## Learning objectives (2019)
### <Medical Science Courses>

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<th>Fields of research</th>
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</table>
| 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 antioxidant 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      |          | Tohru Masuyama           | 1. **Pathophysiology of anemia in heart failure**
| Medicine           |          |                          | 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**
| Organ Function and Metabolism |        | 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     |          | Shuhei Nishiguchi        | 1. **Development of new diagnostic tool and treatment by clinical, pathological and physiological method**
| Clinical Research   |          |                          | 2. **Development of new diagnostic imaging**
| on Biliary and      |          |                          | 3. **Study in genetic liver diseases by molecular biology**
| Pancreatic Disease  |          |                          | 4. **Study in nutritional and metabolic abnormality in liver diseases**
|                    |          |                          | 5. **Study in prevention of hepatic fibrosis and hepatocarcinogenesis**
| Diabetology, Endoc |          | Hidenori Koyama          | 1. **Molecular, cellular and biological aspects of insulin secretion, insulin resistance and metabolic syndrome**
|rinology and        |          |                          | 2. **Dementia, hypoglycemia and atherosclerosis in diabetes**
| Metabolism         |          |                          | 3. **Basic and clinical research for endocrinological functions and regulations of insulin, glucagon and incretin**
|                    |          |                          | 4. **Cellular and biological mechanism for feeding and cognitive 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**

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Shuhei Nishiguchi
Diabetology, Endocrinology and Metabolism

Hidenori Koyama
Diabetology, Endocrinology and Metabolism

Keiichiro Suzuki
Biochemistry

Kazuaki Fukushima
Chemical Biology
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| Thrombosis and Hemostasis          | Yoshiiro Fujimori            |                    | 1. Research for the genetic diagnosis and treatment of hemophilia  
2. Research for the treatment of HIV/HCV infection in hemophilia  
3. Research for the mechanism of hemostasis disorders and thrombophilia                                                                                                                                                                                                                |
| Nephrology                         | Masaharu Ishihara            |                    | 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 |
| Hepatobiliary-pancreatic Surgery    | Jiro Fujimoto                |                    | 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 adhesion formation  
4. Simulation and navigation in hepato-biliary-pancreatic surgery |
| Pediatric Surgery                  | Jiro Fujimoto                |                    | 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. Scientific evaluation of surgical procedures of upper GI tract  
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  
8. Study on clinical anatomy of upper GI tract |
| Lower Gastrointestinal Surgery      | Naohiro Tomita               |                    | 1. Colorectal Surgery (colorectal cancer, total colectomy, sphincter preserving operation, multimodality therapy, etc.)  
2. Surgical oncology (mahanism of metastasis, sensitivity and resistance for chemotherapy or radiation therapy, etc.)  
3. Hereditary colorectal tumors (familial adenomatous polyposis, Lynch syndrome, etc.) |
| Breast and Endocrine Surgery        | Naohiro Tomita               |                    | 1. Biological diagnosis of breast cancer  
2. Indication of treatment using chemotherapy and endocrine therapy  
3. Analysis of breast carcinogenic pathway  
4. Identification of genetic changes in breast cancer |
| Cardiovascular Surgery              | Seiki Hasegawa               |                    | 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 hyperplasia & reperfusion injury |
| Thoracic Surgery                   | Seiki Hasegawa               |                    | 1. Surgical treatment and translational research for primary lung cancer  
2. Surgical treatment of metastatic lung tumor  
3. Surgical treatment of mediastinum tumor  
4. Clinical research for malignant pleural mesothelioma  
5. Basic research for regeneration of pulmonary tissue |
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| Obstetrics and Gynecology | Hiroaki Shibahara | 1. Analyses for immunological factors of infertility and pregnancy 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 trial |
| 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. Study on diagnosis and treatment of temporomandibular disorders  
7. 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 |
| Community Health Care | not available during the fiscal year 2019 |
| 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 |
<p>| Biophysics | not available during the fiscal year 2019 |</p>
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| Neurobiology      | Hideshi  | Yagi       | 1. Study on mechanisms of neuronal development  
2. Molecular mechanisms of tissue osmotic regulation through the kidney  
3. Investigation of regulatory mechanism of the hypothalamo-hypophysial 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   | Koichi   | Noguchi    | 1. To acquire a wide range knowledge of neuronal signaling in the central nervous system including the spinal cord.  
2. To understand recent neurophysiological and neuroscientific techniques for investigating basic medical sciences  
3. Study on mechanisms underlying pathological changes in the central neuronal modulation of nociceptive transmission including visceral sensation, and endogenous analgesia |
| Bioinformation    |          |            | not available during the fiscal year 2019 |
| 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         | Hiroo    | Yoshikawa  | 1. Clinical analyses of Parkinson’s disease, especially about non-motor function, sleep disturbance and sensory impairment  
2. Pathophysiology of paraneoplastic encephalopathy  
3. Pathophysiology of white matter lesions in myotonic dystrophy  
4. Morphometric analysis of cerebral atrophy in NMO-MS patients |
| Neuropsychiatry   | Hisato   | Matsunaga  | 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. Development of novel imaging for pituitary tumor  
3. Basic research on neuronal regeneration  
4. Imaging and analysis of supra-aortic arteries  
5. Research on statistical analysis of cerebrovascular diseases |
| Orthopaedic Surgery (Musculoskeletal Research) | Shinichi | Yoshiya    | 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. Analysis of biological responses to surgical stress  
3. Basic and clinical research on maternal and neonatal anesthesia  
4. Clinical research on pain and sympathetic nervous system  
5. Clinical research on neuropathic pain  
6. Clinical research on noxious pain  
7. Clinical research on pain and spinal cord stimulation  
8. Nerve block therapy for acute and chronic pain |
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<tr>
<td>Rehabilitation Science</td>
<td>Kazuhisa Domen</td>
<td>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</td>
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<td>Developmental Biology</td>
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<td>Immunology</td>
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<td>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</td>
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<td>Parasitology</td>
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<td>1. Elucidation of host immune response against parasitic infection 2. Elucidation of mechanism of allergic inflammation by helminth infection</td>
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<td>Medical Microbiology</td>
<td>Satoshi Ishido</td>
<td>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</td>
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<td>Molecular Pathology</td>
<td>Subjects</td>
<td>Tohru Tsujimura</td>
<td>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 4. Pathology of hepatic disease and development of the therapy</td>
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<td>Respiratory Medicine</td>
<td>Subjects</td>
<td>Takashi Kijima</td>
<td>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 diseases 8. Presenting research results at conference and writing a paper</td>
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| Emergency and Critical Care Medicine      |                                                    | Shinichi Nishi      | 1. Pathophysiological study for critically ill patients  
2. Pathophysiology and therapeutic strategy for multiple organ failures  
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 |                                                    | Yoshihiro Fujimori  | 1. Studies on proper blood transfusion  
2. Studies on transfusion related complications  
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 toxicity 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 high precision radiation therapy |
| Medical Physics                           |                                                    | Koichiro Yamakado   | 1. Fundamental and clinical study of high precision Radiotherapy  
2. Electric verification 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 |
| Biology of Blood and Marrow Transplantation |                                                    | Yoshihiro Fujimori  | 1. Pathophysiology of hematopoietic stem cell transplantation  
2. Molecular and genetic markers for hematologic disease  
3. Minimal residual disease of leukemia  
4. Pathophysiology of graft-versus-host disease: the role of cytokines and chemokines  
5. Immunological tolerance and graft-versus-leukemia effect in HLA-mismatched stem cell transplantation |
| Regenerative Medicine for Cardiovascular Disorders |                                                    | Tohru Masuyama      | 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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| **Regenerative Medicine** | Jiro Fujimoto | 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** | Kiyofumi Yamanishi | 1. Advanced technique of skin surgery  
2. Induction and regeneration of the skin  
3. Treatment of skin diseases using stem cells  
4. Molecular mechanisms of skin repair |
| **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** | Yoshihiro Fujimori | 1. In vitro amplification of hematopoietic stem cells  
2. Treatment of GVHD with mesenchymal stem cells  
3. Regenerative medicine with hematopoietic stem cells |
| **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 on health effects of prenatal and early-life exposure to chemicals  
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 2019 |
| **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 2019 |
| **Medical Education** | Keiichiro Suzuki | 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 |
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| Environmental Medicine | Methods and Applications of Clinical Research | Shuhei Nishiguchi | 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 | Shuhei Nishiguchi | 1. Practice of statistical inference  
2. Learning about study design and data collection methods  
3. Learning about statistical principles and methods  
4. Understanding of recent methodologies in Biostatistics |
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| Molecular Medicine | Development of Human Disease Model | | 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 Medicine | Molecular and Gene Therapy | Jiro Fujimoto | 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 |
| Rheumatology | Rheumatology | Hidenori Koyama | 1. Regulation of synovial proliferation and osteoarticular regeneration by regulation of c-Met signal  
2. Regulation of synovial proliferation and osteoarticular regeneration by regulation of sphingosin-1 phosphate signal  
3. Regulation of autoimmunity and translation immunology by molecular display method of yeast and lactobacillus  
4. Regulation of synovial proliferation and osteoarticular regeneration by regulation of signal transduction proteins using affibody  
5. Development of the therapy of refractory collagen diseases using mesenchymal stem cells derived from human amnion. |
| Molecular Medicine | Molecular Control of Skin Disorders | Kiyofumi Yamanishi | 1. Analysis of skin disease models  
2. Novel clinical markers for skin diseases  
3. Development and translational research of new biologics for skin disorders |
| Molecular Medicine | Biology of Hematopoietic Stem Cell | Yoshihiro Fujimori | 1. Biology of hematopoietic stem cells  
2. Hematopoietic stem cell transplantation  
3. Complication of hematopoietic stem cell transplantation  
4. Cell transplantation therapy  
5. Regenerative medicine using stem cells |
| Allergology | Allergology | | not available during the fiscal year 2019 |
| 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. Neuroglial interaction as novel pain mechanism |
| Neurofunctions | Neurofunctions | | not available during the fiscal year 2019 |
| Pain Research | Clinical Pain Research | Mumenaka 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 | Neurological Therapeutics | Hiroo Yoshikawa | 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 |
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| Regenerative Medicine for Central Nervous System | Takayuki Nakagomi | 1. Pathophysiological study for ischemic cerebrovascular disease  
2. Basic research for neurogenesis  
3. Basic research for tissue repairing system of central nervous system  
4. Translational study for therapeutic neuro- and angio-genesis of cerebrovascular disease |
| Cell and Gene Therapy | Akinobu Gotoh | 1. Clinical application of cell and gene therapy for malignant tumors  
2. Development of viral vectors for efficient and stable gene transfer  
3. Study on new gene transfer methods targeting specific organ  
4. A new strategy of suicide gene therapy and immunotherapy  
5. Study on cancer stem cell and clinical application  
6. Clinical development of cancer prevention |