

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"> • Pathological analysis focusing on pharmacokinetics-related genes (Cytochrome P450, Transporter). • Analysis of organ linkage mechanism under pathological conditions. • Investigation of new therapeutic agents and pharmacodynamic and pharmacokinetic analysis and protein structural analysis.

Pharmaceutics

Teaching staff	Professor Shigehiro Ohdo, Ph.D. ※will retire on March, 2024
Research	The study on the individualization of pharmacotherapy has been carried out aiming at further improvement of pharmacotherapy. However, intraindividual variability as well as interindividual variability should be considered to aim at further improvement of rational pharmacotherapy. Because many drugs vary in potency and/or toxicity associated with the rhythmicity of biochemical, physiological and behavioral processes. One approach to increasing the efficiency of pharmacotherapy is the administration of drugs at times at which they are most effective and/or best tolerated. The application of biological rhythm to pharmacotherapy may be accomplished by the appropriate timing of conventionally formulated tablets and capsules, and the special drug delivery system to synchronize drug concentrations to rhythms in disease activity. In all living organisms, circadian pacemaker resides in the paired suprachiasmatic nuclei (SCN). Clock genes are the genes that control the circadian rhythms in physiology and behavior. The knowledge of clock genes may be important for the clinical practice. Therefore, we aim at the development of new chronotherapy based on the following strategy: to monitor a rhythmic marker for selecting dosing time, to overcome the alteration of the clock function, a new concept of adverse effects, by devising a dosing schedule and to produce new rhythmicity by manipulating the conditions of living organs by using rhythmic administration of altered feeding schedules or several drugs.

Glocal Health Care

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"> 1. Studies on molecular mechanism for circadian exacerbations of chronic pain and inflammation. 2. Studies on the prediction of human pharmacokinetic profile in animal scale up based molecular circadian clock 3. Optimization of dosing regimen to achieve the treatment of circadian-related diseases

Clinical pharmacy and Pharmaceutical care

Teaching staff	Associate Professor Takao Shimazoe, Ph.D. ※will retire on March,2024 Lecturer Daisuke Kobayashi, Ph.D. Assistant Professor Takehiro Kawashiri, Ph.D.
Research	<ul style="list-style-type: none"> • Establishment of pharmaceutical education system • Study on leftover drugs for reduction of medical expenses and improvement of adherence (Setsuyaku-bag campaign) • Study of prevention and treatment for various diseases with drugs, herbs, foods, and so on • Establishment of objective indexes in Kampo medicines • Study on development of simultaneous determination of clinically used drugs for therapeutic drug monitoring • Study on circadian rhythms • Establishment of evaluation method for patient education on various diseases • Studies on mechanisms and prevention of chemotherapy-induced peripheral neuropathy

Molecular and System Pharmacology

Teaching staff	Professor Makoto Tsuda, Ph.D. Associate Professor Yuta Kohro, Ph.D. Assistant Professor Risako Fujikawa, Ph.D. Assistant Professor Keita Kouno, 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 Mi Xinya, Ph.D.
Research	1. Comprehensive understanding of the maintenance of cardiac robustness via multi-level interactions 2. Elucidation of the physiological role of sulfur metabolism and its therapeutic application 3. Establishment of therapeutic strategies for curing intractable diseases targeting mitochondrial quality control 4. Promotion of Green-Pharma research by collaborating with National Institutes

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	• Molecular mechanisms of tissue fibrosis • Roles of fibroblasts in various tissues • The hematopoietic stem cell microenvironment

International Biological and Clinical Pharmacy

Teaching staff	
Research	

Laboratory of Global Healthcare

Teaching staff	Professor Jose Caaveiro, Ph.D. Lecturer Saeko Yanaka, Ph.D. Assistant Professor Akinobu Senoo, Ph.D.
Research	• Novel therapeutic approaches to fight human disease (infectious diseases, neurodegeneration, cancer, etc...) • Antibody engineering: Novel antibody modalities and molecular mechanisms. • Vaccines: Characterization of antibodies and antigen design. • Biomolecular recognition between proteins and drugs. • Drug discovery in challenging targets: membrane proteins and protein-protein interaction. • Drug discovery for pain and itch. • High-resolution structural biology. • Design and engineering of immunotoxins. • Fundamental Protein Science for Pharmaceutical sciences.

Molecular Biology

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

Cellular Biochemistry

Teaching staff	Professor Masatoshi Fujita, M.D., Ph.D. Assistant Professor Yoko Katsuki, Ph.D. Assistant Professor Miyako Shiraishi, Ph.D. Assistant Professor Yasunori Noguchi, Ph.D.
Research	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: <ul style="list-style-type: none">1. Function and cell cycle regulation of DNA replication initiation proteins, ORC, CDC6, Cdt1, MCM and related factors.2. Molecular mechanisms for SLX4-mediated cellular responses to replication stress.3. Relationship between chromatin regulations and regulations of replication initiation and replication stress response.4. Development of MCM8-9 inhibitors as novel anti-neoplastic agents.

Pharmacognosy

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

Drug Discovery Structural Biology

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

Molecular Pathobiology

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

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	<p>1) Development of Covalent Drug</p> <p>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.</p> <p>2) Development of Fluorescent Probe</p> <p>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.</p>

Green Pharmaceutical Chemistry

Teaching staff	Professor Takashi Ohshima, Ph.D. Assistant Professor Ryo Yazaki, Ph.D. Assistant Professor Akimasa Sugizaki, Ph.D.
Research	The following topics are currently under investigation in our laboratories: <ol style="list-style-type: none">1. Digitalization-driven Transformative Organic Synthesis (Digi-TOS)2. Development of New Environmentally Benign Catalytic Processes3. Development of New Chemoselective Catalysts4. Synthesis of Biologically Active Natural Products Using One-Pot Multistep Catalysis5. Development of New Molecularly-Targeted Anticancer Drugs6. Promotion of “Green Pharma”

Pharmaceutical Synthetic Chemistry

Teaching staff	Professor Go Hirai, Ph.D. Assistant Professor Makoto Yoritate, Ph.D. Assistant Professor Hiroaki Matoba, Ph.D.
Research	In our group, several research projects based on synthetic organic chemistry are in progress: <ol style="list-style-type: none">1. To develop fields of pseudo-natural product chemistry and pseudo-glycoconjugates with new biological functions2. Creation of biologically active and functional molecules based on lipids3. Development of synthetic methods for novel natural product-like molecular scaffolds4. Drug discovery research based on glycans or glycoconjugates

Molecular Transformation Chemistry

Teaching staff	Professor Takashi Niwa, Ph.D.
Research	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: <ol style="list-style-type: none">1. Exploring reaction chemistry that enables novel transformations2. Developing late-stage modification methods with various external stimuli3. Developing practical synthetic methods for functional molecules

International Chemical and Physical Pharmacy

Teaching staff	Associate Professor Mariko Aso, Ph.D.
Research	The research activities of our laboratory have focused on the following topics: <ol style="list-style-type: none">1. Design of artificial nucleic acids with useful functions2. Site specific protein modification for development of biodrugs3. Development of bone targeting therapeutic proteins

Frontier in Biofunction of Nucleic Acid and Organic Chemistry

Teaching staff	Associate Professor Yosuke Taniguchi, Ph.D.
Research	<ol style="list-style-type: none">1. Synthesis of artificial nucleoside analogues for the formation of the triplex DNA and development of oligonucleotide therapeutics.2. Development of artificial nucleoside analogues for the recognition of oxidative nucleoside damage in DNA3. Creation of nucleoside or nucleotide mimic.

Clinical Pharmacology and Biopharmaceutics

Teaching staff	Professor Ichiro Ieiri, Ph.D. ※will retire on March,2024 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">1. Clinical application of biomarkers reflecting pharmacological and toxicological responses in pharmacotherapy.2. Establishment of countermeasures against drug-induced neurotoxicity and nephrotoxicity based on clarification of their molecular mechanisms.3. Pharmacogenomics in personalized immunosuppressive therapy in organ transplant patients.4. Clarification of pathophysiological role of renal drug transporters in patients with acute kidney injury and/or chronic kidney disease.5. Establishment of personalized anticancer chemotherapy by pharmacokinetic, pharmacodynamics and pharmacogenomic analyses.6. Pharmaceutical informatics to improve pharmaceutical practice by epidemiological approach.

Drug Delivery System

Teaching staff	Professor Yasunari Michinaka , Ph. D. Associate Professor Hiroyuki Kojima, Ph. D. Associate Professor Kenji Hyodo, Ph. D.
Research	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.

Molecular Biology of Cancer Chemotherapy

Teaching staff	Professor Shinya Oda, M.D.
Research	National Hospital Organization Kyushu Cancer Center is a regional center of cancer medicine and cancer genomic medicine, in which clinical R&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: <ol style="list-style-type: none">1) Genomic instability: its significance in tumourigenesis and as a biomarker in cancer medicine2) Abnormality of DNA replication and repair causing genomic instability3) DNA replication and repair as a mechanism of anticancer drugs4) The reality of common genetic biomarkers in cancer medicine5) Collaborative R&D with pharma/bio-companies for new biomarkers and new NGS-based testings

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">• Research for the new generation of drug discovery• Physiological/Pathophysiological roles of nitric oxide• Drug repositioning and target discovery based on clinical evidence• Utilization of real world data for the basic research of pharmaceutical sciences

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">• Development of novel and highly efficient RNA viral drug for treatment of peripheral arterial disease (SeV vector)• Development of the new adoptive immunity-based medicine for cancer ~ NK cells• Research of the rational targets for the development of therapeutics to manage malignancies• High-throughput 3D tumor spheroid screening model for drug discovery• Development of iPS-derived cell based extracorporeal-circulating artificial liver support• Collaborations with industries (university-launched venture, pharmaceutical companies)

Kampo-Medicinal Chemistry

Teaching staff	
Research	

For further information, please visit the following website.

<http://www.phar.kyushu-u.ac.jp/eng/index.php>