## 5. Details and Areas of Research of Faculty Members at Graduate School of Biomedical Sciences

Doctoral Courses [Four years (Department of Medical and Dental Sciences, Infection Research, Life Sciences and Radiation Research, Division of Advanced Preventive Medical Sciences)]

### ① Areas of Research in Department of Medical and Dental Sciences

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Macroscopic Anatomy | TAKAMURA Keiko (Professor)<br>MURAI Kiyohito (Senior Assistant Professor) | ① Microstructural analysis of bone tissue<br>② 3D structural analysis and finite element analysis of CT images of bones<br>③ Research into functional adaptation of motor organs from the perspective of skeletal microevolution among Japanese people<br>④ Research into gene polymorphism in skeletal/joint structure<br>⑤ Research on human clinical anatomy<br>⑥ Anthropological research into skeletal transformation in archeological remains excavated in western Japan<br>⑦ Analysis of molecular mechanism of neuronal aging |
| Histology and Cell Biology | AKAZAWA Yuko (Professor)<br>SHIBATA Yasuaki (Associate Professor)<br>MATSUMOTO Gen (Senior Assistant Professor) | ① Mitochondiral dysfunction, ER stress, and DNA damage response in gastroenterology and hepatology diseases<br>② AI-assisted fibrosis anaysis and spatial prolifing to predict patient outcome<br>③ Epigenetic regulation of germ cell differentiation<br>④ Role of Wnt/b-catenin signaling-related molecules on juvenile development and poor prognosis of hepatocellular carcinoma<br>⑤ Molecular mechanisms of protein aggregates by selective autophagy<br>⑥ Degradation mechanisms of Tau in Alzheimer's diseases<br>⑦ Novel drug discovery for neurodegenerative diseases |
| Oral Anatomy and Dental Anthropology | OYAMADA Jyoichi (Associate Professor) | ① Dental anthropological study of the ancient Japanese<br>② Dental anthropological study of the ancient Chinese<br>③ Dental pathological study of the ancient people<br>④ Anatomical study of head and neck |
| Cell Biology | MATSUSHITA Yuki (Associate Professor) | ① Cellular dynamics of bone and tooth stem cells<br>② The mechanism of bone regeneration based on the skeletal stem cells<br>③ Cancer and skeletal stem cells<br>④ Discovery of novel biological sciences by the interdisciplinary approach |
| Physiology of Visceral Function and Body Fluid | INOUE Tsuyoshi (Professor) | ① Elucidation of the pathophysiology of kidney diseases and development of treatment methods<br>② Anti-inflammatory and organ protection mechanisms through the nervous-immune systems<br>③ Atherosclerosis progression mechanism |
| Biochemistry | ITO Takashi (Professor) | ① Mechanisms of DNA higher-order structure formation in the nucleus<br>② Mechanisms of Estrogen receptor-induced gene activation<br>③ Post-translational histone modification and structural changes of chromatin<br>④ ES cell differentiation and structural changes of chromatin |
| Oncology | IKEDA Hiroaki (Professor) | ① Development of novel immuo cell therapy for cancer patients<br>② Development of novel gene therapy for cancer patients<br>③ Translational research of novel immuno-therapy for cancer patients<br>④ Development of novel transplantation therapy with allogeneic cells<br>⑤ Research into T cell functionality |
| Molecular and Genomic Biomedicine | MASUTANI Mitsuko (Professor) | ① Oncology and drug development based on molecular and quantum medical science<br>② Optimization of radiotherapy and radioprotection based on molecular and quantum medical science and radiation biology<br>③ Biochemistry and molecular epidemiology on environmental stress biomarkers based on molecular and quantum medical science<br>④ Biochemistry and molecular epidemiology on disease biomarkers based on molecular and quantum medical science |
| Oral Chrono-Physiology | NAKAMURA Wataru (Professor) | ① Circadian regulation of Physiological Functions<br>② Neural mechanism in the Suprachiasmatic nucleus; internal circadian clock<br>③ Age related decline in physiological rhythms |
| Pharmacology | ARUGA Jun (Professor) | ① Molecular function and physiological role of synapse organizer proteins<br>② Function and pathophysiology of blood-brain-barrier<br>③ Analysis of pathological conditions and development of therapeutic strategies in neurological disorders<br>④ Wiring mechanism of neural circuit and its regulation by diffuse modulatory system |
| Dental Pharmacology | TSUKUBA Takayuki (Professor) | ① Functions and pathological condition of endo-lysosomal protease<br>② Molecular biological research into endosome and lysosome systems<br>③ Cellular biological research into osteoclast-induced bone resorption mechanisms<br>④ Research into protease in bacteria pathogenic in gum disease |
| Pathology | OKANO Shinji (Professor) | ① Pathobiological analysis for carcinogenesis and progression of hepato-pancreato-biliary cancer and development of new therapeutic drug and biologics<br>② Identification of tumor-agonistic dysbiosis of oral and gut microbiota in carcinogenesis and progression of cancer and elucidation of the mechanism<br>③ Pathological assessment of rejection of composite transplantation and elucidation of the mechanism<br>④ Pathobiological analysis of medication-related osteonecrosis of the jaw<br>⑤ Pathobiological analysis of cancer immunotherapy and development of new therapeutic drug and biologics<br>⑥ Elucidation of western medical mechanism of Kampo medicine treatment effects in cancer-burden patients |
| Pathology | MORI Ryoichi (Associate Professor) | ① Investigating the molecular mechanisms of cutaneous wound healing and scar formation<br>② Developing nucleic acid drugs and compounds that contribute to tissue repair<br>③ Molecular biological studies of the extracellular matrix.<br>④ Functional analysis of wound inflammation and repair-related genes in aging |
| Pathology Informatics | FUKUOKA Junya (Professor) | ① Standardization of pathological diagnosis using digital technology<br>② Clinico-pathological study of lung diseases (neoplastic and non-neoplastic)<br>③ Image analysis using artificial intelligence |

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Oral Pathology | FUJITA Shuichi<br>(Associate Professor) | ① Microenvironment of oral squamous cell carcinoma<br>② Functional analysis on DKK3 gene in head and neck squamous cell carcinoma<br>③ Role of Wnt signaling in bone homeostasis |
| Dental and Biomedical Materials Science | WATANABE Ikuya<br>(Professor) | ① Development of low-elasticity, highly corrosion-resistant titanium alloy for bone replacement material<br>② Optical characteristics of all-ceramic repair porcelain<br>③ Cellular suitability evaluation of biomaterials for dental or biological implant<br>④ Abrasion resistance evaluation of metallic biomaterial<br>⑤ Controlled drug-release system for dental materials |
| Molecular Bone Biology | ITO Kosei<br>(Professor) | ① Differentiation, proliferation and tumorigenesis of mesenchymal stem cells<br>② Functional analysis of oncogenes and anti-oncogenes using gene targeted mice<br>③ Molecular analysis of tumor metastasis using gene targeted mice |
| Forensic Pathology and Science | IKEMATSU Kazuya<br>(Professor) | ① Forensic pathology<br>② Child abuse and neglect<br>③ Forensic molecular pathology<br>④ Forensic genetics<br>⑤ Metabolic Autopsy |
| Clinical Epidemiology | SATO Izumi<br>(Professor) | ① Clinical epidemiological study using a large-scale medical database<br>② Research of pharmacoepidemiology using a large-scale medical database |
| Comparative Medicine | OHSAWA Kazutaka<br>(Professor) | ① Research of infectious desease in laboratory animals<br>② Research of human infectious diseases from laboratory animals<br>③ Research of infection prevention of laboratory animals |
| Biomedical Models | KOBAYASHI Atsushi<br>(Professor) | ① Elucidation of the mechanisms of prion disease development<br>② Establishment of the animal models for spontaneous prion disease<br>③ Elucidation of the common mechanisms of formation and transmission of misfolded proteins |
| Functional Genomics | KISHINO Tatsuya<br>(Associate Professor) | ① Molecular analysis of genomic imprinting<br>② Clarification of establishment of epigenetics in early embryos and neurons<br>③ Production and analysis of model mice of epigenetics diseases<br>④ Functional analysis of responsible genes of diseases with mental retardation |
| Forensic Dental Science | | |
| Frontier Oral Science | KADOWAKI Tomoko<br>(Professor) | ① Molecular and biological research on the mechanisms of progression and persistence of inflammatory diseases<br>② Analyses and regulation of causative inflammatory factors<br>③ Study on the maintenance and disorder of homeostasis system, focusing on proteolytic mechanisms |
| Oral Health | SOUTOME Sakiko<br>(Associate Professor) | ① The cohort study on periodontal disease and arterial sclerosis, diabetes and other systemic health<br>② Clinical study of perioperative oral management<br>③ The study of medication-Related Osteonecrosis of the jaw<br>④ Community oral health activities and their evaluation |
| Ophthalmology and Visual Sciences | OISHI Akio<br>(Associate Professor) | ① Research into macular disease and its treatment methods<br>② Research into anatomy and function of the vitreous body<br>③ Basic and Clinical research on retinal and choroidal circulation<br>④ Development of new operating methods on the vitreous body<br>⑤ Research and clinical practice relating to the treatment of diabetic retinopathy<br>⑥ Basic and clinical research on exfoliation glaucoma<br>⑦ Epidemiological research and treatment on HTLV-1 associated uveitis |
| Otolaryngology - Head and Neck Surgery | KUMAI Yoshihiko<br>(Professor) | ① Development of the innovative treatment for the radiation induced vocal fold scar in head and neck cancer patients<br>② Development of the innovative treatment for the aspiration caused by sarcopenia in elder patients<br>③ Development of the innovative treatment for the aspiration induced by irradiation in head and neck cancer patients<br>④ Analysis of the expression of the 53BP1 in meso-pharyngeal cancer patients<br>⑤ Proto-oncogene mutations in middle ear cholesteatoma contribute to its pathogenesis<br>⑥ Development of an new screening system for newborn hearing-impaired children |
| Neurosurgery | MATSUO Takayuki<br>(Professor) | ① Technological development of skull base surgery<br>② Development of support system for brain tumor surgery<br>③ Research into neuroendoscopic surgery<br>④ Research into radiobiological effect for brain tumor after stereotactic irradiation<br>⑤ Analysis of mechanism in blood brain barrier |
| Anesthesiology and Intensive Care Medicine | HARA Tetsuya<br>(Professor) | ① Pathology of acute heart failure and its control<br>② Control of molecular pathology in ischemia/reperfusion injury<br>③ Intestinal pathology of septic shock<br>④ Neural mechanism of chronic pain and its control |
| Cardiovascular Surgery | MIURA Takashi<br>(Professor) | ① Research into valvuloplasty<br>② Research into video-assisted minimally invasive cardiac surgery<br>③ Research into microscopic bypass surgery with permanent graft patency<br>④ Robotic surgery<br>⑤ Research into aortic root anatomy in patients with aortic regurgitation using 4D-CT<br>⑥ Research into the surgical anatomy of mitral valve complex in hypertrophic obstructive cardiomyopathy<br>⑦ Research into surgery for secondary tricuspid regurgitation due to leaflet tethering |
| Urology | IMAMURA Ryoichi<br>(Professor) | ① Research into biomarkers for early diagnosis of antibody-related rejection after kidney transplantation<br>② Research into the efficacy of the new generation antioxidants for interstitial fibrosis after kidney transplantation<br>③ Interaction between regulatory T cells and natural killer cells in microenvironment of renal cell carcinoma<br>④ Elucidation of the pathological significance of the Hippo pathway in bladder cancer<br>⑤ Primary Aldosteronism：Research into Predicting Hypertension Outcomes Following Adrenalectomy |

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|---|---|---|
| Surgical Oncology | MATSUMOTO Keitaro (Associate Professor) | ① Research into molecular biology of lung, gastrointestinal, thyroid and breast cancer<br>② Research into environmental factors and genetic mutations in lung, gastrointestinal, thyroid, and breast cancer<br>③ Research into novel Therapeutic Methods for Intractable Diseases of the Respiratory and Gastrointestinal Tracts<br>④ Research into respiratory function preserving surgery and reconstructive surgery<br>⑤ Research into lung transplantation and organ preservation<br>⑥ Research into regenerative medicine in the respiratory and gastrointestinal tracts<br>⑦ Development of new medical devices by medical-engineering<br>⑧ Research into perioperative infection<br>⑨ Research into minimally invasive surgery and automated robotic surgery |
| Surgery | EGUCHI Susumu (Professor) | ① Research into digestive organ transplantation (liver, pancreas, islets, small bowel, etc.)<br>② Research into digestive organ regenerative medicine (digestive tract, liver, pancreas, islets, etc.)<br>③ Research into digestive organ cancer (digestive tract, liver, pancreas, biliary tract)<br>④ Research into laparoscopic and robot and AI surgery<br>⑤ Research into thyroid and breast surgery and cancer<br>⑥ Research into development of new strategy for pediatric surgery<br>⑦ Research into immunotherapy for malignant tumors and organ transplantation |
| Obstetrics and Gynecology | MIURA Kiyonori (Professor) | ① Research into Placental and Fetal Functions<br>② Research into Clinical Significance of Perinatal Stem Cell in Obstetrics and Gynecology<br>③ Research into Mother-to-Child Infections<br>④ Research into Reproductive Medicine<br>⑤ Research into Gynecologic Oncology<br>⑥ Research into Women's Healthcare<br>⑦ Research into Laparoscopic and Robot Surgery in Obstetrics and Gynecology |
| Orthopaedic Surgery | OSAKI Makoto (Professor) | ① Bone metabolism research using bone marrow adipocyte<br>② Epidemiological research into osteoarthritis, osteoporosis, dialytic spondylosis<br>③ Research into biofilms<br>④ Research into clinical application of photocatalysts in antibacterial material development<br>⑤ Bone structure and mechanical analysis using CT and MRI<br>⑥ Research into preventing sports injury<br>⑦ Analysis of joint kinematics<br>⑧ Pathological analysis of osteonecrosis of femoral head |
| Plastic and Reconstructive Surgery | KASHIYAMA Kazuya (Associate Professor) | ① Research into reconstructive surgery<br>② Research into microsurgical research and clinical application<br>③ Basic and clinical research of keloids in wound<br>④ Development of new operating methods in the hand surgery<br>⑤ Research into the application of adipose tissue derived stem cells in the reconstructive surgery<br>⑥ Application of amniotic membrane and placenta-derived stem cells for tissue repair |
| Neuropsychiatry | KUMAZAKI Hirokazu (Professor) | ① Reasearch about the achievements and limitations of traditional psychiatry<br>② Research about the current state of the art and challenges of the latest robotic and avatar technologies<br>③ Research about the current state of artificial intelligence technology and challenges in its application to psychiatric medicine<br>④ Research on the use of tele-operated medicine to improve psychiatric services<br>⑤ Research about the consciousness and sensory trait for psychiatric disorders |
| Glocal Mental Health Science | OZAWA Hiroki (Professor) | ① Medical and pharmaceutical research and development of new drugs and health foods based on the demands of international and regional (glocal) society<br>② Research on mental wellbeing, mental health, and related technologies and assessments<br>③ Research on strengthening international and regional partnerships and exchanges and education |
| Dermatology | MUROTA Hiroyuki (Professor) | ① Establishment of a novel therapeutic stratedies for anhidrosis and hyperhidrosis based on a physiological and functional analysis of human sweat gland<br>② Establishment of immune cell transfusion therapy for both skin cancer and cutaneous lymphomas<br>③ Investigation to formulate the novel therapeutic strategies for allergic diseases based on scientific grounds<br>④ Survey for epidemiology of allergy, and evaluation of buren in patients with allergic skin diseases<br>⑤ Survey for actual condition and epidemiological investigation of skin infection (e.g. fungal disease, acid-fast bacteria, and bacterial infection, etc.)<br>⑥ Diagnosis of rare intractable diseases and development of new treatments for those diseases (e.g. pseudoxanthoma elasticum, Fabry disease, and neurofibromatosis, etc.)<br>⑦ Investigaion for biomarkers and microbiomes which are of benefit to involved in treatment options for skin diseases (e.g. psoriasis, atopic dermatitis, etc.)<br>⑧ Establishment of novel therapeutic strategies focusing on the both microenvironment and matrix of skin tumors<br>⑨ Pathological and physiological analysis of sensory abnormalities (e.g. pruritus and pain) and tactile dysfunction |
| Cardiovascular Medicine | MAEMURA Koji (Professor) | ① Basic and clinical research on the mechanisms and treatment of arteriosclerosis and pulmonary hypertension<br>② Development of biomarkers of cardiovascular disease and its clinical application<br>③ Research on the application of chronotherapy to cardiovascular disease<br>④ Association of myocardial tissue changes with genetic abnormlities of cardiomyopathy and lethal arrhythmia<br>⑤ Epidemiology of acute myocardial infarction in Nagasaki<br>⑥ Research on the relationship between cancer and cardiovascular disease<br>⑦ Research on the application of adipose tissue derived stem cells in cardiovascular regenerative medicine<br>⑧ Research on implementation of a regional clinical pathway for cardiovascular disease |
| Gastroenterology and Hepatology | MIYAAKI Hisamitsu (Associate Professor) | ① Molecular biology, mutations and pathology of hepatitis virus<br>② Interferon signals within hepatic cells<br>③ Life and death of hepatic cells<br>④ Early diagnosis and carcinogenic inhibition of hepatic cell cancer<br>⑤ Development of new treatment methods for digestive organ cancer<br>⑥ Digestive organ disorders and metabolic syndrome<br>⑦ Pathological analysis and development of new treatment methods for autoimmune hepatitis<br>⑧ Pathological analysis and development of new diagnostic methods for D198:D205hypersensitivity pneumonia |

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Respiratory Medicine | MUKAE Hiroshi (Professor) | ① Clarification of effect of anaerobic bacteria co-infection on other infectious diseases<br>② Pathogenesis of fungi and mechanisms of antifungal resistance<br>③ Development of novel diagnosis and therapeutic strategies for respiratry fungal infections<br>④ Elucidating the pathogenssis and development of novel immunological treatments for invasive bacterial pneumonia<br>⑤ Development of new molecularly-targeted treatment for pulmonary fibrosis<br>⑥ New evaluation of environmental risks of obstructive pulmonary diseases (COPD and bronchial asthma)<br>⑦ Clarification of molecular targeted drug-resistant mechanisms in driver-mutation positive lung cancer<br>⑧ Development of novel therapeutic agents for pleural malignant mesothelioma<br>⑨ Analysis of adverse events in the immune checkpoint inhibitors<br>⑩ Development of new cell therapy for pulmonary fibrosis |
| Laboratory Medicine | YANAGIHARA Katsunori (Professor) | ① Research into new methods of diagnosing infectious diseases<br>② Clarification of drug-resistant mechanisms and research into drug resistant bacteria control<br>③ Clarification of severe infection mechanisms and development of new treatment methods<br>④ Research about the role of microbiota on human health<br>⑤ Clarification of ATL pathology and development of new treatment methods<br>⑥ Establishment of custom-made diagnostics for neoplasm and infection<br>⑦ Development of new antimicrobials |
| Pediatrics | MORIUCHI Hiroyuki (Professor)<br>DATEKI Sumito (Associate Professor) | ① Epidemiological and clinical research into mother-to-child infections<br>② Investigation on involvement of coronaviruses in the onset of Kawasaki disease<br>③ Research on reactogenecity to COVID-19 vaccine<br>④ Investigation on prevalence of antimicrobial resistant bacteria among infants and toddlers in the community<br>⑤ Research into hereditary diseases and genetic diagnosis<br>⑥ Clinical and Genetic research into short statures<br>⑦ Clinical and Genetic research into pediatric endocrinologic disorders<br>⑧ Research into genetic etiologies of undiagnosed congenital diseases |
| Radiological Science | TOYA Ryo (Professor) | ① Diagnostic imaging of inflammatory and degenerative diseases<br>② Imaging and staging of malignant tumors<br>③ Application of molecular imaging into radiotherapy planning<br>④ Physics analysis and clinical application of high-precision radiation therapy |
| Clinical Oncology | ASHIZAWA Kazuto (Professor) | ① Research into management of pulmonary nodules using diagnostic imaging<br>② Research into molecular imaging for use in determining effectiveness of cancer treatments<br>③ Cutting edge clinical cancer research involving clinical trials on cancer drug treatments in multi-organ cancer cases<br>④ Development of novel therapeutic strategies in rare cancers |
| Clinical Physiology | KURATA Shinji (Associate Professor) | ① Research into management upper airway patency during sleep and anesthesia<br>② Investigation on influence of anxiety on pain perception<br>③ Research into functional role of opioid receptor<br>④ Investigation on ischemia reperfusion injury of liver circulation<br>⑤ Investigation on swallowing disorder |
| Orthodontics and Dentofacial Orthopedics | YOSHIDA Noriaki (Professor) | ① Biomechanical analysis of orthodontic tooth movement<br>② Effect of soft diet feeding on masticatory function development and craniofacial growth<br>③ Etiology and pathogenesis of stomatognathic function disorders<br>④ Mechanisms of root resorption induced by orthodontic tooth movement<br>⑤ Development of orthodontic diagnosis and treatment support system using AI<br>⑥ Development of treatment system for achieving efficient tooth movement<br>⑦ Mechanisms of osteoclast differentiation and its control |
| Pediatric Dentistry | TANOUE Naomi (Associate Professor) | ① Molecular biological research of pathogenic factors of dental caries and periodontal disease<br>② Molecular biological research of teeth and craniofacial growth and development<br>③ Development of new congnitive behavioral therapy<br>④ Materials-based approach to dental and oral diseases |
| Periodontology and Endodontology | YOSHIMURA Atsutoshi (Professor) | ① Physical properties and clinical results of endodontic tools and materials<br>② Wound healing mechanism in pulpitis and apical periodontitis<br>③ Pulp regenerative medicine and biomaterials<br>④ Analysis of alveolar bone resorption mechanism<br>⑤ Role of immune system in periodontal tissue breakdown<br>⑥ Epidemiological study of periodontal diseases<br>⑦ Analysis of virulence factors of periodontopathic bacteria<br>⑧ Associations between periodontal disease and systemic disease |
| Applied Prosthodontics | SAWASE Takashi (Professor)<br>KUROSHIMA Shinichiro (Associate Professor) | ① Biocompatibility and biodynamics of dental implants<br>② Understanding of pathophysiology of and treatment strategy for MRONJ<br>③ Manufacture, clinical application and evaluation of polymers/composite materials/ceramics<br>④ Surface modification of dental materials |
| Prosthetic Dentistry | MURATA Hiroshi (Professor) | ① Research into the development and clinical application of dental materials such as soft denture liners and denture adhesives<br>② Research into mastication function and jaw movement<br>③ Clinical research of prosthetic dentistry<br>④ Maintenance of dentures<br>⑤ Development of swallowing function and choking risk assessment system using artificial intelligence<br>⑥ Development of the oral simulator to enable highly predictive dental treatment |
| Oral and Maxillofacial Surgery | YAMADA Tomohiro (Professor) | ① Basic and clinical research on maxillofacial deformities and congenital anomalies<br>② Basic and clinical research on oral tumors<br>③ Basic and clinical research on oral and maxillofacial reconstruction<br>④ Research on treatment support systems using digital technology |
| Radiology and Biomedical Informatics | SUMI Misa (Professor) | ① Diagnostic imaging of head and neck tumors<br>② Diagnosis and treatment of Sjögren's syndrome<br>③ Deep learning approach for imaging diagnosis<br>④ DNA damage and repair mechanisms |

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Medical Research and Development for Oral Disease | SUMITA Yoshinori (Professor) | ① Translational research of novel cell and gene therapies for jaw and alveolar bone defects<br>② Translational research of novel cell therapies for xerostomia (atrophic salivary glands)<br>③ Research into the function of tissue specific macrophages on morbid aged salivary glands<br>④ Research into the function of megakaryocytes on bone metabolism and regeneration |
| Pharmacotherapeutics | TSUKAMOTO Kazuhiro (Professor)<br>HIRAYAMA Tatsuro (Associate Professor) | ① Research into DNA-based diagnostic methods for personalized medicine<br>② Research into association studies on susceptibility genes for diseases, progression, drug effectiveness, adverse effects, and prognosis using genetic polymorphic markers<br>③ Research into antifungal drug-resistance mechanisms of pathogenic fungi |
| Pharmaceutical Informatics | KAWAKAMI Shigeru (Professor)<br>MUKAI Hidefumi (Associate Professor) | ① Research into targeted DDS using external stimuli from medical equipment<br>② Research into medical applications of nanobiotechnology<br>③ Development of novel nucleic acid medicine encapsulated lipid nanoparticles (LNPs)<br>④ Development of designer bacterial drugs for the treatment of refractory cancer<br>⑤ Development of new PET probes and novel methods for pharmacokinetic analysis |
| Pharmaceutics | NISHIDA Koyo (Professor) | ① Research on drug delivery system aiming to develop new administration forms<br>② Development of control method for distribution of genetic medicine in the body and its pharmaceutical formulation with the purpose of optimizing treatment<br>③ Research on kinetic analysis of drug disposition in the body and dosage regimen under diseased state |
| Pharmacy Practice | NAKASHIMA Mikiro (Professor) | ① Basic and clinical pharmaceutical research of drugs and their proper use<br>② Practical scientific research based on drug preparation and medical communication in the clinical setting<br>③ Development of sequence decoding method for protein antigenization<br>④ Development of highly targeted drug delivery system |
| Molecular Pathochemistry | OHYAMA Kaname (Professor)<br>KODAMA Yukinobu (Associate Professor) | ① Clinical application and advanced research of comprehensive analysis of immune complexes<br>② In-house production of blood drug measurement by LC-MS/MS and research on drug treatment design based on large-scale data<br>③ Research on optimization of drug treatment and proper use of drugs by artificial intelligence<br>④ Elucidation of the molecular basis of hibernation<br>⑤ Development of drugs and genetic delivery systems |
| Nursing Sciences | ETO Hiromi (Professor)<br>HONDA Sumihisa (Professor)<br>SAWAI Terumitsu (Professor)<br>ISHIMATSU Yuji (Professor)<br>KURODA Hiromi (Professor)<br>MATSUURA Emi (Professor)<br>TANAKA Junichi (Associate Proffesor) | ① Research on midwifery and women's health<br>② Research on sleep of mother and child<br>③ Research on health promotion for the community citizens<br>④ Research on into ostomy rehabilitation<br>⑤ Research on prevention for perioperative complication<br>⑥ Research on chronic respiratory nursing<br>⑦ Research on infection control nursing<br>⑧ Research on cardiovascular nursing<br>⑨ Research on people with sleep disturbance<br>⑩ Research on chronic disease nursing<br>⑪ Research on collagen disease nursing<br>⑫ Research on health literacy<br>⑬ Research on acute care nursing<br>⑭ Research on children's health and nutrition |
| Physical Therapy Sciences | KOZU Ryo (Professor)<br>OKITA Minoru (Professor)<br>ORIGUCHI Tomoki (Professor)<br>SAKAMOTO Junya (Associate professor) | ① Clarification of the mechanism for locomotive disorders (joint contracture, muscle atrophy, pain, etc)<br>② Research and development in rehabilitation for musculoskeletal diseases<br>③ Research and development in rehabilitation for cancer<br>④ Clinical research on rehabilitation for acute and chronic cardiorespiratory disorders<br>⑤ Epidemiological study for early detection and secondary prevention of chronic obstructive pulmonary disease<br>⑥ Research on rehabilitation for rheumatic diseases<br>⑦ Fundamental and clnical research on pain in rehabilitation |
| Occupational Therapy Sciences | IWANAGA Ryoichiro (Professor)<br>IMAMURA Akira (Professor) | ① Research for assessment of children with developmental disabilities<br>② Research for dysfunction of sensory and motor in the individuals with autism spectrum disorder<br>③ Research on psychiatric rehabilitation<br>④ Research on investigation and support of addiction<br>⑤ Research on the biological basis of autism spectrum disorder and schizophrenia |
| Health Sciences | OHNISHI Mayumi (Professor)<br>HIGASHI Toshio (Professor)<br>KOSEKI Hironobu (Professor)<br>SATOH Katsuya (Professor)<br>HIRANO Yuko (Professor) | ① Research on health promotion for the community citizens<br>② Research in improving the health of people living under disadvantaged conditions<br>③ Research on rehabilitation for the disabled<br>④ Kinematic analysis and research of arthroplasty for gonarthrosis<br>⑤ Microstructure analysis and strength measurement of disuse bone atrophy<br>⑥ Joint kinetic analysis of wrist and ankle<br>⑦ Research and development in rehabilitation for neurological disease and muscle disease<br>⑧ Research and development in diagnose for dementia disease and rehabilitation for the prevention of dementia disease<br>⑨ Research on transfer of Japan’s care technology to Asian countries<br>⑩ Research on the Sense of Coherence and its implication to health<br>⑪ Research on life adaptation and stress coping of foreign health workers in Japan |
| Preventive Medicine | KOBAYASHI Masakazu (Associate Professor) | ① Research into the effects of lifestyle on physical and mental health in young adults<br>② Research into the effects of lifestyle factors on physical and mental health in workers |
| Medical Innovation | TANAKA Yoshimasa (Professor) | ① Development of novel combination cancer therapy harnessing PD-1 immune checkpoint inhibitors<br>② Development of novel cancer immunotherapy harnessing gd T cells<br>③ Development of novel cancer immunotherapy harnessing nanobodies<br>④ Development of novel cancer immunotherapy harnessing natural products |
| Community Network for Health Welfare | | |
| Endocrinology and Metabolism | | |

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Clinical Neuroscience | TSUJINO Akira<br>(Professor)<br>TATEISHI Yohei<br>(Senior Assistant Professor) | ① Development of new diagnostic and therapeutic techniques for the neurological diseases<br>② Research on molecular, pathological and physiological mechanisms underlying the neurological diseases<br>③ Epidemiological and statistical analysis of omics and clinical data in the neurological diseases<br>④ Biomarker development for precision medicine in the neurological diseases<br>⑤ Translational research and clinical research of regenerative medicine in the neurological diseases |
| Nephrology | NISHINO Tomoya<br>(Professor) | ① Research into mechanisms of kidney diseases and development of new treatment methods<br>② Basic and clinical research into renal replacement therapy including hemodialysis, peritoneal dialysis and kidney transplantation<br>③ Epidemiological and clinical research into chronic kidney disease<br>④ Research into mechanisms and new treatment for complication of chronic kidney disease |
| Emergency Medicine | TASAKI Osamu<br>(Professor) | ① Pathophysiological clarification of sepsis, and research into the development of treatment<br>② Pathophysiological clarification of ischemia-reperfusion injury, and research into the development of treatment<br>③ Pathophysiological clarification of severe trauma, and research into the development of treatment<br>④ Pathophysiological clarification of heatstroke, and research into the development of treatment<br>⑤ Research into nutrition management of critically ill patients |
| Rehabilitation Medicine | TAKAHATA Hideaki<br>(Associate Professor) | ① Research on prevention and treatment of dysphagia and pneumonia in stroke patients<br>② Study of dysphagia in critical care patients<br>③ Studies on myonuclei and satellite cells for muscle regeneration in critically ill patients |
| Neurological Science | | |
| Neuroimmunology | HIGUCHI Osamu<br>(Professor) | ① Development of targeted drug for neurological diseases<br>② Development of drug discovery platform targeting protein kinases<br>③ Development of measurement technology for neurological disease biomarkers |
| Comprehensive Community Care | MINE Takashi<br>(Professor)<br>ICHIKAWA Tatsuki<br>(Professor) | ① Research into comprehensive community care system<br>② Research into the policy for community health<br>③ Research into network system for comprehensive community care<br>④ Research into primary health care in local community<br>⑤ Research into dementia and mild cognitive impairment in community<br>⑥ Research into assessment for sarcopenia<br>⑦ Viral hepatitis and metabolic syndrome |
| Comprehensive Oncology | GOTO Koichi<br>(Professor)<br>KONDO Tadashi<br>(Professor)<br>IGAKI Hiroshi<br>(Professor)<br>ISHIAI Masamichi<br>(Professor)<br>WATANABE Keisuke<br>(Associate Professor) | ① Research into fundamental causes and prevention of cancer<br>② Research into diagnosis and treatment for cancer<br>③ Research into cancer pathophysiology and survivorship<br>④ Research into precision medicine for cancer patients<br>⑤ Development of cellular immunotherapies for cancers<br>⑥ Development of medical devices and programs for cancer treatment |
| Precision Oncology and Translational Research | FUJITA Shin<br>(Professor) | ① Clinical research into precision medicine for cancer patients<br>② Translational research of cancer |

②Areas of Research in Department of Infection Research

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Immunology | AOSHI Taiki (Professor)<br>INOUE Shin-Ichi (Associate Professor) | ① Research on innate immunity<br>② Research on antigen presenting cells<br>③ Research on T cell responses<br>④ Research and development of type 1 innate immune activator<br>⑤ Research and development of PDX disease model<br>⑥ Research and development of new antimalarial drugs<br>⑦ Induction of IL-27 producing regulatory T cells (Tr27 cells) and their roles in the regulation of chronic infection<br>⑧ IL-27-related regulation of immunological memory during malaria infection<br>⑨ Molecular mechanism of memory CD4+ T cell-differentiation and their persistence during malaria infection<br>⑩ Mechanism underlying immune response of γδ T cells and their roles in malaria infection<br>⑪ Mechanism of complicated Plasmodium vivax malaria in India |
| Cellular and Molecular Biology | NISHIDA Noriyuki (Professor) | ① Analysis of prion pathogen behavior and infection/proliferation mechanisms<br>② Analysis of host immune response in regard to prion infection, and development of immunomodulation therapy<br>③ Research into development of viral infection and prion infection diagnosis methods<br>④ Research into development of new drug treatments for pathogens |
| Infectious Diseases | IZUMIKAWA Koichi (Professor) | ① Analysis of antifungal resistance mechanisms and virulence, and development of novel diagnostic tools and treatments for the infections caused by pathogenic fungi (Aspergillus, Candida, and Cryptococcus)<br>② Investigation of the molecular basis of host-pathogen interaction for bacteria causing the respiratory infection<br>③ Investigation of epidemiology and pathogenesis of the emerging, re-emerging infectious diseases as well as diseases caused by drug-resistant pathogens<br>④ Intervention for the preventing the spread of hospital-acquired infection |
| Medical Virology | UNO Naoki (Associate Professor) | ① Technical innovation in molecular viral diagnostics<br>② Molecular assay development for pathogen detection and quantification |
| Microbiology and Oral Infection | NAITO Mariko (Professor)<br>SHOJI Mikio (Associate Professor) | ① Analysis of transport and secretion system of pathogenic factors in periodontal pathogen<br>② Molecular biological analysis of pathogenic factors of periodontal and relative bacteria<br>③ Search and development of antibacterial drugs targeting periodontal pathogen |
| Molecular Virology | TAKAMATSU Yuki (Associate Professor) | ① An Intracellular dynamics of highly pathogenic viruses using live cell imaging system<br>② Molecular replication machinary of highly pathogenic viruses (flaviviruses, alphaviruses, filoviruses and bunyaviruses)<br>③ Molecular mechanisms of pathogenicity in highly pathogenic viruses (flaviviruses, alphaviruses, filoviruses and bunyaviruses) infection<br>④ Seroepidemiological and molecular epidemiological studies of arthropod-borne viruses (e.g. Japanese encephalitis virus, Dengue virus, Zika virus, Chikungunya virus, etc)<br>⑤ Development of diagnostic, therapeutic and preventive measurements against arthropod-borne viruses (e.g. Japanese encephalitis virus, Dengue virus, Zika virus, Chikungunya virus, etc)<br>⑥ Analysis of SARS-CoV2 pathogenecity and development of diagnostic and therapeutic methods |
| Bacteriology | KODAMA Toshio (Professor) | ① Research on pathogenesis of enteropathogenic bacteria<br>② Immune response and host defense mechanism to enteropathogenic bacteria<br>③ Molecular epidemiological study on enteropathogenic bacteria in endemic areas |
| Medical Protozoology | KANEKO Osamu (Professor) | ① Molecular mechanisms of erythrocyte invasion and modification by malaria parasite<br>② Molecular epidemiology of malaria vaccine candidate antigens and drug-resistance genes<br>③ Evolution of malaria parasites<br>④ Understanding the biology of the dormant liver stage of malaria parasites<br>⑤ Development of vaccines, drugs and diagnostic tools for malaria |
| Biochemical Parasitology | MI-ICHI Fumika (Professor) | ① *Entamoeba* lipid metabolism; biochemistry, molecular and cell biology, and physiology<br>② Study for the molecular mechanism underlying *Entamoeba* encystation<br>③ Construction of metabolic pathway of *Entamoeba histolytica* and identification of the targets for the development of anti-amoebiasis drugs |
| Medical Helminthology | HAMANO Shinjiro (Professor) | ① The parasitic diseases to be targeted: Neglected Tropical Diseases (NTDs) such as Schistosomiasis, Leishmaniasis, Trypanosomiasis, Amebiasis, etc.<br>Spatio-temporal epidemiology, behavioral change communications in Africa in addition to research and development for new monitoring methods and drugs for parasitic diseases<br>② Research and development of new vaccines and diagnostic methods against parasitic diseases<br>③ Research on immune response and host defense mechanisms against parasites<br>④ Research on survival strategies and pathogenicity of parasites |
| Immunogenetics | | |
| Clinical Investigation | | |
| Ecoepidemiology and Epidemiological Informatics in Tropical Medicine | KANEKO Satoshi (Professor) | ① Research on the establishment of a large-scale surveillance system for neglected tropical diseases<br>② Research on the linkage between environmental DNA and epidemiological data on tropical diseases<br>③ Research on the application of biometrics to regional medical information systems<br>④ Epidemiological study on growth retardation (stunting) in children in developing countries<br>⑤ Study on electronic resident registration and maternal and child registration in developing countries<br>⑥ Epidemiological study on fungal mycosis |

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| International Health and Medical Anthropology | YAMAMOTO Taro (Professor) | ① Research into international health policy (G8 and the Conference on African Development)<br>② Reassembly of infectious disease on a time axis (study of ancient infectious diseases)<br>③ Molecular evolutionary research into maternal-child HTLV-1 infection<br>④ Infectious diseases and climate change (the environment)/changes to ecosystems<br>⑤ Research into the history of medicine relating to the history of tropical medicine in Japan<br>⑥ Research into factors in the spread of AIDS in the Greater Mekong Economic Corridor and China<br>⑦ High altitude medicine from evolutionary perspective<br>⑧ Field research in microbiome and modern epidemic<br>⑨ Study on Mathematical Infection Model of STIs<br>⑩ Application of Game Theory to Drug Resistance Drugs<br>⑪ Research on oral health, stress and birth outcomes among pregnant women in developing countries |
| Vector Ecology and Environment | MINAKAWA Noboru (Professor) | ① Biology of malaria vector mosquitoes in tropical regions<br>② Biology of viral disease vector mosquitoes in tropical regions<br>③ Malaria and dengue vector contorl tools<br>④ Impacts of environmental changes and climate variability on insect vectors<br>⑤ Modeling COVID-19 and malaria<br>⑥ Ecology and control of non-mosquito vectors such as tsetse flies, sandflies, ticks, etc. |
| Clinical Tropical Medicine | KUBO Yoshinao (Associate Professor) | ① Clinical epidemiology of acute respitatory tract infection among adult<br>② HIV and AIDS in developing countries<br>③ Clarification of acute respiratory infection in developing countries, and countermeasures<br>④ Pathological clarification of other tropical infectious diseases in developing countries, and countermeasures |
| Tropical Pediatric Infectious Diseases | YOSHIDA Lay-Myint (Professor) | ① Clinical epidemiology and microbiology of paediatric infectious diseases in tropical regions<br>② Pediatric Acute Respiratory Infection: clinical epidemiology, etiology, pathogeneis, prevention and treatment<br>③ Clinical epidemiological and modelling studies on impact of vaccination and other intervention<br>④ Statistical analysis of disease surveillance data<br>⑤ Environmental factors and infectious diseases |
| Clinical Product Development | | |
| Tropical Bacteriology | | |
| Tropical Microbiology | HASEBE Futoshi (Professor) | ① Epidemiological study on arbovirus infectious disease s in the tropical area and pathogenic analysis<br>② Investigation of emerging viral diseases in the tropical area and development of quick diagnostic method<br>③ Epidemiological and ecological study on viral infectious diseases in Southeast Asia<br>④ Development of an innovative method to detect viral diseases |
| Emerging Viral Diseases | YASUDA Jiro (Professor) | ① Molecular mechanisms of replication of hemorrhagic fever viruses<br>② Development of novel anti-viral strategies against highly pathogenic viruses (especially influenza, SFTS, Ebola, Marburg and Lassa viruses)<br>③ Development of diagnostic methods for emerging viral diseases<br>④ Analyses of the pathogenicity of SARS-CoV-2 and development of the treatments for COVID-19<br>⑤ Epidemiological and ecological studies on viral diseases in Africa |
| Cellular and Molecular Virology | NANBO Asuka (Professor) | ① Molecular mechanism of infrction and pathogenesis of Filovirus<br>② Characterization of extracellular vesicles released from tumor virus-infected cells<br>③ Molecular mechanism of development of Epstein-Barr virus-associated epithelium tumors<br>④ Development of therapeutics and diagnosis for Filovirus and tumor viruses-associated diseases |
| Viral Ecology | YOSHII Kentaro (Professor) | ① Persistence and transmission of arthropod-borne viruses in hosts<br>② Pathogenic mechanisms of arthropod-borne viruses<br>③ Development of diagnostic methods and epidemiological research of arthropod-borne viruses<br>④ Development of vaccines and therapeutics for arthropod-borne viruses |
| Immune Dynamics in Viral Infections | KAWASAKI Takumi (Associate Professor) | ① Study of vairal immune response in cultured cells<br>② Analysis of Immune dynamics in laboratory animals during viral infections<br>③ Elucidation of the mechanisms of viral replication and virulence<br>④ Applied research for prevention and diagnosis for viral infections |
| Integrative Regulation | IMAIZUMI Yoshitaka (Professor) | ① Research on the clinical pathogenesis and prognosis of refractory tumors<br>② Clinical research on the medical treatment of malignant tumors in the elderly |
| Healthcare Research | KOMORI Atsumasa (Professor) | ① Development and proposal for public policy about viral hepatitis<br>② Development and proposal for public policy about intractable liver diseases<br>③ Characterization and proposal for patient-centered outcomes-based medicine in viral hepatitis and in intractable liver diseases |
| Viral Hepatitis | YATSUHASHI Hiroshi (Professor) | ① Clinical research of hepatitis C and B, and research into the development of treatment methods<br>② Research into analysis of medical and genetic information using data mining<br>③ Research into the genetic mutation, pathology and treatment of hepatitis virus<br>④ Studies on the pathophysiology and treatment of liver fibrosis and cirrosis<br>⑤ Clinical research on the development of liver cancer and its suppression |

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Advanced Research | NAKAMURA Minoru (Professor) | ① Development of molecular target therapy for refractory autoimmune liver diseases (primary biliary cholangitis, autoimmune hepatitis)<br>② Development of order-made treatment for chronic viral hepatitis based on individual analysis of immune-response<br>③ Development of regenerative medicine for diseases in the liver/bile duct based on molecular mechanisms for cellular damage/regeneration |
| Molecular Immunology | | |
| Function and Morphology | KUROKI Tamotsu (Professor) | ① Diagnosis and surgical treatment for liver cancers hepatic cancer, intrahepatic bile duct cancer, etc.<br>② Clinical and experimental research into regenerative capacity and mechanisms in liver diseases<br>③ Development of the novel assessment method for hepatic functional reserve hepatic cell transplant methods<br>④ Clinical and experimental research into the relationship between hepatocellular carcinoma and lifestyle diseases |
| Clinical Pathology | ITO Masahiro (Professor) | ① Clinical and pathological research into viral hepatitis/hepatic neoplasm<br>② Clinical and pathological research into refractory autoimmune hepatic disease<br>③ Molecular pathological research into neoplastic disorders<br>④ Clarification of occurrence mechanisms for radiation-induced neoplasm |
| Basic Mycobacteriosis | MITARAI Satoshi (Professor)<br>KEICHO Naoto (Professor)<br>OHKADO Akihiro (Associate Professor) | ① Research on the development and evaluation of bacteriological diagnostic methods for tuberculosis<br>② Research into drug-resistant mechanisms in mycobacteria and their diagnosis/treatment<br>③ Epidemiological research on Mycobacterial diseases including molocular analysis<br>④ Analytical research on the relationship between mycobacterial function and its microstructure<br>⑤ Functional analyses of mycobacteria with OMICS information<br>⑥ Research on mycobacterial infection, development and recurrence of the disease at genetic, molecular and cellular levels |
| Clinical Mycobacteriosis | SHIRAISHI Yuji (Professor)<br>OHTA Ken (Professor)<br>MORIMOTO Kozo (Professor) | ① Clinical research into treatment of susceptible pulmonary tuberculosis<br>② Research into DOTS (Directly Observed Treatment Short-course)<br>③ Clinical research into multi-resistant tuberculosis<br>④ Clinical research (including clinical trials) into the effectiveness of new antituberculosis drug treatments<br>⑤ Research into non-tuberculous mycobacterial disease<br>⑥ Research into pulmonary rehabilitation for patients with mycobacterial disease<br>⑦ Pathophysiological analyses of systemic inflammation and sarcopenia in pulmonary mycobacteriosis<br>⑧ Pulmonary rehabilitation and nutritional strategies for pulmonary mycobacteriosis |

③Areas of Research in Department of Life Sciences and Radiation Research

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Radiation Medical Sciences | MITSUTAKE Norisato (Professor)<br>SUZUKI Keiji (Associate Professor) | ① Molecular mechanisms of thyroid cancer development<br>② Elucidation of mechanisms of ionizing radiation-induced carcinogenesis |
| Radiation Molecular Epidemiology | | |
| Radiation Biology and Protection | YOKOYAMA Sumi (Professor) | ① Research on radiation dosimetry<br>② Research on radiation protection<br>③ Research on radiation risk communication |
| Radiation and Environment Health Effects | HAYASHIDA Naomi (Professor) | ① Epidemiological research in local population<br>② Research on health effects due to radiation<br>③ Research on thyroid |
| Genome Repair | | |
| Stem Cell Biology | LI Tao-Sheng (Professor) | ① Translational studies on stem cells (cardiovascular diseases, wound healing, cancer, aging…)<br>② Understand how low dose radiation exposure affects the health by viewing the stem cells<br>③ Characterize cancer stem cells and uncover the mechanism on therapeutic resistance<br>④ Investigate the role of autophagy on genomic instability<br>⑤ Basic and translational studies on biomechanical stresses |
| Hematology | MIYAZAKI Yasushi (Professor) | ① Development of new diagnostic methods and treatments for hematopoietic diseases<br>② Molecular analysis for the pathogenesis of hematopoietic neoplasms<br>③ Epidemiology and pathological research for radiation-induced hematopoietic diseases<br>④ Molecular analysis for hematopoietic stem cells<br>⑤ Development of treatments for hematological disorders using hematopoietic cell transplantation and immunotherapy |
| Radioisotope Medicine | KUDO Takashi (Professor) | ① Research into the clinical/pre-clinical use of radioisotopes<br>② Research into measurement of human low dose internal radiation<br>③ Research into risk/benefit assessment of the medical radiation and occupational radiation related to medical radiation usage |
| International Hibakusha Medical Sciences | | |

④Areas of Research in Division of Advanced Preventive Medical Sciences

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Neurobiology and Behavior | NAKAHATA Yasukazu (Associate Professor) | ① Successful aging by revealing molecular mechanisms of how the circadian clock regulates aging process<br>② Discovery of bioactive natural products that activate the circadian clock<br>③ In vivo study to control the aging process by the circadian clock |
| Public Health | AOYAGI Kiyoshi (Professor) | ① Community health based on health promotion science<br>② Prevention of bone/joint disease<br>③ Industrial health<br>④ Prevention of lifestyle-related disease<br>⑤ Physiological polymorphism based on physiological anthropological research |
| Medical Informatics | MATSUMOTO Takehiro (Associate Professor) | ① Development and evaluation of Hospital Information System<br>② Development and evaluation of Health Information Exchange<br>③ Hospital management using Medical DX<br>④ Development and evaluation of Hospital Information System for medical Safety |
| Community Medicine | NAGATA Yasuhiro (Professor) | ① Research in community medicine<br>② Research into the epidemiology of life-style related disease<br>③ Research into community medical information and partnerships<br>④ Research into community-based medical education<br>⑤ Research into comprehensive community care system |
| Immunology and Rheumatology | KAWAKAMI Atsushi (Professor) | ① Research into causes and pathology of autoimmune disease/autoinflammatory disease and development of new treatment<br>② Integrated analysis of arthritis: Etiology,Pathology and Therapy<br>③ Genetic and environmental analysis of autoimmune disease and autoinflammatory disease<br>④ Onset mechanisms for autoimmune disease brought on by viral infection<br>⑤ Multimodal investigation of Preclinical-RA and Pre-RA by genomic, immunological and environmental approach<br>⑥ Multimodal investigation of connective tissue disease associated interstitial lung disease<br>⑦ Research into causes and pathology of refractory autoimmune neural disease<br>⑧ Research into causes and pathology of lifestyle-related disease and development of new treatment<br>⑨ Radiation exposure and thyroid cancer<br>⑩ Reserch of osteoporosis: pathological aspect and advanced treatments |
| General Medicine | MAEDA Takahiro (Professor) | ① Epidemiological study for prevention of lifestyle-related diseases<br>② Research into pathophysiology and prevention/treatment regarding functional somatic syndrome<br>③ Research into medical information sharing in community<br>④ Research into pathophysiology and prevention regarding sarcopenia/frailty<br>⑤ Research into rare diseases in primary care |
| Global Health, Medicine and Welfare | TAKAMURA Noboru (Professor) | ① Environmental monitoring of Fukushima<br>② Evaluation of exposure doses in Fukushima<br>③ Risk perception of residents in Fukushima<br>④ Epidemiological study of victims around Chernobyl Nuclear Power Plant |
| Human Genetics | YOSHIURA Koichiro (Professor) | ① Identification of the genes responsible for onset of disease<br>② Research into the relationship between human genetic polymorphism and disease<br>③ Research into the control of genetic expression through epigenetics mechanisms<br>④ The creation of disease model mice and pathophysiolological analytical research thereof<br>⑤ Development of methods to quantify radiation damage |
| Molecular Medicine | | |
| Tumor and Diagnostic Pathology | NAKASHIMA Masahiro (Professor) | ① Research into molecular pathological specificity of neoplasms in atomic bomb Hibakusha<br>② Research into late-onset radiation-induced disorders<br>③ Creation of Hibakusha neoplasm tissue bank<br>④ Pathology of thyroid neoplasm<br>⑤ Research into pathological diagnostics and new molecular pathological diagnostics |

Doctoral Course [3 years]

①Areas of Research in Department of Pharmaceutical Sciences

| Area of Research | Professor, etc. | Details of main research work |
|---|---|---|
| Cell Regulation | TAKEDA Kohsuke (Professor) | ① Roles of mitochondrial sensing and stress response<br>② Mitochondrial functions in the regulation of inflammation<br>③ Mechanisms of inflammatory death of macrophage lineage cells<br>④ Molecular mechanisms of cell motility |
| Pharmacology and Therapeutic Innovation | KANEKO Masayuki (Professor)<br>TSUKAHARA Tamotsu (Associate Professor) | ① Physiological roles and drug discovery of ubiquitin ligases<br>② Analysis of gene function and drug discovery using genome editing<br>③ Drug discovery based on the translation, transport, and metabolism of protein<br>④ Lipid mediators in inflammation disorders<br>⑤ Lysophosphatidic acid signaling in the nervous system<br>⑥ Drug discovery and development; From Lipid molecules to medicine |
| Pharmaceutical Chemistry | TANAKA Masakazu (Professor)<br>UEDA Atsushi (Associate Professor) | ① Design and synthesis of non-proteinogenic amino acids and their use in pharmaceutical chemistry<br>② Development of helical peptides as an asymmetric organocatalyst<br>③ Design of cell-penetrating foldamers and their application to drug delivery system |
| Pharmaceutical Organic Chemistry | ISHIHARA Jun (Professor) | ① Synthesis of biologically active natural products<br>② Development of highly effective formation of carbon framework<br>③ Development of reaction diversity catalysts |
| Synthetic Chemistry for Pharmaceuticals | KURIYAMA Masami (Associate Professor) | ① Development of highly selective organic reactions for synthesis of pharmaceuticals<br>② Exploitation of reactions for efficient synthesis of unnatural amino acids<br>③ Exploitation of methods for selective molecular transformations of polyols<br>④ Development of environmentally friendly oxidation reactions for production of bulk chemicals |
| Genome-based Drug Discovery | IWATA Nobuhisa (Professor)<br>SHIROTANI Keiro (Associate professor) | ① Analysis of molecular mechanisms underlying the pathogenesis of Alzheimer's disease<br>② Development of disease-modifying therapy and biomarker of Alzheimer's disease<br>③ Analysis of pathophysiological roles of convulsive neurological disease-causing gene PRRT2 in the synapse<br>④ Analysis of tissue-specific gene expression mechanism in eukaryotes |
| Natural Product Chemistry | SAITO Yoshinori (Associate professor) | ① Structural investigation and appliaction of functional natural products<br>② Dynamic chemistry of polyphenols in plants and biomimetic molecular conversion<br>③ Chemical diversity of plant secondary metabolites |
| Medicinal Plant Biochemistry | YAMADA Koji (Associate Professor) | ① Research into the bioactive constituents of medicinal plants<br>② Drug development research into the physiologically active component substances in marine invertebrates<br>③ Drug development research into physiologically active component substances derived from marine microorganisms |
| Structure Analysis for Chemicals | MAKI Toshihide (Associate Professor) | ① Design and development of photofunctional molecules<br>② Research into structure-activity relationship of bioactive compounds based on organic chemistry<br>③ Exploitation of practical synthetic methodologies and their application for medicinal chemistry |
| Chemistry of Biofunctional Molecules | YAMAYOSHI Asako (Professor)<br>YAMAMOTO Tsuyoshi (Associate professor) | ① Development of nucleic acid drugs for functional regulation of non-coding RNAs<br>② Novel drug delivery system using circulating extracellular vehicles<br>③ Development of novel photodynamic genome editing system targeting provirsu genome |
| Hygienic Chemistry | TORIBA Akira (Professor)<br>ABIKO Yumi (Associate professor) | ① Environmental dynamics analysis for atmospheric organic pollutants<br>② Studies on human exposure and health effects of environmental pollutants<br>③ Studies on cellular responses against environmental pollutants and effect of combined exposure<br>④ Analysis of trace elements in biological systems and synthesis of biologically active nanosphere containing metals |
| Analytical Chemistry for Pharmaceuticals | KISHIKAWA Naoya (Associate professor) | ① Development of luminescence reagent and its application to biomedical analyses<br>② Development of ultra sensitive analytical method for trace biologically active substances and pharmaceuticals<br>③ Development of new delivatization methods for mass spectrometry<br>④ Development of rapid separation method for biologically active substances |