Learning objectives (2022)

<Medical Science Courses>

Fields of research	Subjects	Professors	Learning objectives
Organ Function and Metabolism	Biochemistry	Keiichiro Suzuki	1. Acquirement of basic skills for experiments in biochemistry and molecular biology 2. Studies on pathological biochemistry of reactive oxidative species and anti-oxidative enzymes 3. Roles of sugar chain on inflammation 4. Studies on pathological biochemistry of glucose metabolism and protein glycation
	Chemical Biology	Kazuaki Fukushima	1. Acquirement of basic skills for quantum chemical calculation and experiments in organic chemistry 2. Quantum chemical calculation on enzymatic reaction mechanisms 3. Synthesis and functional study of the biologically active substances 4. Stereoselective syntheses for drug discovery
	Cardiovascular Medicine	Masaharu Ishihara	1. Pathophysiology of anemia in heart failure 2. Assessment of cardiac function with a novel imaging modality 3. Mechanism of coronary endothelium dysfunction and the progression of atherosclerosis 4. Coronary plaque morphological assessment with optical coherence tomography 5. Electrophysiological study and imaging testing for the diagnosis and treatment of arrhythmia 6. Molecular mechanism of degenerative aortic valve stenosis
		Masaharu Ishihara	1. Pathophysiology of ischemic cardiovascular disease 2. Invasive and non-invasive imagings of ischemic cardiovascular disease 3. Regulation of microcirculation in the coronary and peripheral artery 4. Invasive and non-invasive treatment of ischemic cardiovascular disease 5. Secondary prevention of ischemic cardiovascular disease 6. Pathophysiology of cardiac arrhythmia 7. Invasive and non-invasive treatment of cardiac arrhythmia
	G-I Diseases	Hiroto Miwa	1. Developmental mechanisms of gastrointestinal esophageal reflux disease (GERD), especially endoscopic negative GERD 2. Mechanistic investigation of symptom development in patients with functional gastrointestinal disorders (FGIDs) 3. Impact of Obesity on gastrointestinal diseases 4. Endoscopic treatment for early gastric, esophageal and colon cancers 5. Role of mucosal permeability and visceral sensation in generation of visceral symptoms 6. Evaluation and its clinical implication of NSAIDs-induced gastrointestinal injuries 7. Chemotherapy for advanced GI cancers 8. Developmental mechanism of cancers in GI tract 9. Evaluation of malignant potential of GI cancers as well as their background mucosa
	Hepatology and Clinical Research on Biliary and Pancreatic Disease	Hiroko Iijima	1. Development of new diagnostic tool and treatment by clinical, pathological and physiological method 2. Development of new diagnostic imaging 3. Study in liver diseases by molecular biology 4. Nutritional and metabolics studies in liver diseases 5. Study in prevention of hepatic fibrosis and hepatocarcinogenesis
	Diabetology, Endocrinology and Metabolism	Hidenori Koyama	1. Molecular, cellular and biological aspects of insulin secretion, insulin resistance and metabolic syndrome 2. Dementia,hypoglycemia and atherosclerosis in diabetes 3. Basic and clinical research for endocrinological functions and regulations of insulin, glucagon and incretin 4. Cellular and biological mechanism for feeding and cognitioive impairment in metabolic disorders 5. Pathogenesis and pathophysiology of atherosclerosis and vascular inflammation 6. Regulation of adrenocortical hormone synthesis 7. Neuroendocrinological aspects of fatigue and disturbances in sleep and autonomic function 8. Pathogenesis and clinical significance of endocrine tumors 9. Purine and pyrimidine metabolism

Fields of research	Subjects	Professors	Learning objectives
Organ Function and Metabolism	Hematology	Takashi Kijima	1. Studies on proliferation and differentiation of hematopoietic stem cells 2. Analysis and treatment of bone marrow failure 3. Analysis and treatment of hematological malignancies 4. Analysis and treatment of hemostatic and thrombotic diseases 5. Research on and treatment by hematopoietic stem cell transplantation
	Nephrology	Takahiro Kuragano	1. Investigation of abnormality of iron metabolism and oxidative stress in chronic kidney disease 2. Investigation of vascular endothelial damage and progression of atherosclerosis in chronic kidney disease 3. Investigation of bone and mineral metabolism in chronic kidney disease 4. Investigation of the mechanisms of renal anemia in chronic kidney disease 5. Investigation of the pathogenesis and factors affecting the progression of renal insufficiency in chronic kidney disease 6. Investigation of the dysbiosis in chronic kidney disease
	Hepatobiliary-pancreatic Surgery	Etsuro Hatano	1. Clinical research on hepato-biliary-pancreatic surgery (primary liver cancer, metastatic liver cancer, bile duct cancer, pancreatic cancer, laparoscopic surgery, liver cirrhosis, splenomegaly, liver regeneration etc.) 2. Molecular analysis on hepato-biliary-pancreatic cancer 3. Molecular and clinical analysis of post-operative aghesion formation. 4. Simulation and navigation in hepato-biliary-pancreatic surgery
	Pediatric Surgery	Takaharu Oue	1. Research on prenatal diagnosis of pediatric surgical diseases 2. Pathogenesis of congenital anomalies in pediatric surgical diseases 3. Research on gastrointestinal hormone in pediatric surgical diseases 4. Research on pediatric surgical oncology 5. Research on pediatric endosurgery
	Upper Gastrointestinal Surgery	Hisashi Shinohara	1.Development of surgery support system using artificial intelligence 2. Research on the sequela of gastrointestinal surgery 3. Establishment of multidisciplinary treatment for esophageal malignant diseases 4. Establishment of multidisciplinary treatment of gastric cancer 5. Research on the mechanism of formation and treatment of peritoneal metastasis from gastric cancer 6. Mechanism of epithelial-mesenchymal transition and its relation with invasion and metastasis of cancer 7.Clinical study on thoracoscopic and laparoscopic surgery for esophageal diseases invasion and metastasis of cancer 8. Study on clinical anatomy of upper GI tract
	Lower Gastrointestinal Surgery	Masataka Ikeda	1. Colorectal Surgery (colorectal cancer,total colectomy, sphincter preserving operation, multimodality therapy, etc.) 2. Surgical oncology (machanism of matastasis, sensitivity and resistance for chemotherapy or radiation therapy, etc.) 3. Onco-cardiology (Cancer and thrombosis, venou thromboembolism)
	Breast and Endocrine Surgery	Yasuo Miyoshi	1. Pathology of breast cancer 2. Biology of breast cancer 3. Treatment agents of breast cancer 4. Immunohistochemistry of breast cancer 5. Cell culture and molecular biology of breast cancer 6. Statistical analysis 7. Manuscript writing in English
	Cardiovascular Surgery	Taichi Sakaguchi	1. Surgery for ischemic heart disease 2. Surgery for valvular heart disease 3. Less invasive surgery for aortic aneurysm 4. Studies of assisted circulation & artificial organs 5. Studies of suppression for intimal hyperplagia & reperfusion injury
	Thoracic Surgery	Seiki Hasegawa	1. Clinical research and surgical oncology for primary lung cancer 2. Clinical research of metastatic lung tumor 3. Clinical research of mediastinum tumor 4. Clinical research for malignant pleural mesothelioma 5. Basic research for regeneration of pulmonary tissue

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Organ Function and Metabolism	Obstetrics and Gynecology	Hiroaki Shibahara	1. Analaysis for immunological factors of infertility and preganancy loss 2. Developmental study for in vitro growth and maturation of frozen immature mammalian eggs 3. Molecular mechanisms of folliculogenesis and embryo development 4. Developmental study for new technology for preimplantation diagnosis and clinical tarial 5. Gynecological Oncology 6. Analysis for immunological factors of normal and abnormal pregnancy 7. Analysis for immunological factors of women's healthcare 8. Analysis for immunological factors of pelvic endometriosis
	Urology	Shingo Yamamoto	1. Pediatric urology 2. Renal transplantation 3. Urogenital infection 4. Urogenital oncology
	Stomatology and Oral Oncology	Hiromitsu Kishimoto	1. Clinical research for perioperative oral management 2. Analysis of mechanisms of invasion and metastasis of oral cancer 3. Analysis of resistance mechanisms to anticancer drugs and irradiation in oral cancer 4. Study on development of odontogenic tumors 5. Study on medication-related osteonecrosis of the jaw 6. Molecular mechanism of osseo-regeneration and osseo-modification
	General Internal Medicine	Ken Shinmura	1. Experimental and clinical researches on sarcopenia and frailty 2. Research on the ageing biomarker in human 3. Experimental and clinical researches on immunosenescence 4. Experimental research on functional elucidation of mitochondrial sirtuins 5. Experimental research on the stress response of the living body
	General Medicine and Community Health Science	Hiroto Miwa	1. Studies for prophylactic approaches based on the proportion of diseases and onset risk 2. Roles that family medicine should play in the community-based healthcare 3. Studies for the effective learning to acquire skills of initial treatment in emergency medicine 4. Studies for nutritional interventions and exercise to prevent the development of frailty and/or sarcopenia 5. Investigation regarding the environmental factors, dietary habit, and daily physical activity for the purpose of extending healthy lifespan
	Clinical Laboratory Medicine	Masahiro Koshiba	1. Pathophysiology and novel treatments for chronic inflammatory diseases (autoimmune diseases and cancer) by purinergic signaling 2. Evidence-based laboratory medicine (EBLM) 3. Development and clinical application of laboratory tests for prediction of chronic inflammatory diseases 4. Detection and development and clinical application of laboratory tests for of hemoglobinopathy (abnormal hemoglobin and thalassemia) 5. Analysis of communication in a medical education field by video-ethnography 6. Pathological investigation and treatment strategy on the arterial stiffness in cardiovascular disease
	Inflammatory Bowel Disease	Hiroki Ikeuchi	1. Establishment of treatment in Inflammatory Bowel Disease based on their etiology 2. Elucidation of mechanism of colitis associated colorectal cancer and establishment of an early diagnostic method 3. Elucidation of mechanism of upper gastrointestinal lesion complicated in ulcerative colitis 4. Establishment of treatment in intractable pouchitis 5. Inflammatory bowel disease and postoperative infection 6. Postoperative treatment in Crohn's disease and postoperative recurrence rate 7. Elucidation of pathophysiology of inflammatory bowel disease 8. Establishment of monitoring and optimisation of IBD therapies 9. Clinical research for optimising thiopurine use through metabolite measurement in inflammatory bowel disease
	Biophysics		not available during the fiscal year 2022

Fields of research	Subjects	Professors	Learning objectives
Integrated Neurosciences	Neurobiology	Hideshi Yagi	1. Study on mechanisms of the neuronal development and possibility of regeneration of nervous system 2. Molecular mechanisms of tissue osmotic regulation through the kidney 3. Investigation of regulatory mechanism of the hypothalamohypophysial system
	Neuroanatomy	Koichi Noguchi	1. Neuroactive substances: analysis of the distribution and physiological function 2. Nerve injury-induced changes in neuroactive substances and the functional significance 3. Molecular basis of synaptic plasticity
	Neurophysiology	Hidemasa Furue	1. Analysis of synaptic transmission in the central nervous system 2. Pharmacogenetic and optogenetic manipulation of central neuronal circuits 3. Central mechanisms of pain and micturition in physiological and pathological conditions
	Neuropharmacology	Motohiko Takemura	1. Molecular biology in the nervous system (especially histaminergic neurons) 2. Mechanisms underlying establishment of drug dependency 3. Genes related to histamine metabolism 4. Genes related to apoptosis in the neurons and endothelial cells
	Neurology	Takashi Kimura	1. MRI analyses of Parkinson's disease and corticobasal syndrome 2. Music therapy for Parkinson's disease 3. Pathophysiology of white matter lesions of myotonic dystrophy 4. Pathophysiology of hemiplegic migraine and migraine with autonomic symptoms
	Neuropsychiatry	Shiho Kitaoka	1. Clinical study on anxiety disorders or depression 2. Epidemiologic study on anxiety or affective disorders 3. Biological study on obsessive-compulsive disorder 4. Cross-cultural study on obsessive-compulsive spectrum disorders 5. Study on clinical psychopharmacology 6. Biological research on animal models of depression 7. Neuroimaging study on anxiety or obsessive-compulsive disorders
	Neurosurgery	Shinichi Yoshimura	1. Development of novel imaging for cerebrovascular disease 2. Research on statistical analysis of cerebrovascular diseases 3. Basic research on glioma stem cells 4. Basic research on neuronal regeneration 5. Imaging and analysis of supra-aortic arteries
	Orthopaedic Surgery (Musculoskeletal Research)	Toshiya Tachibana	1. Basic and clinical research of sports medicine and joint reconstructive surgery 2. Basic and clinical research of bone and soft tissue tumors 3. Basic and clinical research of disorder and surgery of the spine and the spinal cord 4. Three-dimensional kinematic analysis of the joint and the spine based on MRI,CT, and radiological images 5. Basic and clinical research of pain in musculoskeletal system 6. Application of regenerative medicine to treatment of musculoskeletal injuries and diseases
	Anesthesiology and Pain Medicine	Munetaka Hirose	1. Fluid dynamics under surgical stress 2. Development of novel monitoring of nociceptive response 3. Basic and clinical research on maternal and neonatal anesthesia 4. Development of novel therapy for chronic pain 5. Basic and clinical research on regional anesthesia 6. Basic and clinical research on cancer pain

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Integrated Neurosciences	Otolaryngology – Head and Neck Surgery	Kenzo Tsuduki	1. Pathogenesis and development of surgical treatment for middle ear cholesteatoma 2. Application of vestibular evoked myogenic potential to vertigo and dizziness 3. Development of new treat for eustachian tube function 4. Clarification for pathogenesis of eosinophilic sinusitis 5. Basic research of smell and taste disorders and development of their treatments 6. Development of new chemotherapy for head and neck cancer
	Ophthalmology	Fumi Gomi	1. Pathophysiology and treatment strategy of eye diseases 2. Visual science 3. Ophthalmic imaging analysis
	Rehabilitation Science	Kazuhisa Domen	1. Biomechanics of human movement and motor control theory 2. Clinical application of computational neuroscience to movement disorder 3. Application of motor learning theory to therapeutic exercise (including neuro-rehabilitation such as constraint-induced movement therapy) 4. Clinical research on functional assessment scale and prediction of functional outcome
	Developmental Biology	Hisashi Yamasaki	1. Understanding of cellular and molecular procedure in the development of various vertebrate species 2. Analysis of the differentiation process of primordial germ cell, germ cell and reproductive organs in amphibian embryos 3. Understanding the evolution of the vertebrate morphology using cyclostomes
Bioresponse Medicine	Physiome	Yoshitaka Oku	1. Mechanism of respiratory rhythmogenesis 2. Pathophysiology of swallowing 3. Mechanism of central chemoreception 4. Mechanism of exacerbation of chronic inflammatory airway disease 5. Development and plasticity of functional neuronal network 6. Elucidation of interactions between respiration and cognition
	Immunology	Etsushi Kuroda	1. Elucidation of molecules involved in interface between innate and acquired immunity 2. Elucidation of immune regulation by cytokines 3. Elucidation of mechanism of host defense 4. Elucidation of mechanism of immune diseases, and establishment of therapy 5. Elucidation of mechanism of allergy, and establishment of therapy
	Parasitology	Etsushi Kuroda	1. Elucidation of host immune response against parasitic infection 2. Elucidation of mechanism of allergic inflammation by helminth infection
	Medical Microbiology	Satoshi Ishido	1. Cellular and molecular mechanisms for microbial clearance in mammalian host 2. Contribution of microbial infection or microbial products to the development of chronic atopic or inflammatory diseases 3. Cellular and molecular mechanism underlying chronic infection with pathogens 4. Host defense evasion machinery encoded in human herpes virus 6 5. Establishment of evaluation system of protective immunity against Varicella zoster virus infection
	Infection Control and Prevention	Kazuhiko Nakajima	1. Epidemiological study of antibiotic resistant organisms by the classification of genotypes and phenotypes 2. Surveillance of surgical site infection and analysis of risk factors 3. Rapid test of MRSA by PCR 4. Pharmacokinetics and pharmacodynamics in antimicrobial agents

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Bioresponse Medicine	Molecular Pathology	Tohru Tsujimura	1. Pathology of malignant mesothelioma and development of the molecular target therapy 2. Role of endoplasmic reticulum stress and autophagy in the survival, proliferation, and anticancer drug resistance of tumors 3. Development of therapy based on epithelial-mesenchymal transition
	Molecular and Diagnostic Pathology	Seiichi Hirota	1.Development of molecular pathology methods for diagnoses in various diseases 2.Development of molecular targeted therapy and immunotherapy for various diseases 3.Clarification of mechanisms of cancer metastasis 4.Development of screening methods of disease-specific G protein-coupled receptors 5.Analyses of pathophysiology of gut motility and pathology of GIST 6.Pathological analyses of various tumors and cardiovascular diseases
	Molecular Medical Genetics	Masaki Ohmuraya	1. DNA damage and repair mechanisms 2. Genome-wide analysis of human, animal and microbe DNA 3. Molecular mechanisms of tumor progression and suppression 4. Research on genome editing technology 5. Research using genetically modified organisms
	Clinical Immunology	Kiyoshi Matsui	1. Evaluation of function in intestinal and cardiovascular lesions of systemic sclerosis 2. Etiology, pathogenesis and therapy of Sjogren's syndrome 3. Effects and side effects of new biologics on therapy of rheumatoid arthritis 4. Etiology and pathology of IgG4-related diseases 5. Etiology, pathogenesis and therapy of allergic diseases 6.Therapeutic approach and Pathological analyses of vasculitis
	Respiratory Medicine	Takashi Kijima	1. Doing research honestly based on research ethics 2. Understanding and acquisition of molecular biological technique 3. Being able to create research plans by students themselves 4. Utilizing basic and clinical papers for students' own researches 5. Being able to analyze and consider the research results scientifically as well as objectively 6. Understanding the basic elements of medical statistics 7. Approaching for developing a novel diagnostic or therapeutic strategy of refractory respiratory diseasea 8. Presenting research results at conference and writing a paper
	Pediatrics	Yasuhiro Takeshima	1. Research for the development of new molecular therapy for muscular dystrophy 2. Research for the molecular pathology of neuromuscular diseases in childhood 3. Research for the pathophysiology and therapeutics of kidney and gastrointestinal diseases in childhood 4. Research for the molecular pathology of kidney diseases in childhood 5. Research for the mechanism of hematologic diseases, and molecular biology of malignant diseases in childhood 6. Research for the pathophysiology of neonatal diseases 7. Research for the pathophysiology and therapeutics of allergy diseases in childhood 8. Research for the pathophysiology and therapeutics of inborn error of metabolism and endocrine disease in childhood
	Molecular Dermatolo	Nobuo Kanazawa	1. Molecular genetic analysis of skin diseases 2. Regenerative medical analysis of skin diseases 3. Inflammatory and immunological analysis of skin diseases 4. Clinical analysis of skin surgery 5. Clinical analysis of skin vesculopathy 6. Pathological analysis of skin diseases 7. Serological and genetic diagnosis of skin diseases 8. Clinical analysis of molecular targeted therapeutics
	Radiology	Koichiro Yamakado	1. Experimental and clinical study of diagnostic radiology 2. Interventional radiology 3. Radiation Oncology 4. Nuclear Medicine (Including Positron Emission CT)

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Bioresponse Medicine	Emergency and Critical Care Medicine	Shinichi Nishi	1. Pathophysiological study for critically ill patients 2. Pathophysiology and therapeutic strategy for multiple organ failures
		Junichi Hirata	1. Basic and clinical research on cardiopulmonary cerebral resuscitation 2. Research on pathophysiological mechanisms and treatments of severe trauma and critically ill patients 3. Research on immunological and metabolic response and management with various therapeutic strategies in systemic inflammation
	Transfusion Medicine and Cellular Therapeutics	Takashi Kijima	1. Studies on proper blood transfusion 2. Studies on transfusion related-complication 3. Development of new cellular therapies 4. Therapeutic cell processing in Cell Processing Center 5. Clinical studies on new cellular therapies
	Thoracic Oncology	Seiki Hasegawa	1. Molecular medicine and novel therapeutics for mesothelioma 2. Molecular medicine and chemoprevention for asbestos-related oncogenesis 3. Molecular biology for thoracic malignancies 4. Development of early diagnostic procedure and its clinical implication for mesothelioma
	Radiation Oncology	Koichiro Yamakado	1. Fundamental and clinical study of toxicology for the radiation therapy 2. 3D dose monitoring system for preventing the set-up error with using flat panel amorphous silicon detectors (FPD) 3. Effects of Zinc on proctitis in patients receiving radiotherapy 4. Fundamental and clinical study of for high precision radiation therapy
	Medical Physics	Koichiro Yamakado	1. Fundamental and clinical study of high precision Radiotherapy 2. Electric verificaiton system of portal imaging using LAN system for radiotherapy 3. 3D dosimetry using polymer gel dosimeter
	Clinical Oncology	All professors of graduate school in clinical oncology	1. Pharmacokinetics and pharmacodynamics of anti-cancer agents 2. Mechanism of action of anti-cancer agents 3. Clinical implication of pharmacogenomics 4. Establishment of predictive systems for drug sensitivity in molecular targeted treatment 5. Identification of novel molecular targets and novel anticancer agent development
	Regenerative Medicine for Cardiovascular Disorders	Masaharu Ishihara	1. Regenerative medicine of the blood vessel and myocardium 2. Purification of endothelial progenitor cells and mesenchymal stem cells 3. Myoblast autologous grafting for ventricular dysfunction 4. Evaluation of myocardial regeneration therapy 5. Evaluation of coronary microcirculation
		Masaharu Ishihara	1. Understanding of coronary and peripheral vascular circulation 2. Mechanism and treatment of ischemic/reperfusion injury 3. Mechanism and treatment of atherosclerosis 4. Development of novel intravascular therapy 5. Regeneration of vascular and myocardial cells

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Bioregeneration	Regenerative Medicine	Etsuro Hatano	1. Investigation of mechanism of liver regeneration 2. Cell differentiation from hematopoietic stem cells and iPS cells 3. Organ reconstruction from cirrhotic liver 4. Investigation of mechanism of liver fibrosis and regeneration after liver transplantation
	Skin Regeneration and Repair		not available during the fiscal year 2022
	Plastic Surgery	Masao Kakibuchi	1. Enhancement of the viability of skin, muscle and bone autograft 2. Analysis of peripheral nerve regeneration 3. Application of latest knowledge of wound healing 4. Diagnosis and treatment of facial bone fractures 5. Embryology of congenital anomaly of the face
	Regenerative Medicine with Hematopoietic Stem Cells		not available during the fiscal year 2022
Environmental Medicine	Environmental Pathophysiology	Ichiro Wakabayashi	1. Environmental factors for vascular diseases 2. Physiological actions of alcohol 3. Pathophysiology of diabetes mellitus 4. Epidemiology of atherosclerotic diseases
	Public Health	Masayuki Shima	1. Study on health effects of environmental pollutants 2. Study on effects of air pollution on respiratory and allergic diseases 3. Study on biomarkers for health effects of fine particulate matter (PM2.5) and ozone 4. Birth cohort study to evaluate the effects of prenatal and early-life exposure to chemicals on children's health 5. Epidemiological analysis of community health and medicine 6. Assessment of health care programs in occupational health 7. Evaluation of the cell-mediated immunity to viruses
	Legal Medicine	Hajime Nishio	1. Postmortem molecular screening of sudden unexplained death 2. Analysis of psychiatric patients of autopsy cases 3. Case study 4. Study of postmortem diagnosis using blood samples
	Medical Ethics		not available during the fiscal year 2022
	Disaster Medicine	Junichi Hirata	1. Field research and epidemiology of disaster/mass casualty incident 2. Research on medical dispatch and stuff training in disaster response 3. Conceptualization of disaster response for daily risk management 4. Research on disaster prevention and preparedness
	Medical Informatics		not available during the fiscal year 2022
	Medical Education	Hitoshi Naruse	1. Establishment of new methods of medical education 2. Establishment of new methods of bed side learning 3. Education of bioethics and professionalism 4. Inter-professional education 5. Education of patient safety 6. Education of medical communication 7. Education of gender equality
	Department of Patient Safety and Quality Management	Keiko Takahashi	1. Patient safety 2. Ethical based medicine 3. Healthcare economy 4. Resilient health care through patient engagement 5. Interprofessional education 6. Legal ordinance on medical care 7. Analysis and summary of the incident

Fields of research	Subjects	Professors	Learning objectives
Environmental Medicine	Methods and Applications for Clinical Research	Takeshi Morimoto	1. Clinical epidemiology 2. Clinical reasoning and diagnostic accuracy 3. Measurement of quality of practice 4. Design and analyses of clinical trials 5. Design and analyses of observational studies 6. Data management 7. Regulations and ethics in clinical research 8. Systematic review and cost-effectiveness 9. Academic writing
	Biostatistics	Takashi Daimon	1. Biostatistics 2. Bayesian statistics 3. Research and development of statistical methods in clinical trials 4. Research and development of statistical methods in observational studies

<Advanced Medical Science Courses>

Fields of research	Subjects	Professors	Learning objectives
Molecular Medicine	Development of Human Disease Model	Etsushi Kuroda	1. Establishment of experimental mouse models for allergic disease 2. Establishment of experimental mouse models for endometriosis 3. Establishment of experimental mouse models for immune diseases 4. Establishment of gene deficient mice
	Molecular and Gene Therapy	Etsuro Hatano	1. Study on molecular and gene therapy in the field of digestive disease and Hepatobiliary-pancreatic disease 2.Identification of cancer stem cell and cancer immuno research
	Allergology & Rheumatology	Kiyoshi Matsui	1. Mechanisms of pathophysiology and pathogenesis in Eosinophilic disease 2. Mechanisms of pathophysiology and pathogenesis in immune reconstitution syndrome 3. Regulation of autoimmune and translation immunology by molecular display method of yeast and lactobacillus 4. Regulation of synovial proliferation and oseteochondral regeneration by regulation of signal transduction proteins using affibody 5 Therapeutic approach and Pathogenesis analysis of Immunosenescence cells in allergy & Rheumatic disease
	Molecular Control of Skin Disorders		not available during the fiscal year 2022
Pain Research	Pain Research	Koichi Noguchi	1. Basic research of pain mechanisms 2. Neuroactive substances in nociceptive pathway: analysis of the distribution and physiological function in pain mechanism 3. Novel mechanisms of intractable pain and their clinical application 4. Neuro-glial interaction as novel pain mechanism
	Clinical Pain Research	Mumetaka Hirose	1. Cancer pain management system 2. Clinical application of spinal cord stimulation 3. Systematic management of chronic pain 4. Multidisciplinary pain management
	Neurological Therapeutics	Takashi Kimura	1. IVIg therapy for immune-mediated neurological disorders, especially CIDP and MS 2. Morphological analyses of ubiquitin-protease system in CNS 3. Biological analyses of axonal dystrophy in *gad* mice using imaging mass spectrometry 4. Neuropathy due to mitochondrial dysfunction
Gene Medicine and Therapeutic Regeneration	Regenetative Medicine for Central Nervous System	Takayuki Nakagomi	1. The clarification of pathophysiology and pathogenesis in ischemic cerebrovascular disease 2. The mechanism of neurogenesis in ischemic cerebrovascular disease 3. The role of the immune system in ischemic cerebrovascular disease 4. The elucidation of the traits for stem cells induced after ischemic cerebrovascular disease 5. The development of new therapies using stem cells
	Cell and Gene Therapy	Akinobu Gotoh	1. Clinical application of cell and gene therapy for malignant tumors 2. Study on new gene transfer methods targeting specific organ 3. Study on cancer stem cell and clinical application 4. Clinical development of cancer prevention 5. Study on therapeutic mechanism of Chinese herbs