupational and environmental health for healthcare workers ⑤HIV/AIDS management in occupational health settings
Health Care Policy and Health Economics	近藤 正英 KONDO Masahide	①Application of economics for health care ②Health care policy research ③Global health economics

Health Economics	**大久保 麗子** OKUBO Reiko	①Cost-effectiveness analysis in chronic diseases ②Cost-effectiveness analysis in oral diseases ③Research on quality of life in chronic diseases
Life course epidemiology	**吉田 都美** YOSHIDA Satomi	①Clinical epidemiology and pharmacoepidemiology research using claims database, DPC, and electronic medical records ②Eepidemiology research using JECS, maternal and child health, and school-based health checkup data ③Research on the application of AI and machine learning to medical information ④Maternal, child and adolescent health
Public Health and Health Policy	**宮脇 敦士** MIYAWAKI Atsushi	①Policy research and policy evaluation using electronic medical records and health insurance claims ②Quality and equity of healthcare and underlying structural determinants ③Physicians' clinical patterns, behavior, and work-life balance ④Social determinants of health