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. 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.

For guidance, contact: Kenji Irie, Provost, Master’s Program in Medical Sciences, Graduate School of Comprehensive Human Sciences, University of Tsukuba

Phone: 029-853-3007  
FAX: 029-853-3483  
E-mail: frontier@md.tsukuba.ac.jp

### Master’s Program in Medical Sciences

<table>
<thead>
<tr>
<th>Research Area</th>
<th>Faculty</th>
<th>Research</th>
</tr>
</thead>
</table>
| Anatomy and Embryology        | 高橋 智 TAKAHASHI Satoru | 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.  
⑤ Elucidation of etiology and gene function in disease model mice. |
| Anatomy and Neuroscience       | 武井 陽介 TAKEI Yosuke | ① Animal model studies on synaptic dysfunction in schizophrenia and autism.  
② Cell-biological studies on synaptic dysfunction in schizophrenia and autism.  
③ Studies on synaptic dysfunction caused by inflammation.  
④ Studies on neuropsychiatric diseases caused by disrupted intracellular transport. |
| Neurobiology                  | 志賀 隆 SHIGA Takashi | ① Roles of monoamines in the synapse formation  
② Effects of environmental factors on the development of brain and behavior  
③ Effects of gravitational stress on the brain  
④ Functional analyses of novel candidate genes involved in axonal guidance  
⑤ Analyses of neurodegenerative diseases at a molecular level |
### Diagnostic Pathology

野口 雅之
NOGUCHI Masayuki

1. Study about molecular mechanisms of multistep carcinogenesis including precancerous or background lesions.
2. Study about molecular carcinogenesis and early progression based on the genomic and epigenomic abnormalities and drug development targeted the early cancer
3. Application of fetal protein to cancer diagnosis and therapy.

### Experimental Pathology

加藤 光保
KATO Mitsuyasu

1. Molecular mechanisms of stemness induction in cancer development
2. Cell division kinetics of cancer stem cells by application of live imaging and three-dimensional quantitative analysis
3. Development of anti-cancer stem cell therapy using macrocyclic peptides and antibody

### Systems Neuroscience

設楽 宗孝
SHIDARA Munetaka

1. Brain information processing mechanism of motivation and reward expectancy
2. Research on reinforcement learning and decision-making mechanism in the brain
3. Research on information coding mechanism of reward value in the brain
4. Research on visual recognition mechanism in the brain

### Cognitive and behavioral Neuroscience

松本 正幸
MATSUMOTO Masayuki

1. Roles of monoamine systems in cognitive, emotional and motivational brain functions
2. Brain mechanisms underlying value-based decision making

### Neurophysiology

小金澤 祇史
KOGANEZAWA Tadachika

1. Study on the neural regulation of the cardiovascular system
2. Study on the neural regulation of the respiratory system
3. Study on the neural regulation based cardiovascular and respiratory diseases

### Biochemistry, Molecular Cell Biology

入江 賢児
IRIE Kenji

1. Post-transcriptional regulation of gene expression by RNA-binding proteins
2. Molecular mechanism of mRNA localization and local translation regulating cell polarity, asymmetric cell division, and cell-fate
3. Regulation of endoplasmic reticulum stress response
4. Prospore membrane formation by vesicle docking

### Molecular and Developmental Biology

小林 麻己人
KOBAYASHI Makoto

1. Hematopoietic stem cell formation
2. Digestive organ formation
3. Defense against oxidative and ER stresses
4. Aging and gerontology study
5. Foods and drugs for healthy life extension

### Biochemistry, Gene Regulation

久武 幸司
HISATAKE Koji

1. Molecular mechanisms of iPS cell induction
2. Mechanisms of adipocyte differentiation
3. Molecular basis of epigenetics
4. Chromatin modifications and transcriptional regulation
<table>
<thead>
<tr>
<th>Field</th>
<th>Name</th>
<th>Research Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological Chemistry</strong></td>
<td>OHBAYASHI Norihiko</td>
<td>① Physiological functions of the small G proteins: Rab and Arf&lt;br&gt;② Development of novel anti-cancer drugs targeting signal transduction systems&lt;br&gt;③ Membrane dynamics research aiming at invasion/metastasis, vascularization and pigmentation</td>
</tr>
<tr>
<td><strong>Molecular Neurobiology</strong></td>
<td>MASU Masayuki</td>
<td>① Molecular studies on neural development and neural circuit formation&lt;br&gt;② Molecular studies on signal transduction in the nervous system&lt;br&gt;③ Molecular studies on heparan sulfate and lipid mediators in signal transduction</td>
</tr>
<tr>
<td><strong>Infection Biology (Molecular Virology)</strong></td>
<td>KAWAGUCHI Atsushi</td>
<td>① Molecular mechanism of virus replication, species specificity and pathogenicity of influenza virus&lt;br&gt;② Molecular mechanism of innate immunity</td>
</tr>
<tr>
<td><strong>Infection Biology (Bacteriology)</strong></td>
<td>MORIKAWA Kazuya</td>
<td>① Infection strategies in Gram positive pathogens&lt;br&gt;② Adaptation mechanisms of staphylococci&lt;br&gt;③ Post-transcriptional regulation in bacteria&lt;br&gt;④ Evolution of RNA regulatory networks in Enterobacteria (Salmonella/ E. coli)</td>
</tr>
<tr>
<td><strong>Infection Biology (Molecular Parasitology)</strong></td>
<td>HO, KIONG</td>
<td>① Understanding 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.&lt;br&gt;② Mechanism of mRNA recapping pathway in regulating gene expression.&lt;br&gt;③ RNA repair - understanding of the function and mechanism behind cellular responses to RNA damage.</td>
</tr>
<tr>
<td><strong>Immunology</strong></td>
<td>SHIBUYA Kazuko</td>
<td>① To reveal host defense mechanisms against cancer and infectious diseases, and to develop their therapeutic manipulation&lt;br&gt;② To reveal cellular and molecular basis of allergy and autoimmune diseases, and to develop their therapeutic manipulation</td>
</tr>
<tr>
<td><strong>Medical Genetics</strong></td>
<td>NOGUCHI Emiko</td>
<td>① Identification of the susceptible genes related to allergic diseases&lt;br&gt;② Genetic analysis using next generation sequencer&lt;br&gt;③ Functional studies of genes involved in allergy.</td>
</tr>
<tr>
<td><strong>Molecular and Genetic Epidemiology</strong></td>
<td>TSUCHIYA Naoyuki</td>
<td>① Identification of genomic variants associated with susceptibility and clinical characteristics of human autoimmune rheumatic diseases such as systemic lupus erythematosus, ANCA associated vasculitis, systemic sclerosis and rheumatoid arthritis.&lt;br&gt;② Molecular mechanisms of HLA and other genes associated</td>
</tr>
<tr>
<td>Field</td>
<td>Name</td>
<td>Research Areas</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Genome Biology                            | Muratani Masafumi     | ① Integrative genome and epigenome analysis of clinical samples to understand mechanisms of cancer development and for discovery of new drug targets and biomarkers.  
② Cell-free DNA and RNA profiling to monitor environmental stress responses in internal tissues. |
| Regenerative Medicine and Stem Cell Biology| Ohneda Osamu          | ① Development of Stem Cell Therapy using Mesenchymal Stem Cells  
② Functional Analysis of Hypoxia Inducible Transcription Factors in vivo  
③ Analysis of Cancer Stem Cells and Tumor Stromal Cells |
| Stem Cell Biology and Biotechnology        | Nishimura Ken         | ① Functional analysis of transcription factors during cell reprogramming  
② Epigenetic regulation during cell reprogramming  
③ Safe and efficient production of differentiated tissue cells |
| Laboratory Animal Science                 | Sugiyama Fumihiro     | ① Development of new technology for producing genetically modified mice.  
② Development of genetically modified mice for analyzing biological function  
③ Investigating the novel gene function in germ cell maintenance and maturation. |
| Bioinformatics                            | Ozaki Haruka          | Development of computational methods for interpreting massive biological data and application of bioinformatics to biomedical problems:  
(1) AI-based prediction of genome sequence functions  
(2) Understanding of cell-to-cell variability thorough single-cell omics analyses and application to disease research  
(3) Investigation and prediction of functions of non-coding regions in genome (DNA) and transcripts (RNA)  
(4) Multi-omics data analyses of biological systems  
(5) Data science of massive clinical data |
| Medical Physics                           | Sake Takeji           | ① Development of techniques for high precision proton therapy  
② Development of dose calculation system for neutron capture therapy  
③ Application of techniques for photon therapy  
④ Quality assurance of radiation therapy  
⑤ Development of new techniques for radiation measurement  
⑥ Study for radiation protection  
⑦ Basic research for acquiring information of biological function with image diagnostic techniques |
| Environmental Biology                     | Kumagai Yoshito      | ① Understanding environmental response to chemicals causing oxidative and electrophilic stresses  
② Understanding reactive sulfur species as a small molecule regulator for stresses |
<table>
<thead>
<tr>
<th>Field</th>
<th>Name</th>
<th>Research Areas</th>
</tr>
</thead>
</table>
| Developmental Genetics                    | NIWA Ryusuke          | ① Studies on interorgan communications for germline stem cell proliferation and maintenance.  
                        |                       | ② Studies on interorgan communications for regulating aging process          |
|                                           |                       | ③ Chemical biology for developing pesticides                                 |
| Neuroscience                              | YANAGISAWA Masashi   | Our lab aims at solving the mystery of sleep                            |
|                                           |                       | ① Elucidation of the molecular mechanism regulating sleep/wakefulness through a forward genetic approach |
|                                           |                       | ② Medicinal chemistry to develop new drug for sleep disorder               |
|                                           |                       | ③ Visualization of neural and glial cell activity during sleep/wakefulness behavior |
| Medicinal Chemistry / Organic Chemistry / Neuropharmacology | KUTSUMURA Noriki     | Design and synthesis of orexin receptor agonists.                           |
|                                           |                       | Design and synthesis of opioid ligands.                                    |
|                                           |                       | Research and development of drugs for narcolepsy.                          |
|                                           |                       | Research and development of drugs for severe pain, depression, polakiuria, malaria, other protozoal diseases, and cancer. |
|                                           |                       | Through pharmacological evaluation (in vitro and in vivo) of the compounds developed above, we aim to create drugs with a new mechanism. |
|                                           |                       | New drug creation by clarification of plasticity in the central nervous system and change of emotional brain function induced by stress, chronic pain and drugs of abuse. |
| Molecular Behavioral Physiology           | SAKURAI Takeshi       | ① Elucidation of physiological roles of novel neuropeptide                    |
|                                           |                       | ② Revealing the neural circuits and neural mechanisms that work in the system that regulates emotion. |
|                                           |                       | ③ Studies on the neural circuits and neural mechanisms that play roles in the regulation of sleep/wakefulness states. |
| Functional sleep science                  | SAKAGUCHI Masanori    | ① Function of sleep in memory consolidation.                                |
|                                           |                       | Correlation of brain plasticity and sleep                                   |
|                                           |                       | ② Function of sleep in processing traumatic memory                         |
|                                           |                       | http://iiis.php.xdomain.jp/sakaguchi/www/                                   |
| Brain maturation/ evolution               | HAYASHI Yu             | ① Elucidation of the function of sleep focusing on brain maturation and aging |
|                                           |                       | ② Elucidation of the evolutionary process of sleep based on molecular and developmental approaches |
| Systems Sleep Biology                     | LAZARUS Michael       | ① Understanding the control of sleep and wake by motivation                 |
|                                           |                       | ② Sleep circuits as potential therapeutic targets for insomnia             |
|                                           |                       | ③ Link between REM sleep loss and the desire for junk food                  |
|                                           |                       | ④ Elucidation of neural mechanisms of short-sleep                          |
|                                           |                       | ⑤ Analysis of the effects of short-sleep on physiological functions         |
| Molecular Circuits of RNAi, Sleep, and Fear | LIU, Qinghua | ① Comprehensive understanding of the molecular and neural bases for sleep drive  
② Elucidation of the neural circuits for adaptive behaviour to fear |
|-------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electrophysiology and molecular biology of sleep | 本城 咲季子 HONJOH Sakiko | ① The dynamics of thalamocortical system across sleep/wake cycles  
② Elucidation of neural circuits underlying NREM sleep specific EEG patterns  
③ Analysis of vigilance state dependent transcriptional changes  
④ Elucidation of the function of vigilance state specific genes in neural activity |
| Occupational psychiatry/Space psychiatry | 松崎 一葉 MATSUZAKI Ichiyo | ① A study of the strong qualities unexpectedly in space  
② Salutogenesis and Sense of coherence  
③ Nature based Rehabilitation |
| Matrix and Stem Cell Biology (TARA Center) | 柳沢 裕美 YANAGISAWA Hiromi | ① Identification and functional analysis of novel extracellular matrix proteins in the vessel wall  
② Phenotypic analysis of mutant mice with vascular diseases  
③ Molecular mechanism of mechanotransduction in the vessel wall  
④ Analysis of epidermal stem cell niche  
⑤ Aging study of epithelial stem cells |
| Nephrology | 山縣 邦弘 YAMAGATA Kunihiro | ① Mechanism of chronic progressive kidney diseases  
② Method of early diagnosis and prevention of kidney diseases  
③ Approach to treatment of progressive kidney diseases  
④ Epidemiology of acute kidney injury and chronic kidney disease  
⑤ Outcome research of lifestyle diseases |
| Clinical Immunology and Rheumatology | （ ） | 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 | 千葉 滋二宮 治彦 CHIBA Shigeru NINOMIYA Haruhiko | ① Mechanism of leukemo/lymphomagenesis  
② Mechanism of bone marrow failure  
③ Translational research on stem cell therapy  
④ Megakaryocyte and platelet production  
⑤ Laboratory hematobiology for hematopoietic disorders |
| Medical Oncology and Gastroenterology | 兵頭 一之介 HYODO Ichinosuke | ① Basic and clinical research on medical oncology  
② Development of molecular targeted agent and novel therapy |
| Pulmonary Medicine | 植澤 伸之  
HIZAWA Nobuyuki | ① Molecular genetics of chronic inflammatory lung diseases including asthma and COPD  
② Role of genetics and environmental factors in allergic diseases  
③ Study of interactions between genetics and environment in respiratory diseases |
| --- | --- | --- |
| 佐藤 浩昭  
SATOH Hiroaki | ① Study of chemotherapy for lung cancer  
② Clinical application of carbohydrate antigens for respiratory diseases  
③ Optimal therapeutic strategy development for lung cancer in the elderly |
| Pulmonary medicine, infection, and allergy | 石井 幸雄  
ISHII Yukio | ① Elucidation of cellular and molecular mechanisms of pulmonary host responses to environmental stimuli, including cigarette smoke, antigens, chemical carcinogens, and microorganisms.  
② Exploring the bio-markers in inflammatory and allergic lung diseases. |
| Cardiology | 家田 真樹  
IEDA Masaki | ① Cardiac regeneration and translational research  
② Reprogramming to generate cardiomyocytes  
③ Molecular mechanism and new therapy for cardiovascular diseases |
| 宮内 卓  
小池 朗  
本間 覚  
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 | 島野 仁  
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 Lipid transcription factors and pathophysiology  
⑤ Physiology and pathophysiology of different organs in the quality aspect of fatty acids  
⑥ Brain fatty acid metabolism, neurogenesis, and higher brain functions  
⑦ Regenerative medicine for pancreatic beta cells  
⑧ Stem cell fatty acid and differentiation  
⑨ Sensing mechanism and transcriptional regulation of energy metabolism  
⑩ Hub-metabolites and epigenetic regulation in carbohydrate, lipid, and protein metabolism  
⑪ Holesterol synthesis inhibition and myopathy  
⑫ Cholesterol synthesis inhibition and brain dysfunction  
⑬ Molecular visualization at organella level and synthetic biology |
<table>
<thead>
<tr>
<th>Section</th>
<th>(                  )</th>
<th>Details</th>
</tr>
</thead>
</table>
| **Infectious Diseases** | 1. Epidemiological investigation of serious infectious diseases and HIV infection.  
2. Molecular investigation of pathogenic and drug-resistant factors of microorganisms.  
3. Evaluation of precautions against transmissible infectious diseases.  
4. Clinical studies among patients with infectious diseases |
| **Neurology**         | ①Molecular pathogenesis of Alzheimer’s disease  
②Pathology and biochemistry of neuromuscular disorders  
③Neurobiology of neurodegenerative disorders  
④Neuro-ophthalmology of neurological disorders  
⑤Clinical and epidemiological studies of organoarsenic intoxication |
| **General Thoracic Surgery** | 佐藤 幸夫  
SATOH Yukio | 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 |
| **Pediatric Surgery**  | 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 |
| Organ Transplantation, Gastroenterological and Hepatobiliary Surgery |  | 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) Cancer: Comprehensive elucidation of cancer genesis and metastasis by analyzing cancer stem cells, local microenvironment (incl. fibroblast and platelets), and niche in metastatic site (liver Kupffer 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 | 松丸 祐司 MATSUMARU Yuji | 1) Neurooncology
1)-1 Neurooncology(Advanced Therapeutics): Boron neutron capture therapy (BNCT), Proton therapy, Tumor vaccination, Gene therapy, 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)
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 |
<table>
<thead>
<tr>
<th>Field</th>
<th>Researchers</th>
<th>Research Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of the Musculoskeletal System</td>
<td>山崎 正志 (YAMAZAKI Masashi)</td>
<td>Clinical and basic research on following themes:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>① Treatment of spinal disorders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>② Treatment of joint disorders</td>
</tr>
<tr>
<td></td>
<td></td>
<td>③ Sports medicine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>④ Regeneration of peripheral nerve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⑤ Functional improvement treatment using Robot suit HAL for musculoskeletal disorders</td>
</tr>
<tr>
<td>Urology</td>
<td>西山 博之 (NISHIYAMA Hiroyuki)</td>
<td>① Cancers of genitourinary system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>② Urodynamics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>③ Andrology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>④ Urolithiasis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⑤ Urinary tract infection</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>大鹿 哲郎 (OSHIKA Tetsuro)</td>
<td>① Visual science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>② Visual optics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>③ Minimally invasive ocular surgery</td>
</tr>
<tr>
<td></td>
<td></td>
<td>④ Vision-related quality of life</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⑤ Development of artificial vitreous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>⑥ Development of new generation of OCT</td>
</tr>
<tr>
<td>Otology &amp; Equilibrium Research</td>
<td>( )</td>
<td>Study on theories and methods for pathophysiological, electrophysiological and biochemical research in otology and cochleoneural path way.</td>
</tr>
<tr>
<td>Field</td>
<td>Name</td>
<td>Research Topics</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Oral and Maxillofacial Surgery | BUKAWA Hiroki      | ① New development of biological marker for oral cancer (p63 and GNT-V)  
② Research for clinical diagnosis and treatment of oral cancer using microRNA (miR203, miR155, miR205 and let-7)  
③ Regenerated research using dental pulp stem cell  
④ Research for oral bacterial flora involved internal medical disease (NASH, NAFLD and diabetes mellitus) |
| Psychiatry                  | ARAI Tesuaki          | ① Molecular neuropathology of dementia and neurodegenerative disorder  
② Clinical study of diagnosis, therapeutics, prevention and care of dementia  
③ Neuroimaging of neuropsychiatric disorders  
④ Clinical and social psychiatry for depression  
⑤ Suicidology and suicide prevention  
⑥ Psychiatric study of eating disorders |
| Pediatrics                  | TAKADA Hidetoshi     | ① Development of new gene therapy for genetic disorders of childhood using new Sendai virus vector  
② Immunological analysis of host factor in children who developed vaccination-related adverse reaction  
③ Analysis of the characteristics of immune reaction of fetuses and neonates  
④ Nationwide analysis of child disorders including primary immunodeficiencies  
⑤ Long term analysis of therapeutic effect of childhood cancer  
⑥ New objective analysis of the development of children |
| Obstetrics and Gynecology   | 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. |
| Radiation Oncology          | SAKURAI Hideyuki     | ① Research for radiosensitivity, and improvement of radioresistance  
② Radiation treatment planning using multimodality imaging  
③ New cancer therapy using particle radiation therapy |
| Radiation Health Risk Science | ISOBE Tomonori      | ① Environmental radiation (distribution of radiation in soil, river, sea, crops and wildlife)  
② Radiation exposure evaluation  
③ Soil and surface decontamination technology  
④ Dose Evaluation and Radiation Protection Technique of Medical Radiation Exposure to Eye Lens  
⑤ Dose evaluation of neutron exposure in radiotherapy  
⑥ Technical development on radiation disasters |
<p>| Anesthesiology              | TANAKA Makoto       | ① Effects of anesthetics and anesthetic techniques on arterial baroreflex function |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| **Clinical laboratory medicine** | 川上 康<br>KAWAKAMI Yasushi | ① Molecular understanding of the endocrine tumor and apoprotein.  
② Molecular analysis of the cell proliferating factor.  
③ Molecular understanding of the hormone synthesis and secretion. |
| **Molecular Sportology**       | 正田 純一<br>SHODA Junichi | ① Development of novel exercise training for obese subjects with lifestyle-related diseases  
② Imaging analysis of organ lipid accumulation in obese subjects with lifestyle-related diseases  
③ Development of glycobiomarkers for obesity and lifestyle-related diseases  
④ Development of novel animal models for obesity and lifestyle-related diseases  
⑤ Exercise-induced activation of antioxidative stress systems  
⑥ Understanding of exercise-induced inhibitory mechanism against carcinogenesis |
| **Pharmaceutical Sciences**    | 本間 真人<br>HONMA Masato | ① Gene Polymorphism analysis for assessing drug metabolizing enzymes and transporters  
② Therapeutic drug monitoring for assessing drug efficacy and adverse reactions.  
③ Pharmacokinetic analysis of Kampo-medicine (Japanese herbal remedies) |
| **Emergency and Critical Care Medicine** | 井上 貴昭<br>INOUE Yoshiaki | ① Molecular biology of septic shock and shock  
② Molecular biology of acute respiratory distress syndrome and multiple organ failure  
③ Molecular biology of clinical toxicology  
④ Molecular biology of delirium |
| **Clinical and Translational Research Methodology** | 橋本 幸一<br>HASHIMOTO Koichi | ① Regulatory science  
② Clinical trials for functional foods  
③ Improvement of efficiency of practical medicine using AI and IOT  
④ Construction of seamless platform for translational research  
⑤ Education of experts of integrative celerity research process for translational researches |
<table>
<thead>
<tr>
<th>Research Area</th>
<th>Faculty</th>
<th>Research</th>
</tr>
</thead>
</table>
| Clinical Research and Regional Innovation | 高野晋吾 TAKANO Shingo | ① Audit and quality assurance of clinical trial  
② Education of audit for translational research  
③ Tumor growth inhibition with angiosuppression |
| Primary Care and Medical Education     | 松阪 諭 MATSUZAKA Satoshi | ① Development of clinical decision system (Liquid biopsy analysis) for cancer chemotherapy  
② Understanding the mechanisms of cancer metastasis and anticancer agent resistance  
③ Functional studies of Organoids with Cancer Stem Cell-like Properties |
| Forensic Medicine                      | 本田 克也 HONDA Katsuya | ① Research on forensic DNA testing  
② Mitochondrial DNA polymorphism  
③ Studies on the toxicological mechanism of xenobiotics  
④ Research of molecular autopsy on sudden unexpected death |
| Medical Science and Welfare            | 柳 久子 YANAGI Hisako | ① Preventive medicine for non-communicable diseases and frailty, Medical welfare for elderly  
② Genetic counselling, Bioethics |

### Master’s Program in Public Health

<table>
<thead>
<tr>
<th>Research Area</th>
<th>Faculty</th>
<th>Research</th>
</tr>
</thead>
</table>
| Occupational psychiatry/Space psychiatry | 松崎一葉 MATSUZAKI Ichiyo | ① A study of the strong qualities unexpectedly in space  
② Salutogenesis and Sense of coherence  
③ Nature based Rehabilitation |
| Primary Care and Medical Education | 前野哲 MAENO Tetsuhiro | ① Clinical research in primary care  
② Development of community-based medical System  
③ Health promotion in the community  
④ Clinical medical education |
| International Community Care and Lifespan Development: Empowerment Sciences | 安梅勅江 ANME Tokie | ① Community empowerment  
② Plasticity of lifespan development and implications  
③ System sciences for health social services |
<table>
<thead>
<tr>
<th>Field</th>
<th>Name</th>
<th>Research Areas</th>
</tr>
</thead>
</table>
| Gerontological Nursing & Caring | HASHIZUME Yumi                | 1. Gender issues and Japanese family caregiving, Interpersonal support for the middle-aged couple  
2. Toyamagata day service  
3. Community care and formal caregivers, care for the family caregivers  
4. Community care in Mongolia  
5. Family caregiving by foreign bride and Japanese husband  
6. Qualitative research method (Grounded theory approach), mixed method |
| Health Services Research      | TAMIYA Nanako                 | 1. Health Services Research (especially older people and children)  
2. Cooperation of medical care and welfare in the local community  
3. Policy evaluation of the long-term care insurance system  
4. Study for the improvement of the quality of in-home care and facility care for older people and people with disability  
5. Public Health based on legal medicine (older people, child abuse, solitary death, actual state of service-related death, etc.) |
| Epidemiology                  | WAGATSUMA Yukiko              | 1. Principles and methods in epidemiology and their applications  
2. Medical statistics and medical information science  
3. Epidemiology for diseases  
4. Sociological survey in the field of medicine  
5. Methods of clinical trials  
6. Strategy to control diseases in developing countries |
| Social Psychiatry & Mental Health | SAITO Tamaki                | 1. Asocial problem behaviors in childhood and adolescence  
2. Development disorder and maladaptation  
3. Rehabilitation of people with mental disorder |
| Forensic Medicine             | HONDA Katsuya                 | 1. Mental health of victims, Psychotherapy  
2. Intervention and treatment for family violence (Child abuse, Domestic violence, elder abuse and parent abuse by children)  
3. Recovery of addiction (Substance use disorder, gambling disorder and internet dependence)  
4. Forensic psychiatry, Criminology |
| Global Public Health          | ICHIKAWA Masao                | 1. Global health research  
2. Community design & health  
3. Injury prevention & control |
| Medical Science and Welfare | YANAGI Hisako | ① Preventive medicine for non-communicable diseases and frailty, Medical welfare for elderly ② Genetic counselling, Bioethics |
| Health care policy and Health economics | KONDO Masahide | ① Application of economics for health care ② Health care policy research ③ Global health economics |
| Livelihood Support Science | TOKUDA Katsumi | ① Child care and guardians’ support ② Beggars with disabilities ③ Cemetery, graves and tombs |
| | MIZUNO Tomomi | ① Barrier-free ② Child care and guardians’ support ③ Understanding persons with special needs |