

## Outline of the Laboratory, Graduate School of Pharmaceutical Sciences, Kyushu University

### Clinical Pharmacokinetics

Teaching staff	Professor Naoya Matsunaga, Ph.D. Lecturer Kengo Hamamura, Ph.D. Assistant Professor Yuya Yoshida, Ph.D.
Research	The following topics are currently under investigation in our laboratory: <ul style="list-style-type: none"> <li>• Pathological analysis focusing on pharmacokinetics-related genes (Cytochrome P450, Transporter).</li> <li>• Analysis of organ linkage mechanism under pathological conditions.</li> <li>• Investigation of new therapeutic agents and pharmacodynamic and pharmacokinetic analysis and protein structural analysis.</li> </ul>

### Pharmaceutics

Teaching staff	Professor Satoru Koyanagi, Ph.D. Assistant Professor Akito Tsuruta, Ph.D.
Research	The following topics are currently under investigation in our laboratory: <ol style="list-style-type: none"> <li>1. Studies on molecular mechanism for circadian exacerbations of chronic pain and inflammation.</li> <li>2. Studies on the prediction of human pharmacokinetic profile in animal scale up based molecular circadian clock</li> <li>3. Optimization of dosing regimen to achieve the treatment of circadian-related diseases</li> </ol>

### Clinical pharmacy and Pharmaceutical care

Teaching staff	Lecturer Daisuke Kobayashi, Ph.D. Lecturer Takehiro Kawashiri, Ph.D. Assistant Professor Shunsuke Fujita, Ph.D.
Research	<ul style="list-style-type: none"> <li>• Establishment of pharmaceutical education system</li> <li>• Study on leftover drugs for reduction of medical expenses and improvement of adherence (Setsuyaku-bag campaign)</li> <li>• Study on development of simultaneous determination of clinically used drugs for therapeutic drug monitoring</li> <li>• Studies on mechanisms and prevention of chemotherapy-induced peripheral neuropathy</li> </ul>

### Molecular and System Pharmacology

Teaching staff	Professor Makoto Tsuda, Ph.D. Associate Professor Yuta Kohro, Ph.D. Assistant Professor Keita Kohno, Ph.D. Assistant Professor Risako Fujikawa, Ph.D.
Research	Work in my laboratory is primarily directed to elucidating glia-neuron interactions in the spinal cord and brain and to understanding the cellular and molecular mechanisms of pain and itch signaling (in particular pathological chronic pain and itch) with the goal of counteracting these mechanisms in order to devise strategies for new types of pain and itch relieving medications.

### Physiology

Teaching staff	Professor Motohiro Nishida, Ph.D. Assistant Professor Yuri Kato, Ph.D. Assistant Professor Tomoya Ito, Ph.D. Assistant Professor Mi Xinya, Ph.D. Assistant Professor Yara Mohamed Atef Ahmed Sayed Ahmed, Ph.D.
Research	<ol style="list-style-type: none"> <li>1. Comprehensive understanding the diversity of heart failure and its application for precision medicine</li> <li>2. Elucidation of the physiological role of reactive sulfur species and its therapeutic application</li> <li>3. Establishment of therapeutic strategies for curing intractable diseases targeting mitochondrial quality control</li> <li>4. Promotion of Green-Pharma research by collaborating with National Institutes</li> </ol>

### Global Pharmacy

Teaching staff	Professor Katsumi Maenaka, Ph.D. Lecturer Eiji Kawanishi, Ph. D.
Research	The research is focused on follows (1) Identification of disease-specific molecular using clinical samples (2) Functional analysis of disease specific molecules (3) Molecular design for drug discovery (4) Development of conversion platform from macromolecule to small molecule (5) Research support for practical use

### Disease Control

Teaching staff	Associate Professor Michio Nakaya, Ph.D.
Research	<ul style="list-style-type: none"><li>• Molecular mechanisms of tissue fibrosis</li><li>• Roles of fibroblasts in various tissues</li><li>• The hematopoietic stem cell microenvironment</li></ul>

### Protein Drug Discovery

Teaching staff	Professor Jose Caaveiro, Ph.D. Associate Professor Saeko Yanaka, Ph.D. Assistant Professor Akinobu Senoo, Ph.D.
Research	<ul style="list-style-type: none"><li>• Protein Drug Discovery (PDD)</li><li>• Novel therapeutic approaches to fight human disease (infectious diseases, neurodegeneration, cancer, etc...)</li><li>• Antibody engineering: Novel antibody modalities and molecular mechanisms.</li><li>• Vaccines: Characterization of antibodies and antigen design.</li><li>• Biomolecular recognition between proteins and drugs.</li><li>• Drug discovery in challenging targets: membrane proteins and protein-protein interaction.</li><li>• Drug discovery for pain and itch.</li><li>• Fundamental Protein Science in Pharmacy.</li></ul>

### Molecular Biology

Teaching staff	Professor Tsutomu Katayama, Ph.D. ※will retire on March, 2027 Associate Professor Shogo Ozaki, Ph.D. Assistant Professor Kazutoshi Kasho, PhD.
Research	In the cell cycle progression, chromosomal DNA is replicated only once at a specific time by the carefully controlled molecular switch for replicational initiation. If this regulation is interfered with, various cell defects occur, such as abnormal chromosomes, inhibition of cell division, and growth of abnormal cells. Thus, a study on this regulatory mechanism is of significance as a basis for the developments of antibiotics and anticancer drugs. We have shown that a protein (DnaA) initiating E. coli chromosomal replication is inactivated by timely and direct interaction with a subunit of chromosomal replicase (DNA polymerase III holoenzyme). This interaction depends on loading the subunit onto DNA. This conformational change occurs for the nucleotide-polymerizing action of the replicase after the initiation reaction by DnaA. Thus, during the cell cycle, the initiation protein is most likely inactivated just after initiation of chromosomal replication in this manner. We have termed this regulatory system RIDA (Regulatory inactivation of DnaA). Reactivation of DnaA will occur before the next round of the replication cycle. We are investigating the molecular mechanisms in this DnaA-activity cycle including timely inactivation and activation.

## Pharmaceutical Cell Biology

Teaching staff	<p>Professor Yoshitaka Tanaka, Ph.D. ※will retire on March, 2026</p> <p>Associate Professor Yuji Ishii, Ph.D.</p> <p>Assistant Professor Yuko Hirota, Ph.D.</p> <p>Assistant Professor Keiko Fujimoto, Ph.D.</p>
Research	<p>Our research interests:</p> <ol style="list-style-type: none"> <li>1. Biology of lysosomes <ul style="list-style-type: none"> <li>• Cellular and molecular mechanisms regulating lysosomal biogenesis and functions by comprehensive functional analysis of lysosomal membrane proteins.</li> <li>• Molecular regulatory mechanisms of intracellular protein degradation.</li> <li>• Molecular mechanisms for ageing and neurodegenerative diseases.</li> </ul> </li> <li>2. Environmental toxicology and drug metabolism <ul style="list-style-type: none"> <li>• Mechanisms of sexual immaturity fixation in offspring by maternal exposure to environmental chemicals.</li> <li>• Mechanisms by which environmental chemicals attenuate dams' nursing.</li> <li>• Functional interaction of drug-metabolizing enzymes.</li> <li>• Alteration of the function of xenobiotic detoxifying enzymes in response to changes in physiological mechanisms.</li> <li>• Metabolisms and analysis of illicit drugs.</li> </ul> </li> </ol>

## Cellular Biochemistry

Teaching staff	<p>Professor Masatoshi Fujita, M.D., Ph.D.</p> <p>Assistant Professor Yoko Katsuki, Ph.D.</p> <p>Assistant Professor Miyako Shiraishi, Ph.D.</p> <p>Assistant Professor Yasunori Noguchi, Ph.D.</p>
Research	<p>We have been clarifying molecular mechanisms of chromosomal DNA regulations, deregulation of which would lead to chromosomal instability and eventually cancer. Now, we have been especially focusing on:</p> <ol style="list-style-type: none"> <li>1. Function and cell cycle regulation of DNA replication initiation proteins, ORC, CDC6, Cdt1, MCM and related factors.</li> <li>2. Molecular mechanisms for SLX4-mediated cellular responses to replication stress.</li> <li>3. Relationship between chromatin regulations and regulations of replication initiation and replication stress response.</li> <li>4. Development of MCM8-9 inhibitors as novel anti-neoplastic agents.</li> </ol>

## Pharmacognosy

Teaching staff	<p>Associate Professor Seiichi Sakamoto, Ph.D.</p> <p>Assistant Professor Poomraphie Nuntawong, Ph.D.</p>
Research	<ul style="list-style-type: none"> <li>• Allelopathy study of <i>Cannabis sativa</i></li> <li>• Plant tissue culture for medicinal plant breeding</li> <li>• Quality control and standardization of crude drugs and Kampo products</li> </ul>

## Drug Discovery Structural Biology

Teaching staff	<p>Lecturer Kouta Mayanagi, Ph.D.</p> <p>Lecturer Tomohiro Yamashita, Ph.D.</p>
Research	<ul style="list-style-type: none"> <li>• Structural biology</li> <li>• Cryo-electron microscopy of macromolecular assemblies</li> <li>• Structural analysis of DNA-Protein complexes</li> <li>• Structural study of intrinsically disordered region (IDR)</li> <li>• Drug discovery research to alleviate pain or itch by strategy of Green Pharma</li> <li>• Discovery of new target molecules related to sensation</li> </ul>

## Molecular Pathobiology

Teaching staff	<p>Professor Ken-ichi Yamada, Ph.D.</p> <p>Assistant Professor Kazushi Morimoto, Ph.D.</p> <p>Assistant Professor Mirinthorn Jutanom, Ph.D.</p> <p>Assistant Professor Masami Abe, Ph.D.</p>
Research	<ul style="list-style-type: none"> <li>• Structural Analysis of Oxidized Lipids Produced in Pathological Conditions</li> <li>• Identification of Bioactive Oxidized Lipids and Elucidation of the Molecular Targets</li> <li>• Molecular Mechanisms of Cell Death Caused by Lipid Peroxidation</li> <li>• Molecular Mechanisms of Oxidized Lipids-related Diseases such as AMD, Dementia, and NASH</li> <li>• Drug Discovery Research Targeting Lipid Peroxidation</li> </ul>

## Drug Discovery and Evolution

Teaching staff	Professor Kenji Hamase, Ph.D. Lecturer Takeyuki Akita, Ph.D. Assistant Professor Manabu Nakazono, Ph.D. Assistant Professor Chiharu Ishii, Ph.D.
Research	Drug discovery and diagnosis using chiral amino acid metabolomics. Anti-aging research focusing on isomerization of proteins. Industrial-academic-government cooperation research on heart and renal disorders. Development of analytical reagents, materials and instruments. Development of novel functional foods, beverages and cosmetics including D-amino acids.

## Medicinal Chemistry & Chemical Biology

Teaching staff	Professor Akio Ojida, Ph.D. Lecturer Naoya Shindo, Ph.D. Assistant Professor Shohei Uchinomiya, Ph.D. Assistant Professor Naoki Zenmyo, Ph.D.
Research	1) Development of Covalent Drug We are challenging drug discovery from chemical biology point of the view. We consider that drug discovery is a research that creates a superior molecule for treatment of disease. In particular, we are actively promoting medicinal chemistry of covalent drug, which exert its function by forming covalent bond with targeted proteins. Throughout the covalent drug research, we explore new organic chemistry that robustly operates in biological systems. 2) Development of Fluorescent Probe We are promoting chemical biology research to elucidate biological functions by utilizing the developed molecule as chemical tool. We particularly focus on cell metabolism, and are thus developing a new fluorescent probe that can detect activity of intracellular metabolism. Throughout this research, we try to open the new way of cell metabolism analysis based on chemical biology approach.

## Green Pharmaceutical Chemistry

Teaching staff	Professor Takashi Ohshima, Ph.D. Assistant Professor Takuma Tagami, Ph.D. Assistant Professor Keitaro Umeno, Ph.D. Assistant Professor Akimasa Sugizaki, Ph.D.
Research	The following topics are currently under investigation in our laboratories: 1. Digitalization-driven Transformative Organic Synthesis (Digi-TOS) 2. Development of New Environmentally Benign Catalytic Processes 3. Development of New Chemoselective Catalyses 4. Synthesis of Biologically Active Natural Products Using One-Pot Multistep Catalysis 5. Development of New Molecularly-Targeted Anticancer Drugs 6. Promotion of “Green Pharma”

## Pharmaceutical Synthetic Chemistry

Teaching staff	Professor Go Hirai, Ph.D. Assistant Professor Makoto Yoritake, Ph.D. Assistant Professor Hiroaki Matoba, Ph.D.
Research	In our group, several research projects based on synthetic organic chemistry are in progress: 1. To develop fields of pseudo-natural product chemistry and pseudo-glycoconjugates with new biological functions 2. Creation of biologically active and functional molecules based on lipids 3. Development of synthetic methods for novel natural product-like molecular scaffolds 4. Drug discovery research based on glycans or glycoconjugates

### Molecular Transformation Chemistry

Teaching staff	Professor Takashi Niwa, Ph.D.
Research	<p>Our group aims for developing novel reaction chemistry to create new transformation methodologies and molecular structures that can contribute to promoting interdisciplinary fields, such as life and medicinal sciences. For this purpose, we focus on synthetic organic and organometallic chemistry, functional molecule synthesis, and mechanistic studies. The research themes can be summarized below:</p> <ol style="list-style-type: none"><li>1. Exploring reaction chemistry that enables novel transformations</li><li>2. Developing late-stage modification methods with various external stimuli</li><li>3. Developing practical synthetic methods for functional molecules</li></ol>

### International Chemical and Physical Pharmacy

Teaching staff	Associate Professor Mariko Aso, Ph.D. ※will retire on March, 2027
Research	<p>The research activities of our laboratory have focused on the following topics:</p> <ol style="list-style-type: none"><li>1. Design of artificial nucleic acids with useful functions</li><li>2. Site specific protein modification for development of biodrugs</li><li>3. Development of bone targeting therapeutic proteins</li></ol>

### Clinical Pharmacology and Biopharmaceutics

Teaching staff	Associate Professor Takeshi Hirota, Ph.D.
Research	<p>The landmark of our research is to establish the rational and efficient personalized pharmacotherapy with sufficient safeness. The efficacy and safety of drug therapy is closely related to each pharmacokinetics, pharmacodynamics and toxicology. Therefore, we developed the various research techniques and intelligences as follows:</p> <ol style="list-style-type: none"><li>1. Clinical application of biomarkers reflecting pharmacological and toxicological responses in pharmacotherapy.</li><li>2. Establishment of countermeasures against drug-induced neurotoxicity and nephrotoxicity based on clarification of their molecular mechanisms.</li><li>3. Pharmacogenomics in personalized immunosuppressive therapy in organ transplant patients.</li><li>4. Clarification of pathophysiological role of renal drug transporters in patients with acute kidney injury and/or chronic kidney disease.</li><li>5. Establishment of personalized anticancer chemotherapy by pharmacokinetic, pharmacodynamics and pharmacogenomic analyses.</li><li>6. Pharmaceutical informatics to improve pharmaceutical practice by epidemiological approach.</li></ol>

### Drug Delivery System

Teaching staff	Professor Yasunari Michinaka, Ph.D. Associate Professor Hiroyuki Kojima, Ph.D. Associate Professor Kenji Hyodo, Ph.D.
Research	<p>The role of drug delivery system (DDS) is to provide optimized drug therapy for patients, enhancing the efficacy and safety by controlling drug release rate and the amount to be absorbed in body. Together with this, recent research effort is targeted at making drugs easier to administer to patients. Further role of employing DDS for companies is product value maximization, including life cycle management.</p>

### Molecular Biology of Cancer Chemotherapy

Teaching staff	Professor Shinya Oda, M.D.
Research	<p>National Hospital Organization Kyushu Cancer Center is a regional center of cancer medicine and cancer genomic medicine, in which clinical R&amp;D is active and many clinical trials are being run. Using information and biospecimens collected/biobanked from cancer patients, we address the following research questions:</p> <ol style="list-style-type: none"><li>1) Genomic instability: its significance in tumorigenesis and as a biomarker in cancer medicine</li><li>2) Abnormality of DNA replication and repair causing genomic instability</li><li>3) DNA replication and repair as a mechanism of anticancer drugs</li><li>4) The reality of common genetic biomarkers in cancer medicine</li><li>5) Collaborative R&amp;D with pharma/bio-companies for new biomarkers and new NGS-based testings</li></ol>

### Translational Pharmaceutical Sciences

Teaching staff	Professor Hirosato Kondo, Ph.D. Professor Takashi Uehara, Ph.D. Professor Shuji Kaneko, Ph.D.
Research	<ul style="list-style-type: none"><li>• Research for the new generation of drug discovery</li><li>• Physiological/Pathophysiological roles of nitric oxide</li><li>• Drug repositioning and target discovery based on clinical evidence</li><li>• Utilization of real world data for the basic research of pharmaceutical sciences</li></ul>

### R&D Laboratory for Innovative Biotherapeutics Science

Teaching staff	Professor Yoshikazu Yonemitsu, M.D., Ph.D. Associate Professor Yui Harada, Ph.D.
Research	<ul style="list-style-type: none"><li>• Development of novel and highly efficient RNA viral drug for treatment of peripheral arterial disease (SeV vector)</li><li>• Development of the new adoptive immunity-based medicine for cancer ~ NK cells</li><li>• Research of the rational targets for the development of therapeutics to manage malignancies</li><li>• High-throughput 3D tumor spheroid screening model for drug discovery</li><li>• Development of iPS-derived cell based extracorporeal-circulating artificial liver support</li><li>• Collaborations with industries (university-launched venture, pharmaceutical companies)</li><li>• Exploring the role of platelets in inflammation control mechanisms</li><li>• Elucidation of the mechanism of tumor malignancy through platelet interactions</li></ul>

For further information, please visit the following website.  
<http://www.phar.kyushu-u.ac.jp/eng/index.php>