CoMIT

Osaka University Graduate School of Medicine

The Center of Medical Innovation and Translational Research

2024

OSAKA UNIVERSITY

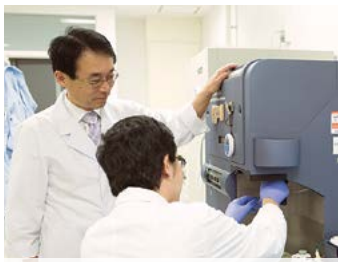
The Center of Medical Innovation and Translational Research Building

Graduate School of Medicine

The CoMIT Building

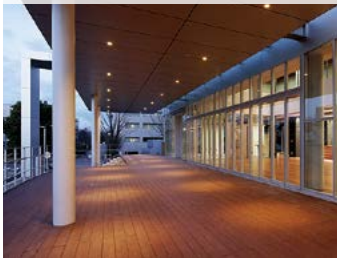
The Center of Medical Innovation and Translational Research

CoMIT



Multifunctional Complex

A hub to seamlessly connect
education, research, bedside, and the society



The CoMIT Building

The Center of Medical Innovation and Translational Research (CoMIT) Building was completed in April 2014 and established as a complex environment for advanced research and educational activities. The Center was jointly financed by a subsidy from the Ministry of Economy, Trade, and Industry and by Osaka University own funds. The funds aimed at promoting translational research through multisectorial collaboration, bringing together the industry, academia and government.

Goals

- **To serve as a hub that seamlessly connect education, basic research, bedside, industry, and the society at large in a view to implement innovative solutions to human health.**
- **To foster a new generation of young personnel equipped with diverse perspectives.**

Organizations

CoMIT

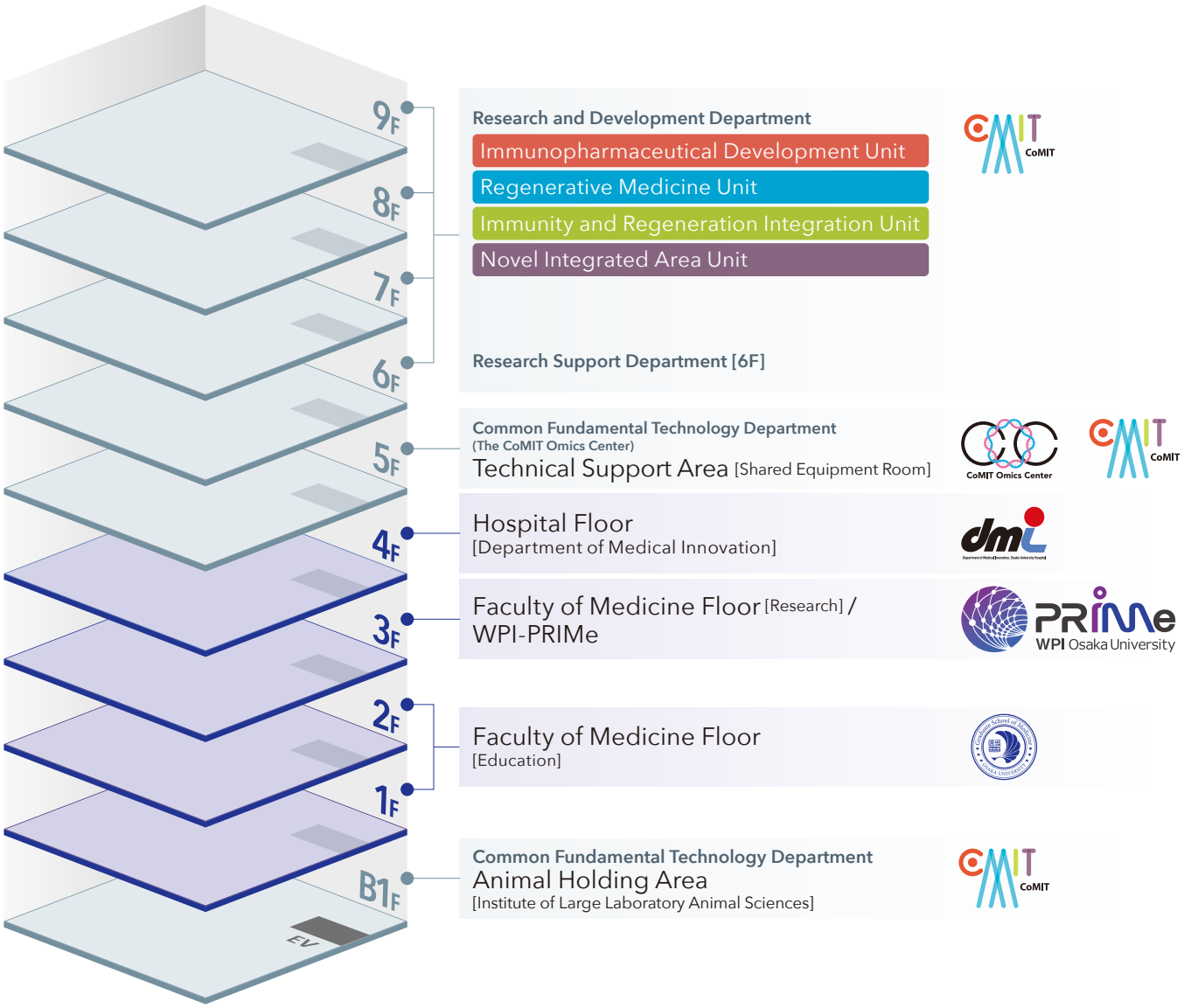
CoMIT is an R&D institute based on industry-academia-government alliance aiming to develop cutting-edge medical technologies. The center aims to promote open innovation and accelerate industrialization of promising research results in the life sciences.

Educational Facilities

The first floor - Third floor of the building host comprises state-of-the art facilities for fundamental education and comprehensive training for students of the Faculty of Medicine and residents of Osaka University Hospital.

Department of Medical Innovation (DMI)

DMI is a division of the University Hospital that provides centralized support to translational research in medical technology, independent data management and statistical analysis for interventional trials and analytic research. The DMI also provides medical services for patients from outside Japan and education/training for overseas health care professionals.



Greetings

Realization of a "Society where Each Member Leads a Meaningful and Fulfilling Life" Through the OU Ecosystem

President
Osaka University
NISHIO Shojiro

In recent years, the world has been facing numerous challenges such as pandemics, global warming, depletion of resources, and aging. Universities have been confronted with growing anticipation from society to cultivate talent and foster innovation in a major reorientation of social systems to pursue the SDGs and carbon neutrality.

In the face of these great expectations and challenges from the society, Osaka University must marshal our collective knowledge and wisdom, actively pursue co-creation with the society, and manifest our capacity to transform society.

The OU (Osaka University) Ecosystem is the cornerstone of co-creation with the society, and creates a virtuous cycle of knowledge, talent, and funds. This is a system to drive even greater social transformation. It involves applying outstanding education and research results in the society, analyzing new issues uncovered through this process, and feeding those results back into fundamental research. Looking the fourth medium-term goal period (FY2022-2027) and beyond, we have formulated the OU Master Plan 2027, with the OU Ecosystem at its core, as an upgraded vision to build sustainable basis for education, research, and university management. With this Master Plan as a guide, Osaka University will promote challenging initiatives through co-creation with the society, in order to be a university that goes beyond simply "contributing to society" to "creating a society where each member leads a meaningful and fulfilling life."

The Center of Medical Innovation and Translational Research (CoMIT) is an "open" space that, in addition to the implementation of student education and research, brings researchers from different disciplines, companies, and universities under one roof as a base for Osaka University's life science field. There, they create a seamless process that starts with technology seeds from basic research then develops them into empirical research and practical applications. In the future, we plan on further strengthening our education and research activities by fully utilizing the functions of the OU Ecosystem at CoMIT, where diverse knowledge, researchers, and students intersect.

Through activities that strongly promote Open Innovation, we plan to work to extend the years that an individual can be active in society, and by encouraging every individual to realize their diverse talents, we aim to make a considerable contribution to the realization of a society in which all individuals can enjoy a rich and happy life–a society that fosters a sense of purpose in life.

Under one roof

Since its establishment in April 2014, the Center of Medical Innovation and Translational Research has been one of the leading research centers for the industry-academia collaboration in Japan. Its proposed mandate is “the development of cutting-edge medical care and promotion of open innovation that is unparalleled in the world ‘under one roof’ through the collaboration of industry, academia, and government institutions.” Under this mission, we are currently working on the research and development of new next-generation drugs and innovative medical technologies in collaboration with companies and research institutions in a variety of fields.

The medical community in Japan is currently facing tremendous challenges in both basic and clinical medicine. In addition to the most recent issues, we must consider the needs of medicine in a rapidly changing society, how to disseminate the results of our research to the medical community, particularly, in the post-corona era, and how to develop next generation research strategies without interruption. This is a time when we need to look toward the future.

In academia, it is important to aim for research that focuses on the essence and true nature of life phenomena, and for clinical and translational research to develop into new basic research that leads to the true elucidation of etiology and pathology. However, in this process, it is also important to support excellent seeds that can be returned to society from an early stage and to develop them into the next generation of innovation together with industry. We believe that the role of the Center of Medical Innovation and Translational Research will continue to increase in order for Osaka University to continue to demonstrate its presence in Japan and abroad. In the future, the Center of Medical Innovation and Translational Research will continue to promote, develop, and implement projects with social implications in the field of advanced medicine through bridging research on innovative ideas, licensing out to companies, and early realization of industrialization through close industry-university collaboration.

Dean
Graduate School of Medicine
KUMANOGOH Atsushi

Aiming to deliver cutting-edge medical care from Osaka

Director
Osaka University Hospital
NONOMURA Norio

It has been exactly ten years since the Center of Medical Innovation and Translational Research (CoMIT) was established in Osaka University. CoMIT has been established as a research center to bridge basic medical research to clinical research and practical medicine.

Osaka has prospered as a town of commerce and merchants since early times, cherishing everything that can "be of service to others." This spirit, I believe, remains alive in medical research. At the Graduate School of Medicine, Osaka University, many researchers constantly devote themselves to research in the field of life science with an aspiration of conducting research that can be of service to others.

There is an extremely long way to go for medical research to reach practical application in medical care. It can "be of service to others" only after going through the process of questioning "what the problem is in practical medical settings" and "what the reason is," identifying the causative agents (proteins or genes), and achieving the development of diagnostic methods and medicines. Also, sometimes more sophisticated and safe medical care may only be achieved by the development of new medical devices through medical-industrial collaboration. In order for these underlying endeavors to be promoted smoothly, the Medical Center for Translational Research was established in 2002 in Osaka University Hospital and has since strived to bridge basic research to clinical practice. The center was later reorganized into the "Department of Medical Innovation" and has become an important institution that promotes not only translational research but also clinical research as a whole. In high recognition of such efforts, in 2015, Osaka University Hospital was certified as a Clinical Research Core Hospital based on the Medical Care Act of Japan.

To further accelerate these efforts, industry-academia collaboration is essential. CoMIT was established to this end, and comprises the Research and Development Department, Common Fundamental Technology Department, and Research Support Department. The Research and Development Department plays a central role in CoMIT, where several industry-academia-government collaboration projects are currently underway by the Immunopharmaceutical Development, Regenerative Medicine, Immunity and Regeneration Integration, and Novel Integrated Area Units. Each unit has industry-academia collaborative research programs and industry-sponsored programs, and fascinating research is being promoted.

Osaka University Hospital will provide full support for the seeds of basic research developed in CoMIT to be transformed through first-in-human trials into clinical implementation.

An integrated research center for collaboration among industry, academia, and government

In 2002, the Graduate School of Medicine of Osaka University established the Medical Center for Translational Research at Osaka University Hospital, and has become one of the first institutions in Japan to establish a system to develop basic technologies (from on and off campus) into advanced medical care. The next innovation expected was the preparation of the "soil" for promising basic technologies to flourish. As a key way to achieve this, the establishment of the Center of Medical Innovation and Translational Research (CoMIT) was proposed with the purpose of enhancing collaboration between industry and academia.

In the course of fleshing out the details, this proposal was selected for the Subsidy for Advanced Technology Demonstration and Evaluation Facility Development (a project for construction of "Centers to Facilitate the Development of Technology") by the Ministry of Economy, Trade and Industry. CoMIT was then established in April 2014 as the culmination of leadership by 3 successive deans of the Graduate School of Medicine and hard work by numerous faculty members.

CoMIT has a highly unique characteristics, where companies, universities, and researchers from different fields and areas gather "Under One Roof" of the same facility for development and practical application of integrative, cross-cutting, advanced medical technology in immunity, regeneration, and other areas. The number of projects promoted at CoMIT and participating companies is actually increasing every year, further enriching research to deliver multiple achievements. I hope CoMIT will continue to play an active role in bridging basic research to clinical research and social implementation as a center to create and deliver new innovations by integrating various areas of knowledge.

Director
Center of Medical Innovation and Translational Research
FUJIMOTO Manabu

1-2F

CoMIT Joint Project with the Faculty of Medicine

Faculty of Medicine Floor [Education]

The first and second floors host state-of-the-art educational facilities for undergraduate and graduate students, and for residents.

The first floor includes (1) the Multimedia Hall, a 134 fixed-seat auditorium equipped with a personal computer and monitor at each seat. The room is suitable for graphical and interactive lectures and practice, language education, seminars, and other versatile educational activities. (2) The Student Laboratory 1 is a space for the practice of basic medicine with state-of-the-art measurement and analysis equipment, where all of the students of the same grade can practice at the same time.

The second floor is home to the Simulation Center and Clinical Training Room, which is also open to both residents and nurses of the University Hospital. On the same floor are located various facilities including the Student Laboratory 3, the Private Study Room, the Lecture Room for graduate students, and the Conference Room.

This floor also hosts rooms for administrative and faculty members of the Medical Education Center and Postgraduate Medical Training Center, which provide continuous pre- and postgraduate education.

Professor
Medical Education Center
Graduate School of Medicine
WATABE Kenji

The center building provides a combination of educational facilities with state-of-the-art equipment. This new facility will certainly make a dramatic improvement in the educational environment for undergraduate students, residents, and graduate students. It is our strong will to utilize the facility to achieve the goal of the Faculty of Medicine to develop human resources and thereby, “foster leaders equipped with a global perspective.”

Fostering Leaders with an International Perspectives

3F

CoMIT Joint Project with the University's Administration Bureau

Faculty of Medicine Floor [Research] / WPI-PRIMe

WPI Premium Research Institute for Human Metaverse Medicine (WPI-PRIMe) – Taking on an Unending Challenge: "Conquering All Diseases" through Metaverse-Based Medical Research –

WPI-PRIMe was selected in 2022 as a research center of World Premier International Research Center Initiative (WPI) launched by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). WPI-PRIMe aims to create a new scientific field, "Human Metaverse Medicine," which enables us comprehensively and continuously to understand the process of disease development, and to develop personalized prevention methods and curative treatments for diseases.

WPI-PRIMe enhances the integration of organoid biomedical science and information and mathematical science, and generates fused disciplines. Moreover, WPI-PRIMe creates worldwide research networks by building an international research environment.

The third floor provides research spaces for Primacy Investigators (PIs) inside and outside Osaka University. This floor also has a seminar room especially designed for active interaction among researchers as meeting spaces. Researchers from diverse fields can work at "under-one-roof" environment and engage in interdisciplinary exchange with PIs working nearby the CoMIT building.

The third floor is also home to the offices for administrative team and the Director of WPI-PRIMe. By having all members and teams working on the same floor, it helps to facilitate workflow and team chemistry of WPI-PRIMe.

Center Director
WPI-PRIMe
NISHIDA Kohji

Research Planning and Management Office

Seminar room "Indra's Net Connect"

4F

CoMIT Joint Project with the Faculty of Medicine

Hospital Floor [Department of Medical Innovation]

Department of Medical Innovation (DMI) provides scientifically and managerially seamless support for diverse procedures of research and development processes to establish novel medical technologies and to create medical innovation aiming at improving global health. DMI consists of four institutions which cooperate efficiently through various stages from exploring basic research ideas to promoting social implementation globally.

Director
Department of Medical Innovation
Osaka University Hospital
MIYAGAWA Shigeru

- **Medical Center for Translational Research (MTR)** promotes translational research from pre-clinical stages to early clinical development in academia. MTR supports exploration of excellent life science ideas, fosters promising seeds and translates them into established medical technologies ready for conveyance to industry.

- **Academic Clinical Research Center (ACR)** supports clinical trials and clinical studies with global-standard subject protection and a supporting system in accordance with the regulations. Development of cutting-edge medical technologies and new therapies are within its scope.

- **Data Coordinating Center (DCC)** provides support for clinical trials and clinical studies including the development of appropriate study protocols, collecting reliable data, and performing accurate statistical analysis in order to conduct evidence-based clinical trials and clinical studies guaranteed by quality assurance.

- **Center for Global Health (CGH)** supports the receiving of non-Japanese patients and medical trainees. CGH fosters healthcare professionals to become international leaders. It also disseminates Japanese innovative medical technologies to other countries.

For the future of medical sciences

5-9,B1F The Center of Medical Innovation and Translational Research

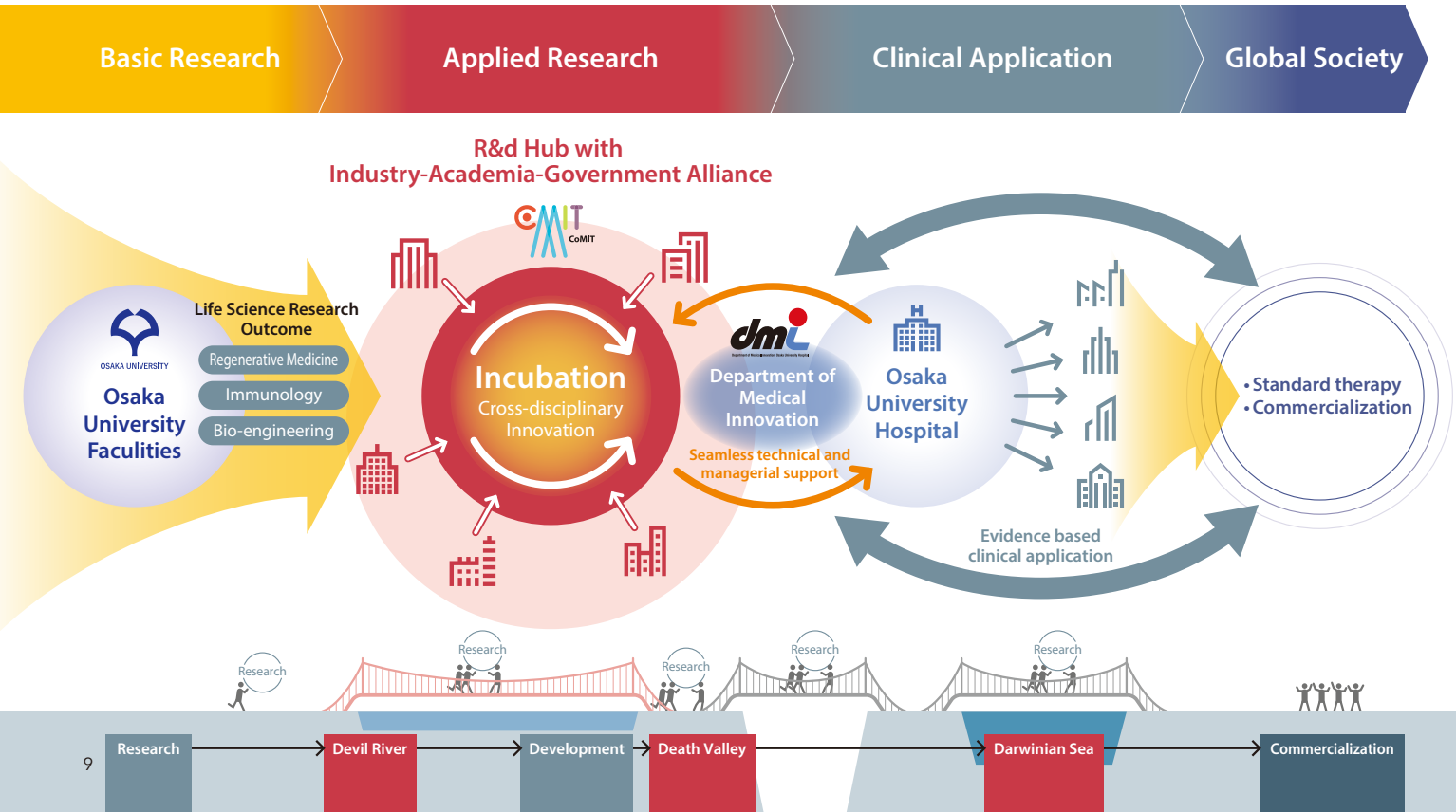
Research and Development in an International Center for Innovative Medical Science

Goals

- **To serve as an R&D hub to seamlessly integrate promising new ideas of basic research into clinical research to the establishment of new standard in medical care**
- **To promote open innovation in order to develop next-generation drugs and innovative medical technologies**

Conventional collaboration between industry and academia in Japan mainly consisted of university laboratories or individual researchers separately conducting joint research with companies. “Collaboration” actually meant connecting scattered dots.

CoMIT has brought collaboration to a new level by putting together company representatives, university personnel, and researchers in different fields to work in the same facility. By doing so, CoMIT seeks to provide an environment that fosters links among disparate laboratories and projects, and to integrate the results of wide-ranging research and technologies in a view to rapidly put those results to clinical and commercial use.



Organization

CoMIT comprises three departments.

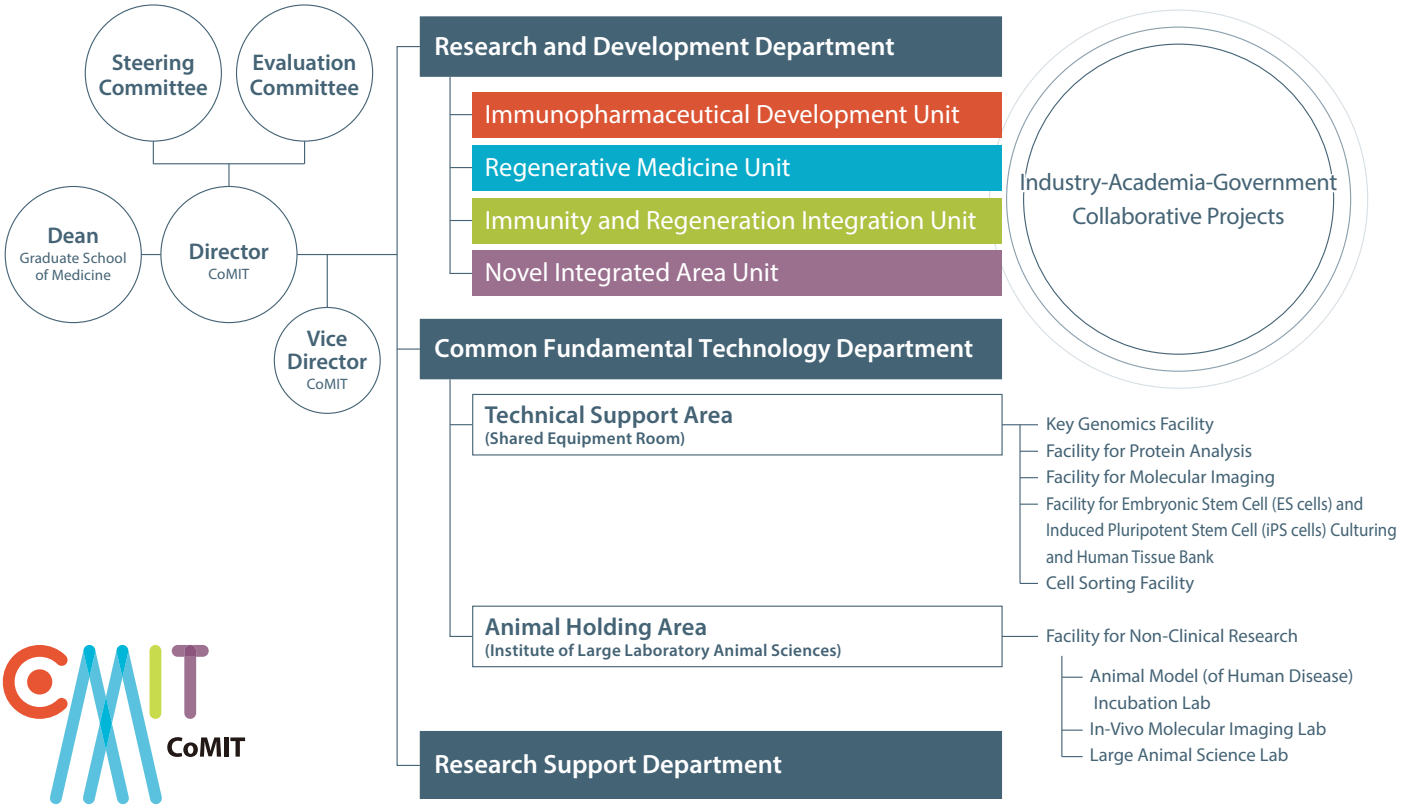
- **The Research and Development Department** implements numerous projects that involve collaboration among industry, academia, and government.
- **The Common Fundamental Technology Department** provides technological infrastructure and support for researchers.
- **The Research Support Department** is responsible for providing managerial support, monitoring and evaluation of the projects.

Our primary research fields

- **Immunology**
- **Regenerative medicine**
- **Integration of the above two fields**
- **Interdisciplinary research**

Osaka University has produced numerous world-acclaimed research results in Immunology and Regenerative medicine. CoMIT mainly focuses on translational research of these outstanding research outcomes.

Our projects, however, are not limited to these two areas and a variety of distinctive interdisciplinary research projects are in progress.



B1F Animal Holding Area
[Institute of Large Laboratory Animal Sciences]

Providing highly-reliable technical support in non-clinical research

Animal facility for pre-clinical research

The Institute of Large Laboratory Animal Sciences supports pre-clinical research on cutting-edge medical technologies. Three operating rooms are large enough to perform various operative procedures with special equipment and devices. Besides, inspection by computed tomography (CT) is applicable to animals that are implanted with iPS cell-derived materials.

Experiments with large laboratory animals are under regulation of the Cartagena Protocol, the Infectious Diseases Control Law and others. Therefore, animal rooms are regularly disinfected with hypochlorite, while effluent from animal husbandry is sterilized in an autoclave at the institute.

Manager
Institute of Large Laboratory Animal Sciences, CoMIT
Professor
Institute of Experimental Animal Sciences, Faculty of Medicine
NAKAO Kazuki

Laboratory animal technicians and veterinarians at the institute support animal procedures in consideration of animal welfare.

Function of the Institute of Large Laboratory Animal Sciences

Equipment of the Institute of Large Laboratory Animal Sciences

Operating rooms

Surgery can be performed under sterilized conditions.

CT room

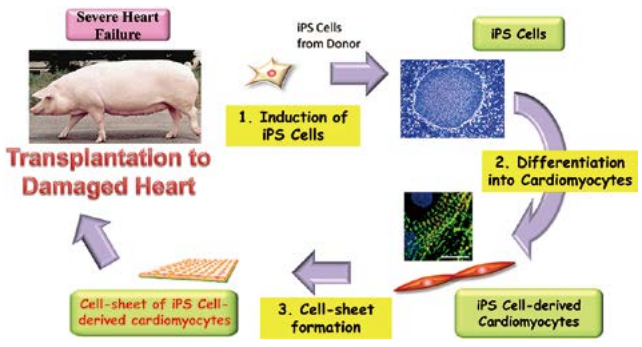
CT scan is available for *in vivo* experiments.

Sterilizer

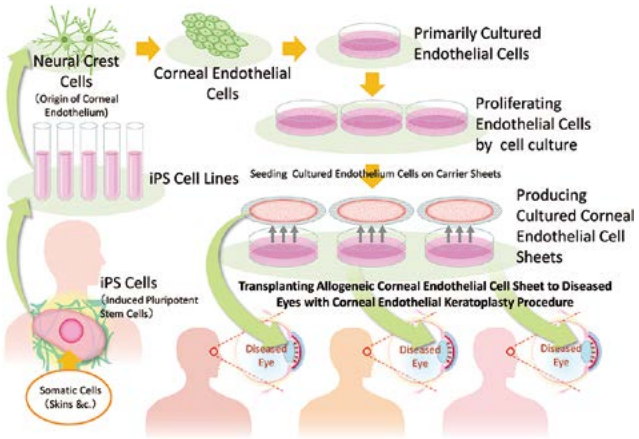
All the effluent is sterilized in two autoclaves (two tons/time).

Examples of Developed Technologies in Regenerative Medicine

Regenerative Therapy for Severe Heart Failure with iPS Cell-derived Cardiomyocytes



Regenerative Therapy for Corneal Endothelium Using Human iPS Cells



Common Fundamental Technology Department
(The CoMIT Omics Center)

5F Technical Support Area
[Shared Equipment Room]

CoMIT Omics Center

CoMIT's technical support area provides technical infrastructure and extensive support for researchers. We offer cutting-edge experimental equipment for all laboratories to share in their experiments.

Our technical experts are always ready to provide the maintenance of equipment and react at first notice in case of problem.

You don't have to worry about the condition of the equipment. Just come to our floor and focus on your experiment.

We also provide consultation service to help enhance the quality of your research by constantly offering highly-reliable analysis of your data.

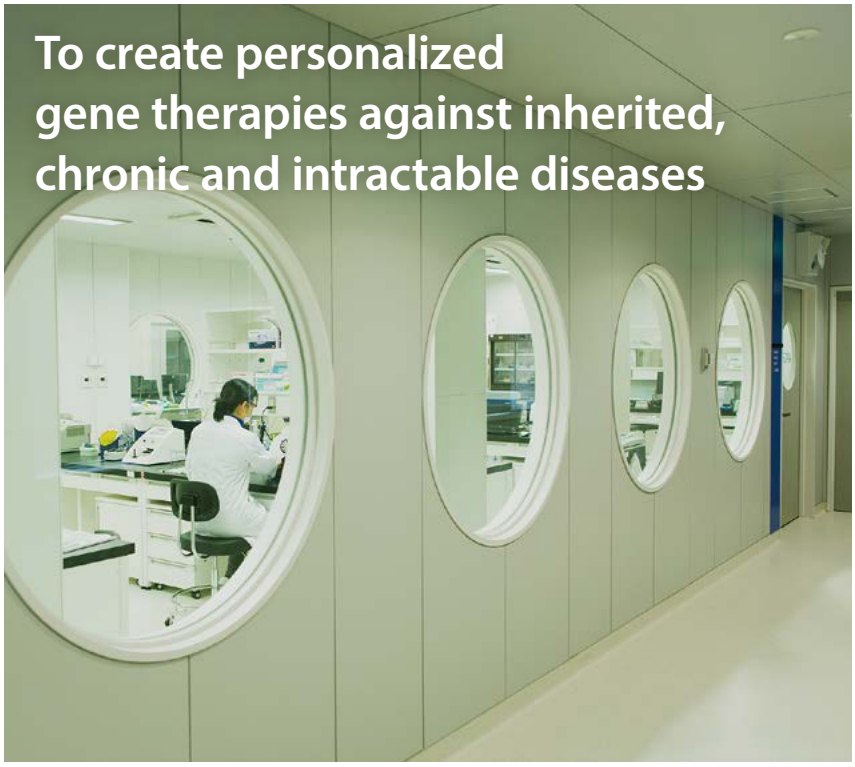
Manager
CoMIT Omics Center
Professor
Department of Integrative Physiology, Graduate School of Medicine
OKAMURA Yasushi

Deputy Manager
CoMIT Omics Center
Associate Professor
Department of Neuroscience and Cell Biology, Graduate School Medicine
USUI Noriyoshi

We support projects from research consultation through to analysis, mainly in the core facilities specializing in genome and protein analyses.

Five Facilities of the CoMIT Omics Center

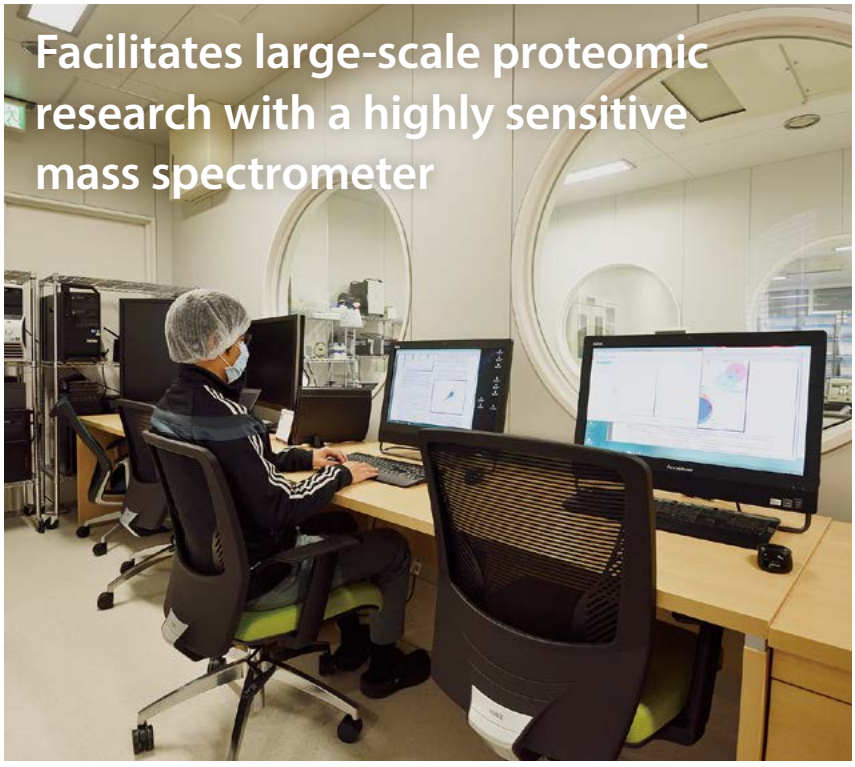
Key Genomics Facility



Facilities

- Next-generation DNA sequencers with outstanding performance
- Sanger sequencers that accurately perform DNA sequencing
- In disease panel analysis, these sequencers can detect 0.5% of mutations.

Protein Analysis Facility



Features

- Cutting-edge mass spectrometers
- Can detect minute quantities of proteins
- Works in coordination with the Graduate School of Medicine and other facilities
- Work in a class 10,000 clean room
- Can identify up to 10 trillionth of a gram of protein.

5F Technical Support Area
[Shared Equipment Room]

Cell Sorting Facility

Features

- Can distinguish and analyze up to 10 cells in a chamber.
- A target group of living cells can be separated at a rate of 8,700 cells/second

Molecular Imaging Facility

Features

- 3D imaging via light sheet microscopy
- Live cell imaging with little damage to cells

Facility for ES cells and iPS cells Culture and Human Tissue Bank

Features

- Overarching management of the samples needed for -omics research
- Cultures can be performed in special environments, such as culturing under hypoxic condition


Center of Medica
Innovation and
ranslational Reso

Industry-Academia-Government Collaborative Projects

The core activities of the CoMIT consist of the academia-industry collaborative projects conducted in the Research and Development Department. These are not just company-funded projects but company representatives and researchers at the university are conducting actual research activities together to accelerate the industrialization of outstanding research results produced in Osaka University.

CoMIT

31 Projects
Collaborative R&D projects

60 Companies
Collaborating with

Research and Development Department INDEX

Immunopharmaceutical Development Unit | Regenerative Medicine Unit | Immunity and Regeneration Integration Unit | Novel Integrated Area Unit

	Page	Unit	Project	Responsible Departments	Principal Investigator
9F	37		Research and development of social implementation on health maintenance by integration of musculoskeletal regenerative medicine and sports/health epidemiology	Department of Sports Medical Science	Professor **NAKATA Ken** Department of Medicine for Sports and Performing Arts
	27		Development of medical equipment, biomechanical evaluation methods and novel musculoskeletal regenerative medicine for diagnosis, prevention and treatment of sports injury and disorders	Department of Sports Medical Biomechanics	Professor **NAKATA Ken** Department of Medicine for Sports and Performing Arts
	23		Development of innovative therapies for intractable immune disease and cancer by targeting neuro, immune and metabolic regulatory factors	Department of Advanced Clinical and Translational Immunology	Professor **KUMANOGOH Atsushi** Department of Respiratory Medicine and Clinical Immunology
	28		Development of computer-aided diagnosis programs and patient-matched instruments	Department of Orthopedic Biomaterial Science	Endowed Chair Associate Professor **OKA Kunihiro** Department of Orthopedic Biomaterial Science
	37		Research Evaluation of Safety and Impact in Long COVID Intervention with Ensitrelvir for National Cohort Efficacy (RESILIENCE study)	Department of Post-infectious diseases Therapeutics	Professor **KUTSUNA Satoshi** Department of Infection Control and Prevention
	24		Development of cGMP manufacturing process for novel lipid-based nano-medicine by taking advantage of the in-line manufacturing platform technology	Department of DDS Pharmaceutical Development	Specially Appointed Associate Professor **MATSUZAKI Takashi** Department of DDS Pharmaceutical Development
	38		Research and development of neural informatics, modulation and restoration	Department of Neurological Diagnosis and Restoration	Professor **KISHIMA Haruhiko** Department of Neurosurgery
	38		Building new clinical evidence by integrating clinical trial data and real world data (RWD)	Department of Biostatistics and Data Science	Specially Appointed Professor **HIDA Eisuke** Department of Biostatistics and Data Science
8F	22		Analysis of the functions of pathological or physiological periostin	Department of Advanced Molecular Therapy	Specially Appointed Professor **TANIYAMA Yoshiaki** Department of Advanced Molecular Therapy
	22		The development of immunotherapy targeting immune suppressive molecules and cells	Department of Frontier Research in Tumor Immunology	Specially Appointed Professor **OHKURA Naganari** Department of Frontier Research in Tumor Immunology
	23		Clinical research for regulatory factors in tumor immunology	Department of Clinical Research in Tumor Immunology	Specially Appointed Professor **WADA Hisashi** Department of Clinical Research in Tumor Immunology
	32		Development of stem cell-based gene therapy adapted for the regeneration-inducing medicine	Department of Stem Cell Gene Therapy Science	Specially Appointed Associate Professor **KIKUCHI Yasushi** Department of Stem Cell Gene Therapy Science
	33		Development of novel medicine for inducing scarless and functional tissue regeneration by mobilizing bone marrow mesenchymal stem cells	Department of Stem Cell Therapy Science	Endowed Chair Associate Professor **SAGA Kotaro** Department of Stem Cell Therapy Science
	36		Research and development of precision diagnostics by highly sensitive spectroscopy (Life and Medical Photonics Division, Institute for Open and Transdisciplinary Research Initiatives (OTRI))	Department of Neurosurgery	Professor **KISHIMA Haruhiko** Department of Neurosurgery
	33		Establishing cancer profiling to develop innovative, personalized medicine and therapeutics	Department of Medical Data Science	Professor **DOKI Yuichiro** Department of Gastroenterological Surgery
7F	26		Development of new technology for the manufacturing, standardization and application of stem cell-based products	Department of Stem Cells and Applied Medicine	Endowed Chair Associate Professor **SAKIMOTO Susumu** Department of Stem Cells and Applied Medicine
	35		Exploration of Innovative Diagnostic and Therapeutic Approaches for Ocular Diseases: 1. Development of advanced diagnostic imaging software 2. Creation of diagnostic equipment and clinical indices that enhance decision-making in the diagnosis and treatment of both ophthalmic and systemic diseases	Department of Vision Informatics	Professor **NISHIDA Kohji** Department of Ophthalmology
	26		Development of Innovative Medical Devices using Bionanotechnology and drug development for corneal regeneration medicine	Department of Advanced Device Regenerative Medicine	Professor **NISHIDA Kohji** Department of Ophthalmology
	31		Elucidation of the involvement of chronic inflammation during the pathogenic processes of various ophthalmic diseases and the creation of treatments	Department of Ocular Immunology and Regenerative Medicine	Professor **NISHIDA Kohji** Department of Ophthalmology
	36		Innovation of cutting-edge fundamental technologies to accelerate drug discovery and regenerative medicine: Creation of physiologically-relevant cardiac tissues, and Development of system to acquire/evaluate biomedical information	Department of Cardiovascular Regenerative Medicine and Drug Discovery	Specially Appointed Professor **LEE Jong-Kook** Department of Cardiovascular Regenerative Medicine and Drug Discovery
	27		Development of new therapy for cardiovascular diseases	Department of New Generation Cardiovascular Therapy	Professor **MIYAGAWA Shigeru** Department of Cardiovascular Surgery
	21		Development of next-generation designer cell with improved adipose-derived stem cells (ADSCs)	Department of Gene & Stem Cell Regenerative Therapy	Endowed Chair Professor **SHIMAMURA Munehisa** Department of Gene & Stem Cell Regenerative Therapy
	32		Development of immunomodulation technology and quality control technology in cell therapy	Department of Immunology and Molecular Medicine	Professor **KUMANOGOH Atsushi** Department of Respiratory Medicine and Clinical Immunology
6F	35		Research and development of advanced devices for next-generation medical care	Department of Device Application for Molecular Therapeutics	Professor **KUMANOGOH Atsushi** Department of Respiratory Medicine and Clinical Immunology
	30		New drugs for refractory neurological diseases through translational research	Department of Neuro-Medical Science	Professor **YAMASHITA Toshihide** Department of Molecular Neuroscience
	20		Development of novel diagnostic and therapeutic approaches for treating aging-associated diseases	Department of Clinical Gene Therapy	Endowed Chair Professor **MORISHITA Ryuichi** Department of Clinical Gene Therapy
	20		Therapeutic Vaccines as Next Generation Biologics	Department of Health Development and Medicine	Endowed Chair Professor **NAKAGAMI Hironori** Department of Health Development and Medicine
	30		1. Understanding the pathogenesis of inflammatory skin diseases associated with dysbiosis 2. Analysis of the impact of maintaining skin homeostasis on overall health span	Department of Cutaneous Immunology and Microbiology	Professor **FUJIMOTO Manabu** Department of Dermatology
	21		Elucidation of disease mechanisms and therapeutic targets in cutaneous immune-mediated disorders from the perspective of resident memory T cells	Department of Medicine for Cutaneous Immunological Diseases	Professor **FUJIMOTO Manabu** Department of Dermatology
	31		We aim to address the challenges of frailty, declining birthrate, and cancer through the application of hybrid medicine	Department of Advanced Hybrid Medicine	Specially Appointed Assistant Professor **EGASHIRA Ryuichiro** Department of Advanced Hybrid Medicine

Immunopharmaceutical Development Unit

Novel-concept research for diseases associated with immune abnormalities.

Development of novel diagnostic and therapeutic approaches for treating aging-associated diseases

B-1 | 6F | 0611

MORISHITA Ryuichi
Endowed Chair Professor
Department of Clinical Gene Therapy

Responsible Department

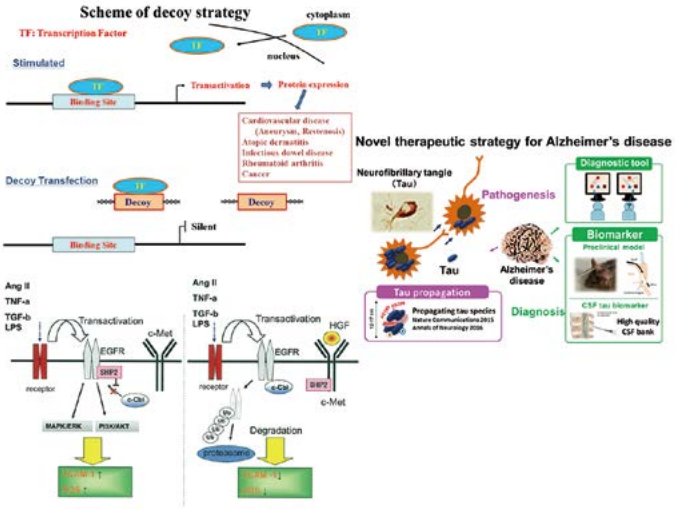
Department of Clinical Gene Therapy

Research Partner

FunPep Co., Ltd.

Chronic inflammation is involved in the pathogenesis of many aging-related diseases, including cerebrovascular disease, cancer, and Alzheimer disease. As life expectancy increases, the proportion of humans suffering from aging-related diseases is increasing, and the development of new early diagnosis and treatment is awaited. We aim to elucidate the mechanisms of persistent chronic inflammation in aging-related diseases at the molecular level, and to establish novel and highly original diagnostics and therapeutics.

In particular, we are developing therapeutics for various cardiovascular diseases and recurrent metastatic cancer, as well as diagnostics and therapeutics for dementia and ischemic cerebrovascular disease based on the elucidation of the pathophysiology from multiple perspectives. Based on the knowledge obtained, we will actively conduct translational research and provide cutting-edge medical care from Japan to the world.



Therapeutic Vaccines as Next Generation Biologics

B-14 | 6F | 0612

NAKAGAMI Hironori
Endowed Chair Professor
Department of Health Development and Medicine

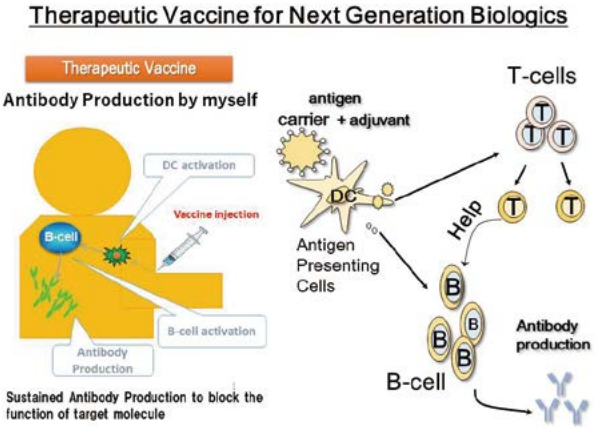
Responsible Department

Department of Health Development and Medicine

Research Partners

Daicel Corporation
FunPep Co., Ltd.

The purpose of this project is to apply vaccine therapy as a next-generation biologics to the treatment of lifestyle-related diseases and intractable diseases, and to develop a basic technology for safer and more efficient therapeutic vaccines. This basic technology can be applied to the treatment of various diseases and has the potential to spread not only to developed countries but also to developing countries. To develop therapeutic vaccines for clinical application targeting the treatment of infectious diseases, lifestyle-related diseases, and intractable diseases and novel vaccine to deplete aging cells, AnGes Corporation, Daicel Corporation, and Funpep Corporation, together with the Department of Health Development and Medicine (Professor Nakagami), are collaborating in an industry-academic framework to develop a therapeutic vaccine, which will be originated in Japan. We will carry out translational research on therapeutic vaccines.



Elucidation of disease mechanisms and therapeutic targets in cutaneous immune-mediated disorders from the perspective of resident memory T cells

A-30 | 6F 0613B

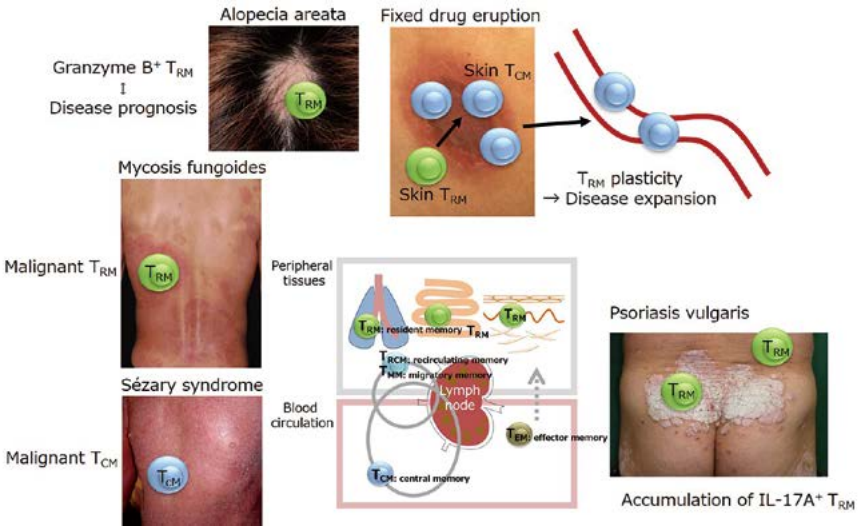

FUJIMOTO Manabu
Professor
Department of Dermatology

WATANABE Rei
Guest Professor
Department of Medicine for Cutaneous Immunological Diseases

Responsible Department
Department of Medicine for Cutaneous Immunological Diseases

Research Partner
Maruho Co., Ltd.

We have demonstrated that immune cells localized in the skin are involved in the development, relapse and prognosis of skin diseases. In this collaborative research program, we aim to clarify the subtypes of skin immune cells, centering skin TRM, involved in cutaneous immune-mediated diseases, and to elucidate the key factors regulating the development and function of these cells. Our goal is to develop the therapeutic strategies targeting these factors.



Development of next-generation designer cell with improved adipose-derived stem cells (ADSCs)

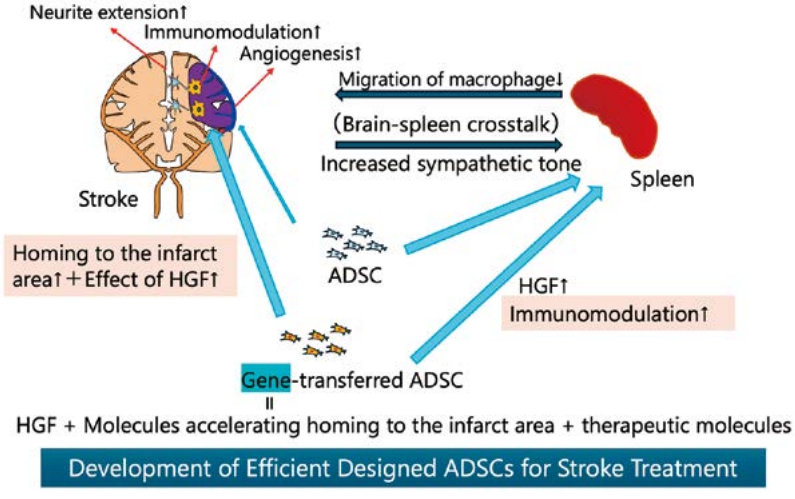
B-15 | 7F 0713

SHIMAMURA Munehisa
Endowed Chair Professor
Department of Gene & Stem Cell Regenerative Therapy

Responsible Department
Department of Gene & Stem Cell Regenerative Therapy

Research Partner
AS Medical Support Co., Ltd.

We are focusing on the development of novel therapies using adipose-derived stem cells (ADSCs) with enhanced functions via gene transfer. The response to treatment of ischemic stroke by autologous mesenchymal stem cells, including ADSCs, varies widely among individuals. In particular, ADSCs from elderly individuals have been reported to have decreased expression of hepatocyte growth factor (HGF), decreased levels of exosome miRNAs that promote nerve regeneration, and increased expression of exosome miRNAs associated with inflammation and aging. By introducing various genes, including HGF, we aim to create ADSCs designed to restore these impaired functions, accumulate efficiently at the site of injury, and exert sufficient therapeutic effect, thereby becoming a breakthrough therapy for ischemic stroke and multiple sclerosis.



Analysis of the functions of pathological or physiological periostin

A-28 | 8F 0801

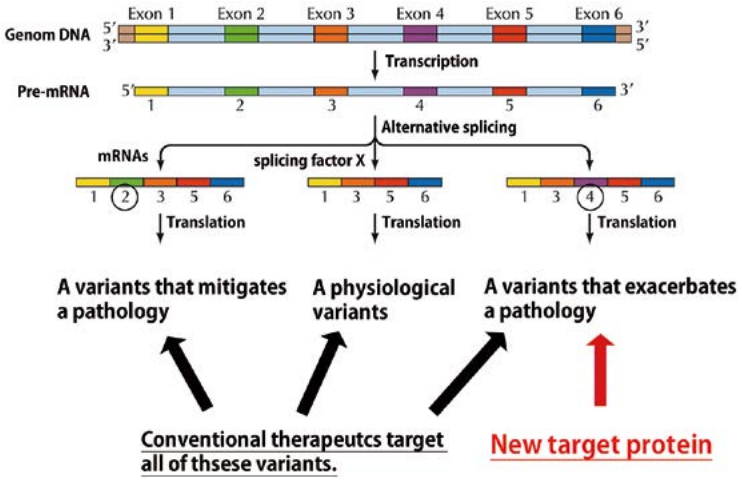
TANIYAMA Yoshiaki
Specially Appointed Professor
Department of Advanced Molecular Therapy

Responsible Department
Department of Advanced Molecular Therapy

Research Partner
Periotherapia Co.,Ltd.

"Alternative splicing variant (ASV)," a mechanism in which multiple products are produced from a single gene by variant switch, not only enables the acquisition of complex morphology and cellular functions of multicellular organisms but is also deeply involved in the pathogenesis of several diseases.

The purpose of this research is to selectively inhibit only ASV that is involved in the pathogenesis of chronic diseases such as cancer, heart failure, arteriosclerosis, renal failure, and diabetic retinopathy without inhibiting physiological ASV. We think that a safe and efficient therapy can be provided by selective inhibition of ASV. In this course, we will analyze the molecular mechanisms of pathological and physiological periostin and its in vivo functions such as transport of periostin mutants via exosomes or not.



The development of immunotherapy targeting immune suppressive molecules and cells

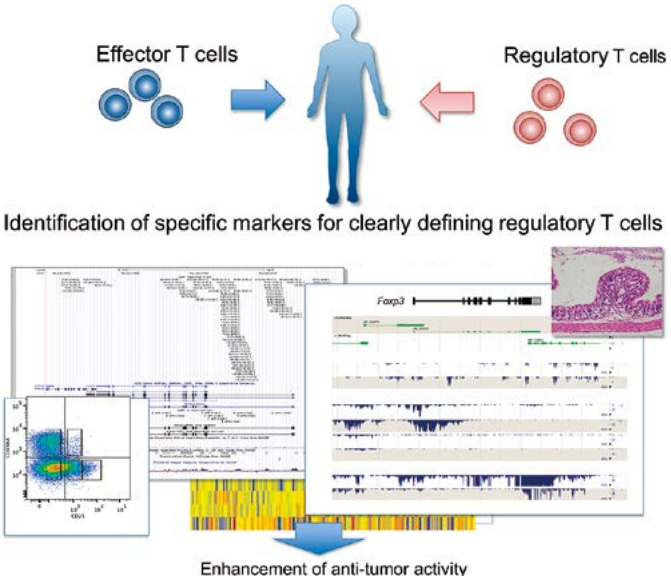
A-5 | 8F 0802

OHKURA Naganari
Specially Appointed Professor
Department of Frontier Research in Tumor Immunology

Responsible Department
Department of Frontier Research in Tumor Immunology

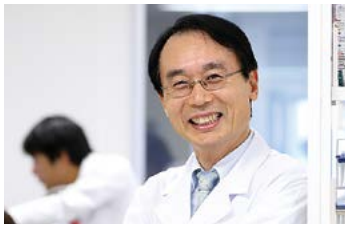
Research Partner
Shionogi & Co., Ltd.

Immunotherapy for cancers is expected to become an additional choice for cancer treatment. The therapy, however, does not necessarily provide successful results because of its anti-tumor effect prevention by immune suppressive cells, including regulatory T cells. Therefore, we first have to examine the molecular mechanisms by which cancer cells escape from immune surveillance, and identify molecules that clearly distinguish regulatory T cells from effector T cells. These molecules would be expected to be applicable for regulatory T cell-depletion in cancer patients, leading to the enhancement of anti-tumor activity.



Clinical research for regulatory factors in tumor immunology

A-4 | 8F | 0803, 0804



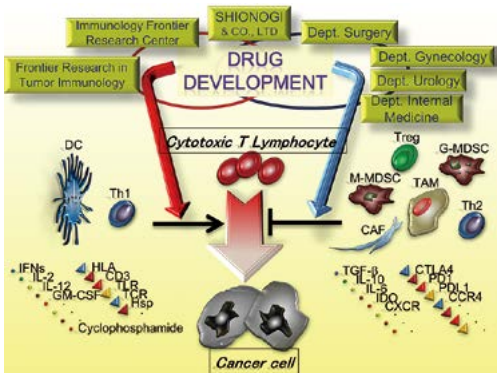
WADA Hisashi
Specially Appointed Professor
Department of Clinical Research in Tumor Immunology

Responsible Department
Department of Clinical Research in Tumor Immunology

Research Partner
Shionogi & Co., Ltd.

Emerging interest in new cancer immunotherapy through the regulation of immunosuppressive mechanisms has attracted worldwide attention because of the remarkable clinical effects of immune checkpoint inhibitors. With the full support of Professor Sakaguchi (IFReC), who discovered regulatory T cells (Tregs), our laboratory explores mechanisms to regulate various immunosuppressive cells, especially Tregs, to chase up new drug seeds for clinical application of cancer immunotherapy in collaboration with Shionogi & Co., Ltd.

To conduct clinically oriented research, especially detailed analysis in tumor micro-environment, we have established close cooperation with the departments of gastroenterological surgery, gynecology, urology, dermatology, breast surgery, head and neck surgery, respiratory surgery, and respiratory medicine. Through this broad collaboration, we have newly identified and patented “CCR8”, uniquely expressed on tumor-infiltrating Tregs. Furthermore, we have produced an antibody drug targeting CCR8, and a clinical trial has been initiated in 2022.



Development of innovative therapies for intractable immune disease and cancer by targeting neuro, immune and metabolic regulatory factors

A-20 | 9F | 0903

KUMANOGOH Atsushi
Professor
Department of Respiratory Medicine and Clinical Immunology

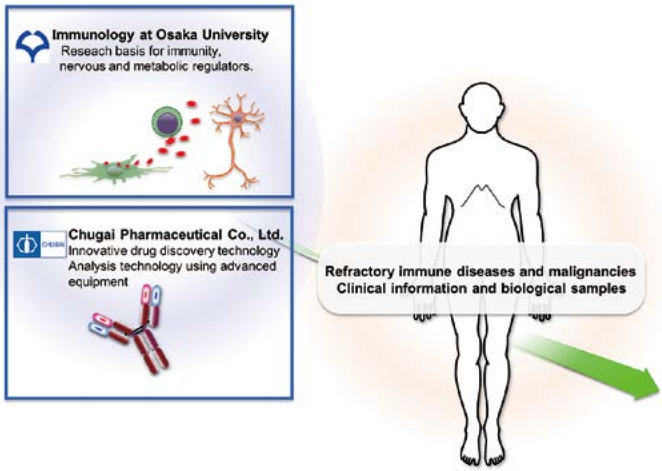
NARAZAKI Masashi
Specially Appointed Professor
Department of Advanced Clinical and Translational Immunology

Responsible Department
Department of Advanced Clinical and Translational Immunology

Research Partner
Chugai Pharmaceutical Co., Ltd.

Immunology research has brought many new discoveries and findings as a driving force in medicine and life sciences. The achievements have been applied to the development of biologics for rheumatoid arthritis and allergic diseases, as well as to cancer immunotherapy with anti-immune checkpoint antibodies, and have a great impact on clinical practice today. However, there are still many intractable immune diseases and cancers for which there is no cure, and clinical applications based on research progress and new findings are required.

With these backgrounds, the project promotes integrated analysis and verify human-derived samples using advanced immunological techniques based on the research achievements of immunology at Osaka University. From the results obtained, we aim to develop new therapeutic methods by cooperation with Chugai Pharmaceutical Co., Ltd. drug discovery technology.



Development of cGMP manufacturing process for novel lipid-based nano-medicine by taking advantage of the in-line manufacturing platform technology

A-22 | 9F 0912A, 0914B

MATSUZAKI Takashi
Specially Appointed Associate Professor
Department of DDS Pharmaceutical Development

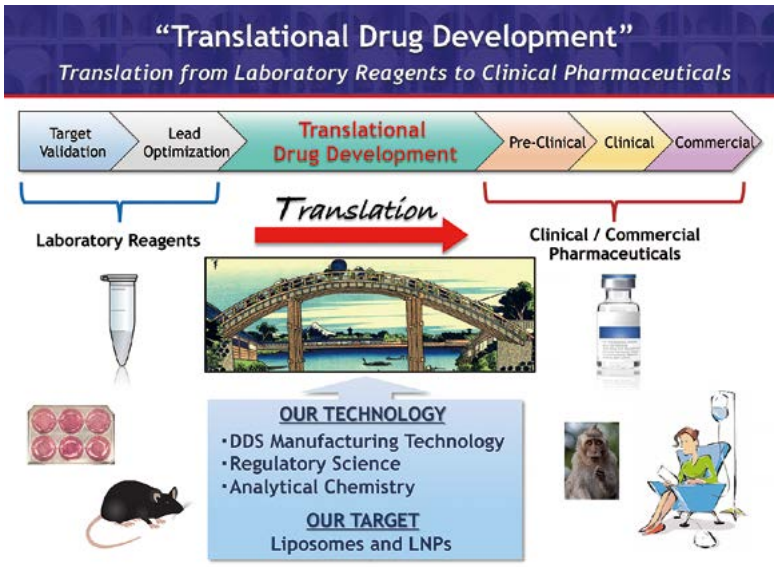
Responsible Department

Department of DDS Pharmaceutical Development

Research Partners

Shionogi Pharma Co., Ltd.

The aim of our department is the development of current good manufacturing practice (cGMP) manufacturing processes for novel lipid-based nano-formulations, including liposomes and lipid nano-particles (LNPs), targeting immunocompetent cells for the treatment of cancer and transplant rejection. Our innovative and patented in-line manufacturing technologies, SOLID and SQUID, have proven to be promising for cGMP production of liposomal investigational new drugs. Our technologies will accelerate the “Translational drug development” in which laboratory reagents are re-developed to clinical and commercial pharmaceuticals, and therefore lead to prompt approval of new drugs.



Regenerative Medicine Unit

For the establishment of regenerative therapies as new standard in medical care.

Development of new technology for the manufacturing, standardization and application of stem cell-based products

B-12 | 7F 0701

SAKIMOTO Susumu
Endowed Chair Associate Professor
Department of
Stem Cells and Applied Medicine

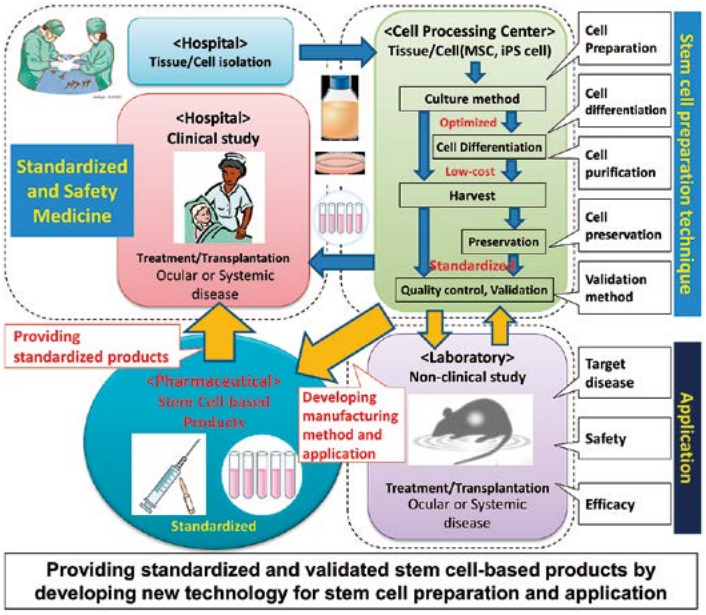
Responsible Department

Department of
Stem Cells and Applied Medicine

Research Partner

ROHTO Pharmaceutical Co., Ltd.

Regenerative medicine based on stem-cell technology can possibly treat irreversibly dysfunctional tissues or organs that medicine cannot treat currently. However, the realization of regenerative medicine has faced some significant obstacles, such as cell preparation methods, product standardization, and the costs of manufacturing. The aim of our department is to develop new technologies to manufacture and standardize stem-cell-based products for the advancement of regenerative medicine.



Development of Innovative Medical Devices using Bionanotechnology and drug development for corneal regeneration medicine

A-34 | 7F 0703

NISHIDA Kohji
Professor
Department of Ophthalmology

Responsible Department

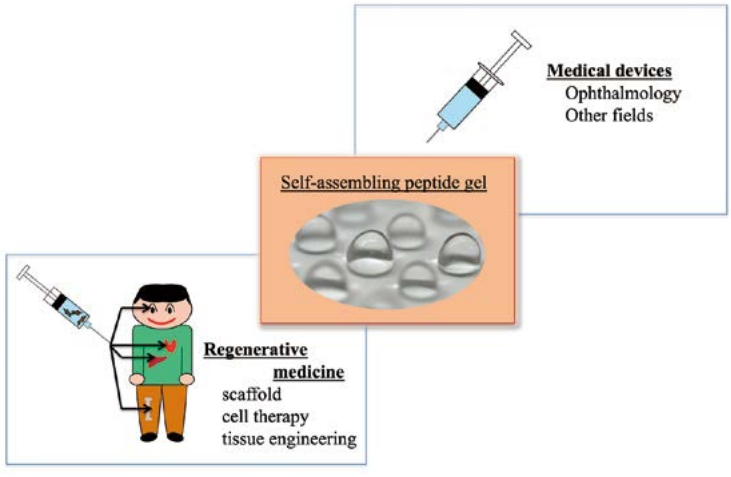
Department of Advanced Device Regenerative Medicine

Research Partner

Menicon Co. Ltd.

We are aiming to develop innovative medical devices by using a new self-assembling peptide gel developed with nanotechnology. The self-assembling peptide gel has high transparency under neutral condition and acts as a scaffold.

The development of medical devices with the self-assembling peptide gel is mainly focused on ophthalmology field where transparency is important. Specifically, we will develop auxiliary materials for surgeries and tissue regeneration. We also aim to develop new drugs for corneal regenerative medicine.



Potential uses of the self-assembling peptide gel

Development of new therapy for cardiovascular diseases

A-26 | 7F | 0712

MIYAGAWA Shigeru
Professor
Department of Cardiovascular Surgery

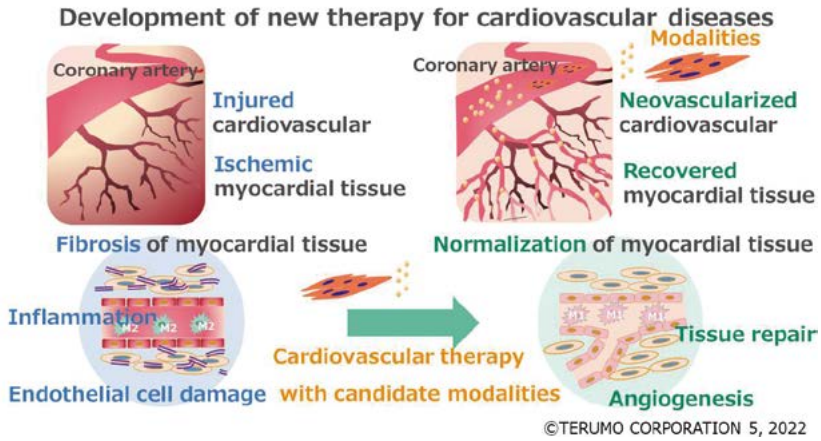
Responsible Department

Department of New Generation Cardiovascular Therapy

Research Partners

Terumo Corporation

Through past collaboration research initiatives, Osaka University and Terumo accumulated much knowledge about cell therapy and tissue engineering field. In this new collaborative research program, we aim to combine past knowledge and cutting edge technologies to develop new therapy for cardiovascular diseases. This is based on knowledge and experience about tissue engineering, angiogenesis and our fundamental, core technologies. We challenge next generation therapy for cardiovascular diseases that have not met medical needs.



Development of medical equipment, biomechanical evaluation methods and novel musculoskeletal regenerative medicine for diagnosis, prevention and treatment of sports injury and disorders

A-18 | 9F | 0902

NAKATA Ken
Professor
Department of Medicine for Sports and Performing Arts

TSUJII Akira
Specially Appointed Associate Professor (Lecturer)
Department of Sports Medical Biomechanics

Responsible Department

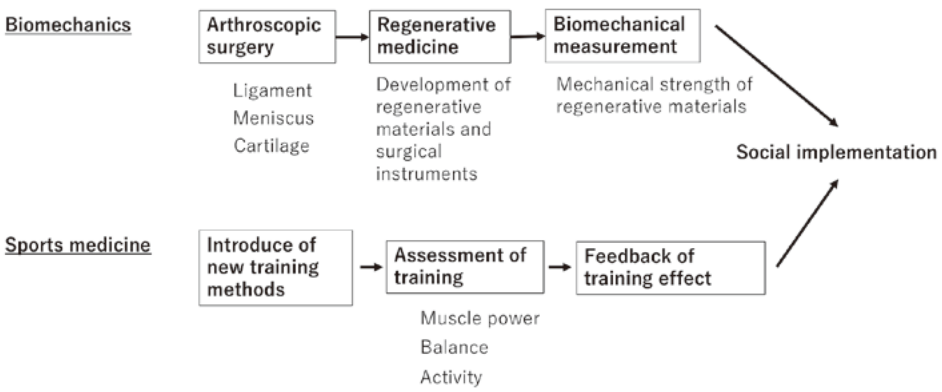
Department of Sports Medical Biomechanics

Research Partners

Stryker Japan K.K.
Akiyama Medical Co.,Ltd.
ORPHE Inc.
Interstem Co., Ltd.
StemCell Institute
TEIJIN NAKASHIMA MEDICAL CO.,LTD.
SUNWISE CO.,LTD.
ASAHI KASEI PHARMA Corp.

Sports injury and disorder are observed in musculoskeletal system of the whole bodies including shoulder, elbow and ankle joints as well as knee joints. Care and treatment for these injuries, disorders and diseases are essential for return to sports and improvement of sports performance.

Based on our previous research products from “Development of arthroscopic devices for regenerative medicine” and “Research and development of the evaluation and training methods about dynamic balance”, development and practical application of new medical equipment as well as conduct research on biomechanical evaluation methods of activity for physical therapy and research related to the diagnosis, prevention and regenerative medicine of sports injuries, disorders and diseases will be advanced to social implementation.



Development of computer-aided diagnosis programs and patient-matched instruments

B-3 | 9F | 0904

OKA Kunihiro
Endowed Chair Associate Professor
Department of
Orthopedic Biomaterial Science

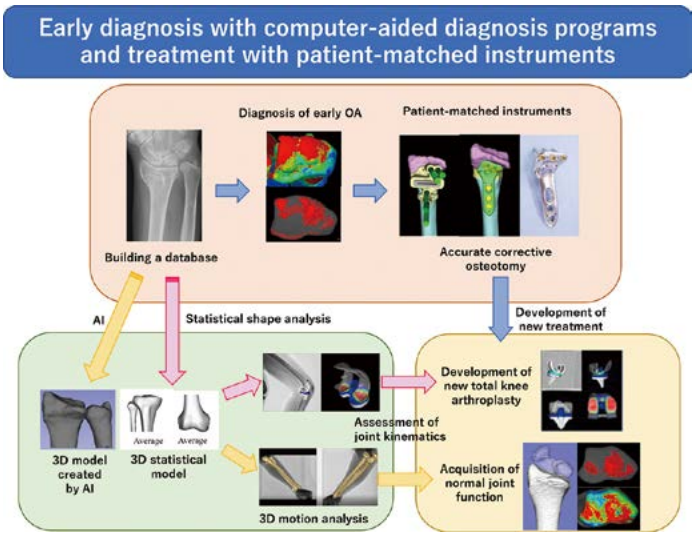
Responsible Department

Department of Orthopedic Biomaterial Science

Research Partner

TEIJIN NAKASHIMA MEDICAL CO.,LTD.

As osteoarthritis progresses, degenerative changes become irreversible and cause severe joint dysfunction. The purpose of our research is to clarify the pathology of bone and joint diseases by using 3D kinematic analysis and joint stress analysis, which would lead to early diagnosis and early therapeutic intervention to preserve joint condition. Patient-matched instruments are also developed to restore normal joint morphology and motion. At the same time, we are developing programs to reproduce accurate 3D joint motion and to automatically convert 2D images into 3D models, using the image data storage of various bone and joint diseases.



Immunity and Regeneration Integration Unit

Attempts to develop novel concept therapies through the integration of immunology and regenerative medicine.

New drugs for refractory neurological diseases through translational research

A-21 | 6F | 0604, 0912B

YAMASHITA Toshihide
Professor
Department of Molecular Neuroscience

ITOKAZU Takahide
Specially Appointed Professor
Department of Neuro-Medical Science

Responsible Department

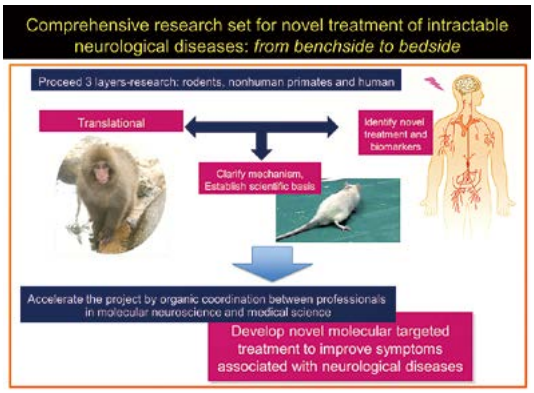
Department of Neuro-Medical Science

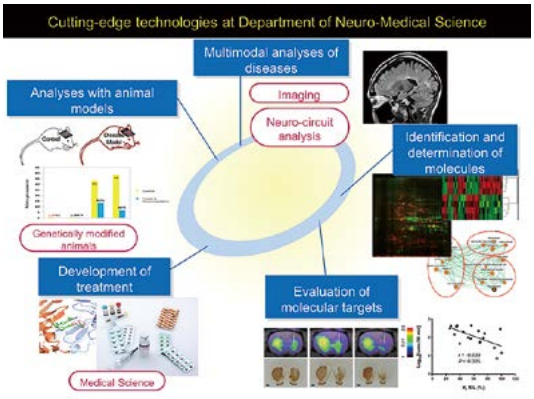
Research Partner

Mitsubishi Tanabe Pharma Corporation

- Search for biomarkers of the state of refractory neurological diseases and effect of drug treatment
- Basic research on drug development for refractory neurological diseases
- Search for new drug targets in refractory neurological diseases

Frustratingly, little is known about the causes of many neurological diseases and little is available in terms of treatment. In this course, we examine the pathology of several neurological diseases, the use of animal models to study the disease, and consider potential drug targets and biomarkers. Studies involve basic and clinical research.





1. Understanding the pathogenesis of inflammatory skin diseases associated with dysbiosis
2. Analysis of the impact of maintaining skin homeostasis on overall health span

A-29 | 6F | 0613A, 0911B

FUJIMOTO Manabu
Professor
Department of Dermatology

MATSUOKA Yuumi
Professor
Immunology Frontier Research Center (IFReC)

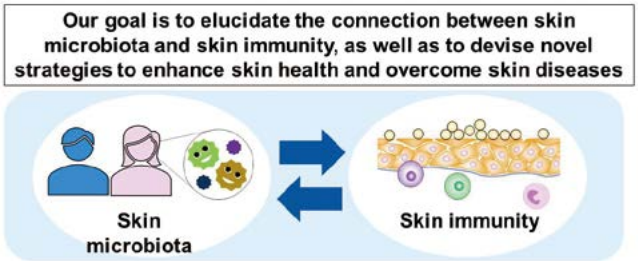
Responsible Department

Department of Cutaneous Immunology and Microbiology

Research Partner

ROHTO Pharmaceutical Co., Ltd.

Our skin, the largest organ in the human body, protects us from the outside world. It also contains a diverse range of microorganisms that can impact our health. In particular, dysbiosis, which disrupts the normal bacterial flora, is known to occur in diseases such as acne vulgaris, atopic dermatitis, and psoriasis. However, the precise mechanism by which skin microorganisms affect the host's health and diseases is not well understood, and elucidating this could lead to the development of new treatments and preventative measures for skin diseases. Our laboratory employs cutting-edge analytical methods for the skin microbiome and host immunity, as well as 3D skin devices created from induced pluripotent stem cells, to analyze various inflammatory skin diseases and reveal new disease mechanisms, while also working on controlling pre-disease states to achieve "healthy skin."



We aim to address the challenges of frailty, declining birthrate, and cancer through the application of hybrid medicine

A-13 | 6F 0614

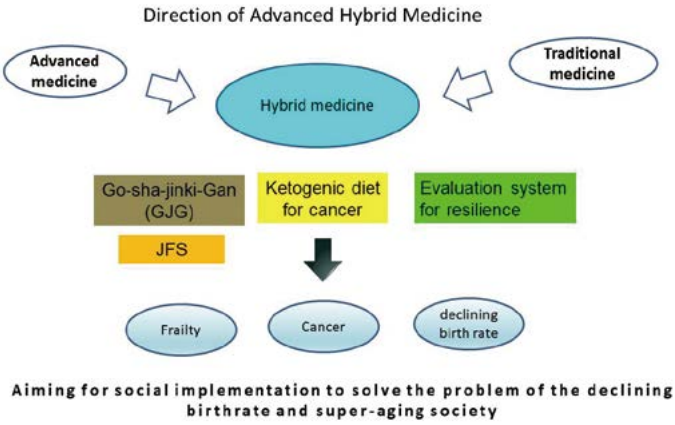
EGASHIRA Ryuichiro
Specially Appointed Assistant Professor
Department of Advanced Hybrid Medicine

HAGIHARA Keisuke
Guest Professor
Department of Advanced Hybrid Medicine

Responsible Department
Department of Advanced Hybrid Medicine

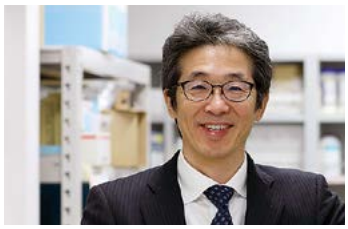
Research Partner
TSUMURA & CO.

Our approach combines advanced medicine and traditional medicine, leveraging various intellectual property developed through hybrid medicine. We are working on the social implementation of a new form of hybrid medicine to solve the challenges of frailty, a declining birthrate, and cancer in a super-aged society. Currently, Japan is facing the issues of frailty, a declining birthrate, and an increasing number of cancer patients. In our efforts, we are developing a novel frailty evaluation method called the Japan Frailty Scale (JFS). We are also investigating the molecular mechanisms and building clinical evidence to demonstrate the anti-frailty effects of Go-sha-jinki-Gan (GJG). Additionally, the remarkable clinical outcomes of ketogenic diet for cancer patients have garnered significant attention. As a common mechanism for these problems, we are focused on developing methods to evaluate and enhance resilience.



Elucidation of the involvement of chronic inflammation during the pathogenic processes of various ophthalmic diseases and the creation of treatments

A-6 | 7F 0704

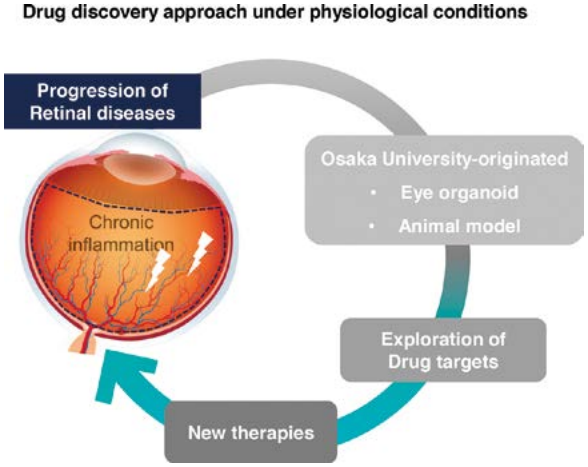


NISHIDA Kohji
Professor
Department of Ophthalmology

Responsible Department
Department of Ocular Immunology and Regenerative Medicine

Research Partner
Otsuka Pharmaceutical Co., Ltd.

In Japan, retinitis pigmentosa, diabetic retinopathy, and age-related macular degeneration, all of which affect the retina, account for more than 30% of the cause of visual impairment. While chronic inflammation deteriorates pathological condition in these retinal diseases, the molecular mechanisms regulating disease progression have not been fully elucidated. Our goal of the project is to develop novel therapies for resolving chronic inflammation. We attempt drug discovery approach under physiological conditions close to human organs using the animal model and organoid of specific eye diseases based on the research achievements of Ophthalmology at Osaka University.



Development of immunomodulation technology and quality control technology in cell therapy

A-2 | 7F 0714

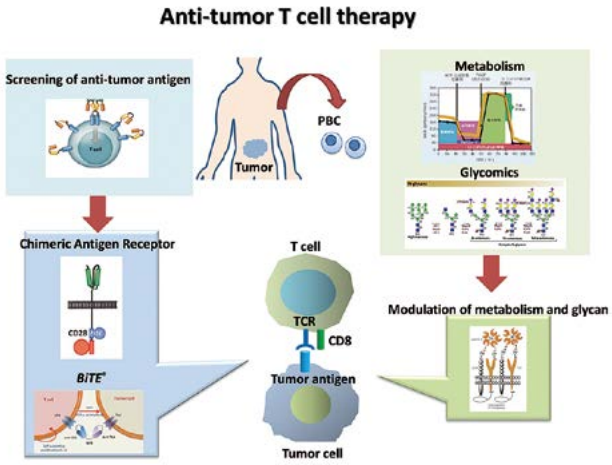
KUMANOGOH Atsushi
Professor
Department of Respiratory Medicine and Clinical Immunology

Responsible Department
Department of Immunology and Molecular Medicine

Research Partner
Otsuka Pharmaceutical Co., Ltd.

Cancer immunotherapy, represented by immune checkpoint inhibitors and CAR-T cells, has dramatically improved the long-term outcome of cancer treatment. On the other hand, only a small fraction of patients benefits from their clinical efficacy, and the development of combined immunotherapy and drug modification that can exert stronger and longer therapeutic effects is urgently needed.

This joint research team is working with Otsuka Pharmaceutical to develop a new treatment using what has been elucidated in basic research using preclinical murine models and in analysis using clinical specimens treated with immunotherapies. From the research on immunoregulation technology, we developed a new method for controlling the quality of immune cells by modification of glycosylation. Since this immuno-cell quality control technology can be applied for cancer immunotherapy, we are developing this technology to cell therapy in particular. Specifically, we will develop a novel cancer immunotherapy using activated T cells with newly established glycosylation modification. Furthermore, we will investigate the effector function and therapeutic duration by the induction of chemokines and neural guidance factors to regulate T-cell infiltration and maintain T-cell proliferation.



Development of stem cell-based gene therapy adapted for the regeneration-inducing medicine

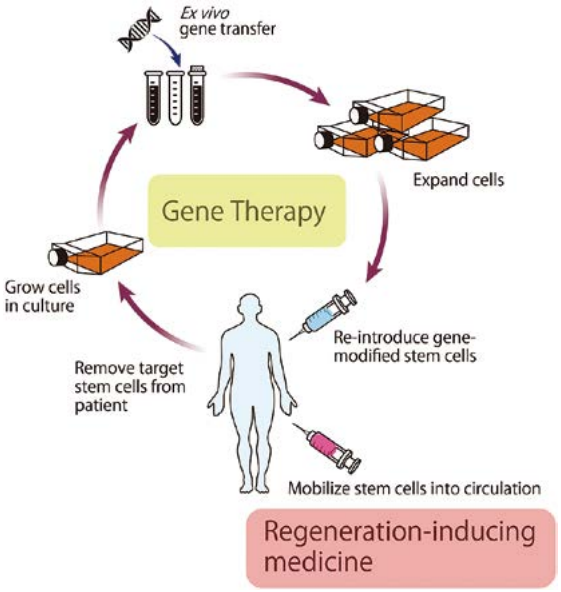
A-19 | 8F 0811

KIKUCHI Yasushi
Specially Appointed Associate Professor
Department of Stem Cell Gene Therapy Science

Responsible Department
Department of Stem Cell Gene Therapy Science

Research Partner
StemRIM Inc.

The goal of our project is to develop a gene therapy targeting stem cells as a curative treatment for inherited diseases based on the collaborative research of “regeneration-inducing medicine” with StemRIM. We aim to provide non-invasive and effective gene therapy through the ex vivo approach, in which stem cells are genetically modified outside the body and then transplanted back again to the patients who have been suffering from intractable inherited diseases, such as epidermolysis bullosa, hemophilia, metabolic disorders, etc.



Development of novel medicine for inducing scarless and functional tissue regeneration by mobilizing bone marrow mesenchymal stem cells

B-6 | 8F 0812


SAGA Kotaro
Endowed Chair
Associate Professor
Department of Stem Cell Therapy Science

TAMAI Katsuto
Guest Professor
Department of Stem Cell Therapy Science

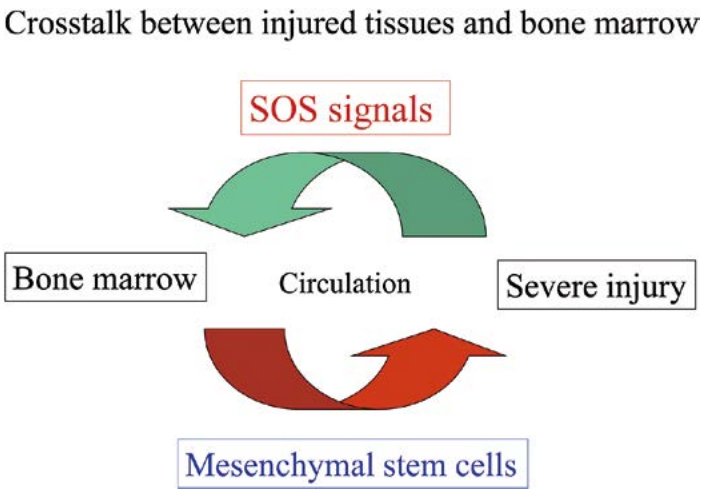
Responsible Department

Department of Stem Cell Therapy Science

Research Partner

StemRIM Inc.

We found that some of necrotic tissue-derived factors induce mobilization of bone marrow mesenchymal stem/progenitor cells (MSCs) into the circulation if their concentration in the serum is highly elevated. This action results in the enhancement of tissue regeneration by increasing amount of circulating MSCs to the injured tissue. Goal of our project is to disclose the underlying molecular circuit of the injury-induced, MSC-mediated tissue regeneration mechanism in vivo. These findings will be applied to develop a novel medication to induce tissue regeneration by increasing MSCs' circulation from the bone marrow to the tissues with intractable injury.



Establishing cancer profiling to develop innovative, personalized medicine and therapeutics

A-7 | 8F 0813A, 0814


DOKI Yuichiro
Professor
Department of Gastroenterological Surgery

ISHII Hideshi
Guest Professor
Department of Medical Data Science

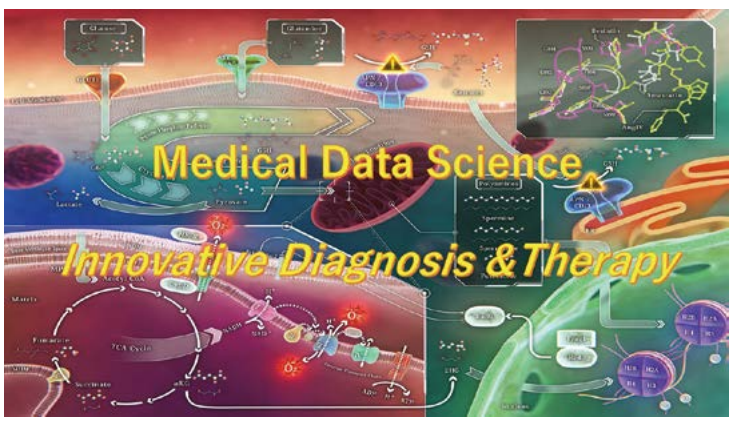
Responsible Department

Department of Medical Data Science

Research Partners

Hirotsu Bio Science Inc.
Kinshu-kai Medical Corporation
IDEA Consultants Inc.
Kyowa-kai Medical Corporation
Unitech Co. Ltd.

We pursued research and development of the critical characteristics such as cancer stemness by building a biological diagnosis and drug discovery/development platform that is unparalleled in the world and based on integrated cutting-edge knowledge. We aim to accumulate multidimensional networking information, knowledge, and applications to develop and demonstrate the highest degree of academic flexibility. We plan to contribute to the industry and community by discovering biological diagnosis and drug discovery/development, and building highly accurate human models that precisely reflect the response of cancer stem cells to anticancer agents and patients' pathologies, innovative metabolism analysis of cancer stem cells, trans-omics analysis, and highly accurate predictive molecular markers. These plans include, but are not limited to, companion drug development, next-generation nucleic acid drug development, innovative drug delivery systems, and the redevelopment of discontinued drugs.



Novel Integrated Area Unit

Integration of insights from diverse research fields.

Research and development of advanced devices for next-generation medical care

A-9 | 6F | 0603


KUMANOGOH Atsushi
Professor
Department of Respiratory Medicine and Clinical Immunology

YAMASHITA Kunihiko
Specially Appointed Associate Professor
Department of Device Application for Molecular Therapeutics

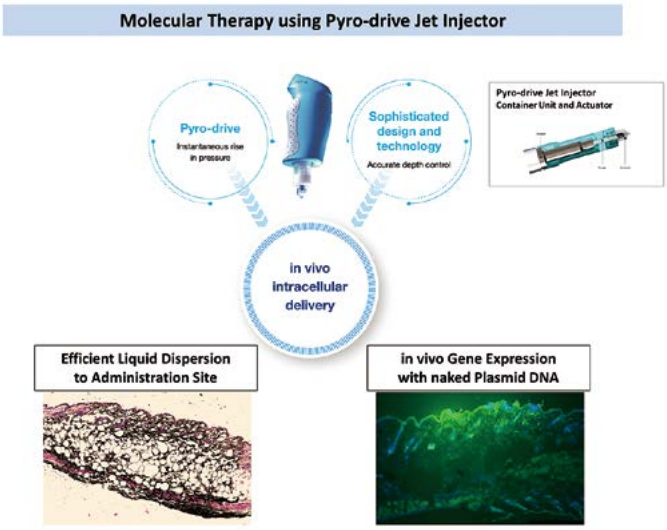
Responsible Department

Department of Device Application for Molecular Therapeutics

Research Partner

Daicel Corporation

We have been developing new medical methods by direct gene introduction technology into cell. In the future, we will also develop new drugs relating technology with the aim of applying them to pharmaceuticals. Specifically, we will develop a new, more advanced and innovative medical method that combines DDS preparations using exosomes and liposomes, which have been attracting attention in recent years. Furthermore, by applying the technology and knowledge cultivated through these developments, we will promote the development of not only new injection devices but also wearable safety devices. Through these efforts, we will comprehensively promote the development of devices for medical use.



Exploration of Innovative Diagnostic and Therapeutic Approaches for Ocular Diseases
1. Development of advanced diagnostic imaging software
2. Creation of diagnostic equipment and clinical indices that enhance decision-making in the diagnosis and treatment of both ophthalmic and systemic diseases

A-33 | 7F | 0702


NISHIDA Kohji
Professor
Department of Ophthalmology

MARUYAMA Kazuichi
Specially Appointed Associate Professor
Department of Vision Informatics

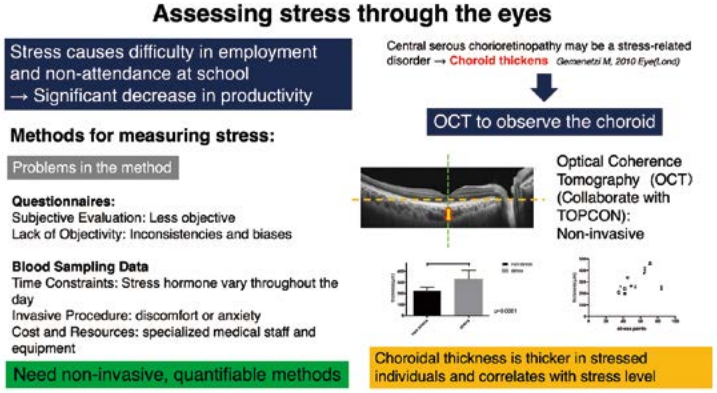
Responsible Department

Department of Vision Informatics

Research Partner

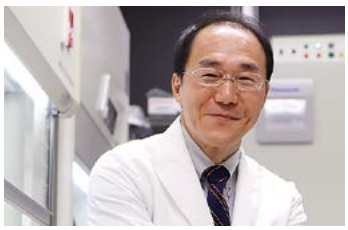
TOPCON CORPORATION

We are developing innovative software that leverages ophthalmic imaging data to tackle challenging diagnostic and therapeutic issues in eye diseases. By integrating the outcomes of diagnosis, treatment, and follow-up evaluations, we will enhance our equipment's functionality in conjunction with expert clinical assessments. Furthermore, we are partnering with health screening centers to merge data from ophthalmological instruments with general health screening results. This approach helps us trace the progression from healthy states to the onset of diseases, enhancing our understanding and management of both eye and systemic diseases. Looking ahead, we will use this comprehensive data to refine our software further, and develop diagnostic tools and clinical metrics that will inform more effective treatment plans.



Innovation of cutting-edge fundamental technologies to accelerate drug discovery and regenerative medicine: Creation of physiologically-relevant cardiac tissues, and Development of system to acquire/evaluate biomedical information

A-31 | 7F 0711B



LEE Jong-Kook
Specially Appointed Professor
Department of Cardiovascular Regenerative Medicine and Drug Discovery

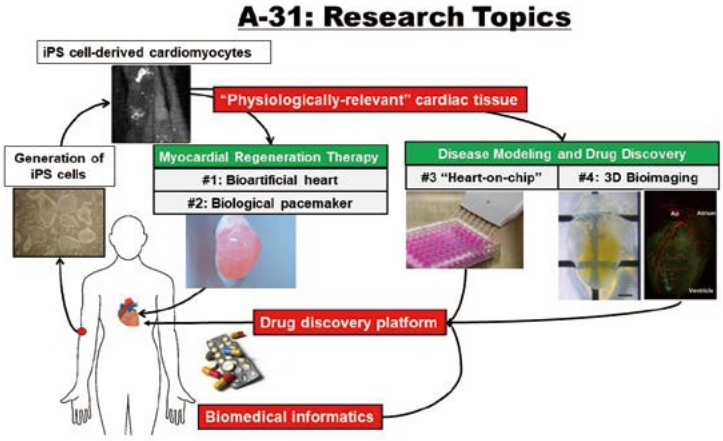
Responsible Department

Department of Cardiovascular Regenerative Medicine and Drug Discovery

Research Partners

SUZUKEN CO., LTD.
Alpha MED Scientific Inc.
AFI Corporation.

Focusing on drug discovery, the development of biological pacemakers, and the creation of organ-mimicking three-dimensional cardiac tissues, we will enhance each system and technology by leveraging cutting-edge innovations. Furthermore, we aim to devise sophisticated methods for acquiring and evaluating biomedical data essential for diagnosing and treating arrhythmias and heart failure, with the goal of integrating these advancements into societal applications.



Research and development of precision diagnostics by highly sensitive spectroscopy (Life and Medical Photonics Division, Institute for Open and Transdisciplinary Research Initiatives (OTRI))

C-9 | 8F 0813B

KISHIMA Haruhiko
Professor
Department of Neurosurgery

FUJITA Katsumasa
Professor
Graduate School of Engineering

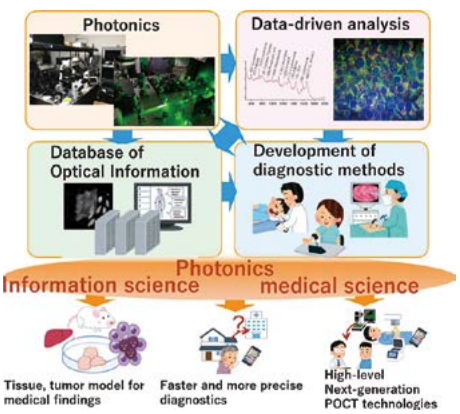
Responsible Department

Department of Neurosurgery

Research Partner

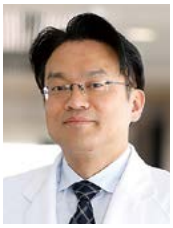
Sysmex Corporation

Based on highly sensitive and precision spectroscopic measurement technology, we aim to develop new diagnostic and testing technologies for maintaining people's health, providing gentler medical care and a drug discovery environment. Photonics measurement technology enables non-invasive and multiple informative measurement. For example, non-invasive analysis for iPS-derived cells and organoids is possible, and it is expected to support stable production and quality evaluation of them, and contributes to drug discovery and regenerative medicine. In addition, we can expect to contribute to medical care and health by evolving highly sensitive measurement at the molecular level and integration technology of analytical functions into microfluidic chips, and developing highly sensitive and low-cost nucleic acid testing device. In order to utilize these technologies as precise and easy diagnostic methods in the medical field, we will promote field-integrated research through an industry-government-academia collaboration system. School of Medicine and hospital in Osaka University will play a central role in collaborating with companies and Life and Medical Photonics Division in OTRI.



Research and development of social implementation on health maintenance by integration of musculoskeletal regenerative medicine and sports/health epidemiology

A-17 | 9F 0901

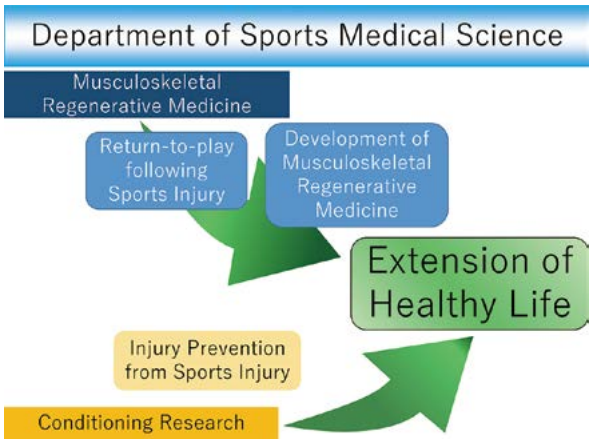
NAKATA Ken
Professor
Department of Medicine for Sports and Performing Arts

TANAKA Hiroyuki
Specially Appointed Professor
Department of Sports Medical Science

Responsible Department
Department of Sports Medical Science

Research Partner
Saraya Co., Ltd.

Sports are important in that they contribute to both health and longevity by improving physical activity, and musculoskeletal regenerative medicine, which plays a fundamental role in sports activities, is currently being conducted worldwide from basic research to bridging practical application research, the true outcome of which is to obtain health maintenance through improved physical activity. However, research on prevention of musculoskeletal diseases from the viewpoint of social contribution to physical activity is still in its infancy. The purpose of this cooperative research program is to integrate basic research on muscles, bone and cartilage, nerves, and other musculoskeletal organs important for health maintenance with research on prevention of musculoskeletal diseases, and to develop it into a new medical research field for social implementation.



Research Evaluation of Safety and Impact in Long COVID Intervention with Ensitrelvir for National Cohort Efficacy (RESILIENCE study)

A-32 | 9F 0911A

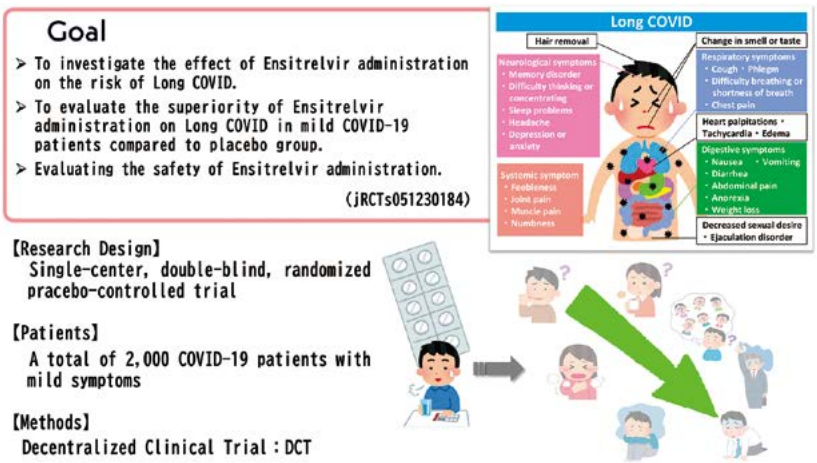

KUTSUNA Satoshi
Professor
Department of Infection Control and Prevention

ONOZUKA Daisuke
Specially Appointed Associate Professor
Department of Post-infectious diseases Therapeutics

Responsible Department
Department of Post-infectious diseases Therapeutics

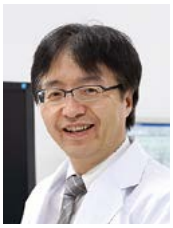
Research Partner
Shionogi & Co., Ltd.

Some patients who have recovered from the acute phase of COVID-19 infection are experiencing various post-infection symptoms called Long COVID, such as respiratory and cardiovascular symptoms, taste and smell disorders, and neurological impairments, leading to a decreased quality of life (QOL) and impact on social life. The pathophysiology of these conditions is largely unknown, and there are no confirmed treatments or prevention methods. Shionogi Pharmaceutical is developing Ensitrelvir fumarate, a new oral antiviral drug that inhibits the 3C-like protease essential for the replication of SARS-CoV-2. This drug has the potential to address these social issues. Universities, with their specialized knowledge and medical infrastructure, are collaborating with industry to rapidly advance research aimed at elucidating the pathophysiology of Long COVID and establishing treatment and prevention methods.



Research and development of neural informatics, modulation and restoration

A-16 | 9F 0913



KISHIMA Haruhiko
Professor
Department of Neurosurgery

HIRATA Masayuki
Guest Professor
Department of Neurological Diagnosis and Restoration

Responsible Department

Department of Neurological Diagnosis and Restoration

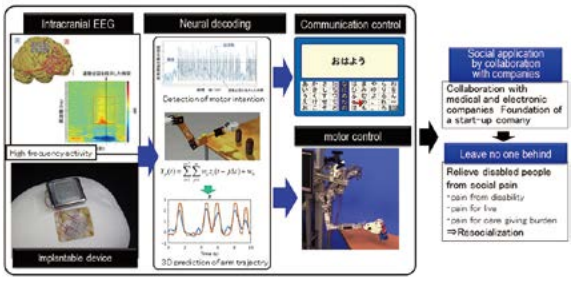
Research Partners

NIHON KOHDEN CORPORATION
Ricoh Company, Ltd.
Murata Manufacturing Co., Ltd.
JiMED Inc.

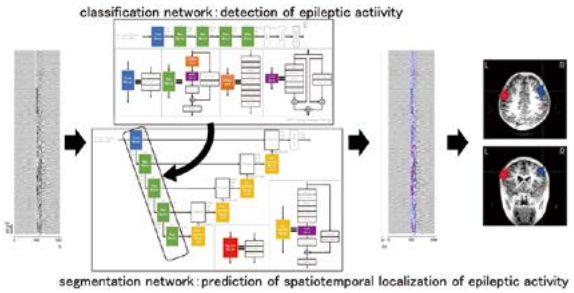
The aim of this project is to develop neural informatics, modulation and restoration. Main missions of this project are as follows,

1) Research and development of recording and analysis methods of magnetoencephalography
2) Research and development of implantable wireless brain-machine interfaces
3) Research and development of neural informatics, modulation and restoration related to 1) and 2).

Implantable brain machine interfaces



Automated MEG analysis of epileptic activity using deep learning



Building new clinical evidence by integrating clinical trial data and real world data (RWD)

A-24 | 9F 0914A

HIDA Eisuke
Specially Appointed Professor
Department of Biostatistics and Data Science

Responsible Department

Department of Biostatistics and Data Science

Research Partner

SHIONOGI & Co., Ltd.

RWD such as data from electronic medical record, national receipt database or patient registry are really valuable information source which can indicate actual health care environment and that is receiving a lot of attention recently because, we are expecting that effective use of RWD can optimize clinical development strategies, build clinical evidence and highly effective pharmacovigilance system and finally, take a part of enhancing clinical evaluation efficiency.

However, we also recognize there are a lot of challenges in terms of appropriate use of RWD and interpretation of research results obtained from RWD and especially, in the regulatory environment, we definitely need to overcome a lot of difficulties such as data quality and data collection methodologies of RWD.

Our department mission is to contribute to health care improvement and the realization of healthy society with overcoming following diverse difficulties in relation to effective use of RWD in collaboration with department of integrated medicine biomedical statistics and data coordinating center as well.

•Investigating methodology of collection and management of RWD focusing on data quality
•Developing new evaluation methodology for medicinal products as well as medical devices by integrating clinical trial data and RWD
•Exploring new clinical evaluation indicator with utilizing RWD

In order to obtain high quality evidence from clinical research, biostatistical literacy such as “designing scientific protocol”, “data management for ensuring conformity of data” and “Statistical analysis and appropriate interpretation of study results” is really important.

In addition to above, we aspire to foster expert researchers with expertise in epidemiology, statistics, bioinformatics and medical information which are foundation of medical data science.

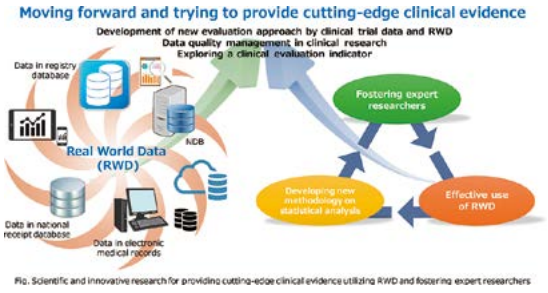


Fig. Scientific and innovative research for providing cutting-edge clinical evidence utilizing RWD and fostering expert researchers

Common space

1F Multimedia Hall

Screen Projector Whiteboard Microphone

Meeting room / Seminar room Information

2F

Seminar room (0224) — Screen, Projector, Microphone

Meeting room (0230) — Screen, Projector, Whiteboard

6F

Seminar room (0605) — Screen, Projector

Meeting room (0610) — Screen, Projector, Whiteboard

7F

Seminar room (0705) — Screen, Projector

Meeting room (0710) — Screen

8F

Seminar room (0805) — Screen, Projector

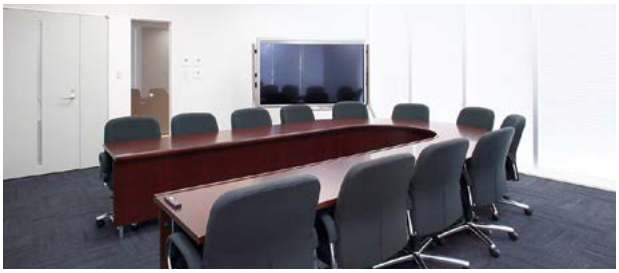
Meeting room (0810) — Screen

9F

Seminar room (0905) — Screen, Projector

Meeting room (0910) — Screen

2F | Seminar room

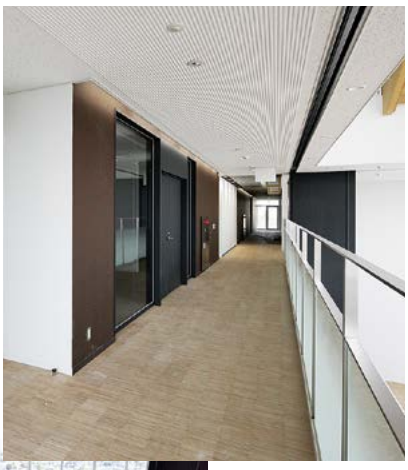


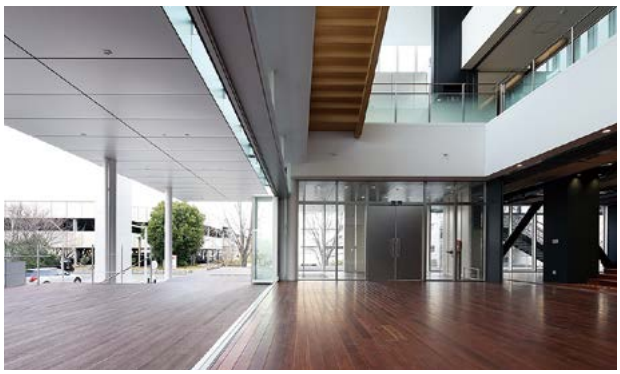
2F・6F | Meeting room

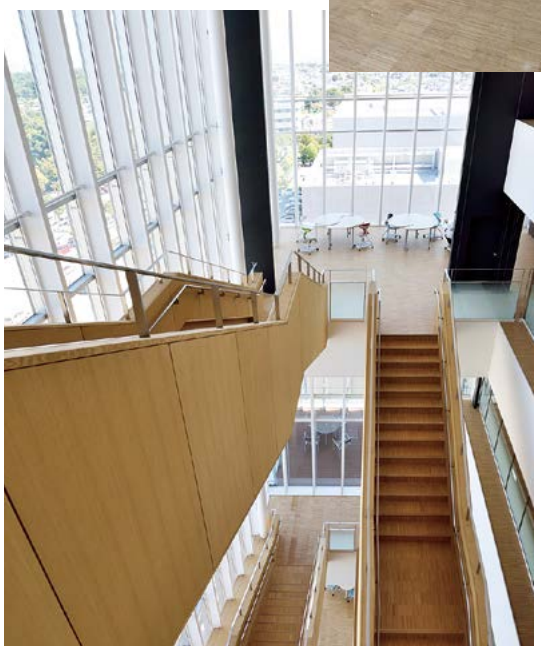
6F～9F | Seminar room

7F～9F | Meeting room

Free space

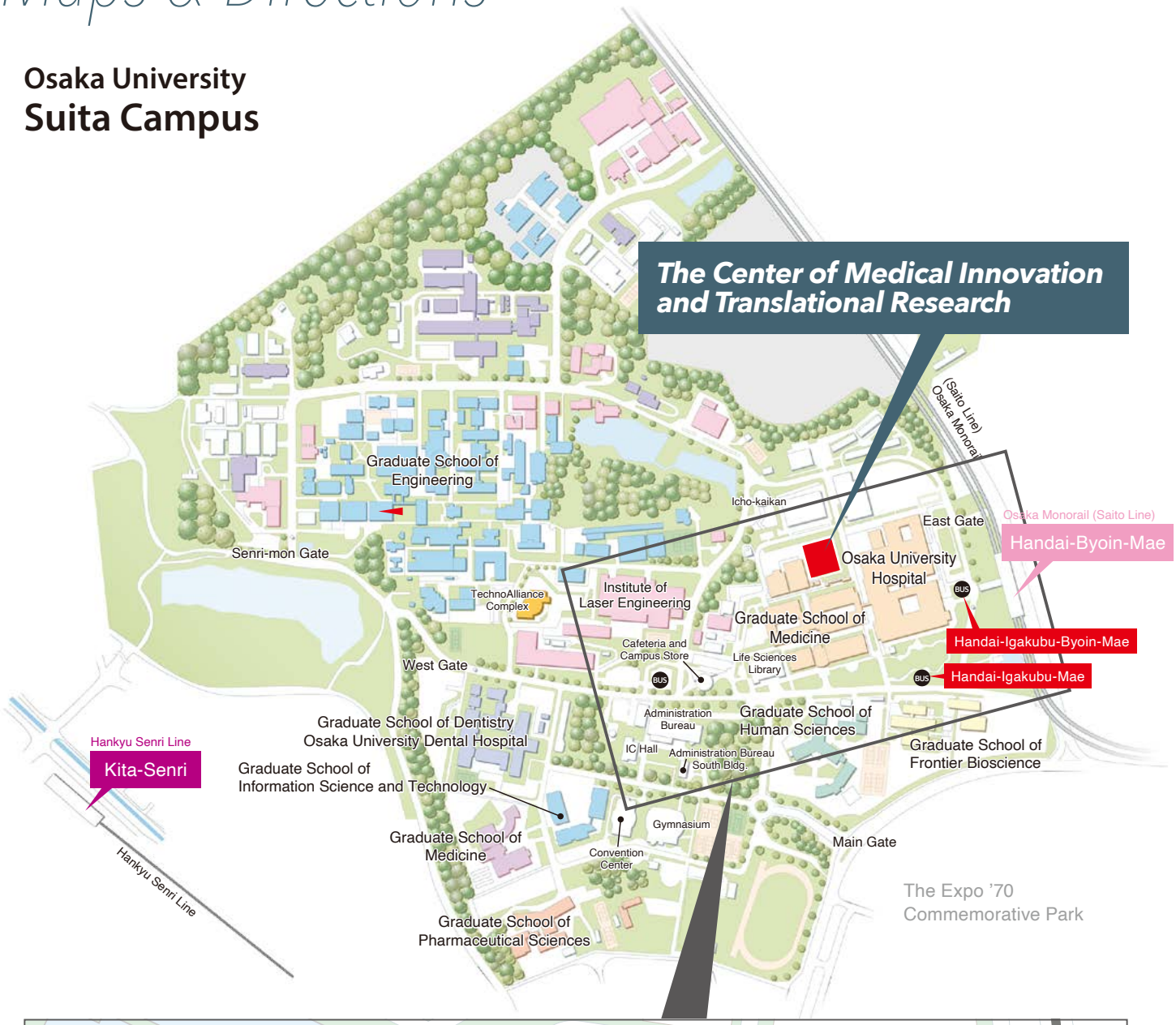






Maps & Directions

Osaka University
Suita Campus



Access Map

Directions

By train

Monorail

●5 minutes on foot from Monorail Handai-Byoin-Mae.

Train

●20 minutes east on foot from Kita-Senri, Hankyu Senri Line.

By bus

Kintetsu Bus

●Bus for Handai-Honbu-Mae from Ibaraki-Shi, Hankyu Kyoto Line. Exit at Handai-Igakubu-Mae. (5 minutes)

From airport

From Osaka International (Itami) Airport

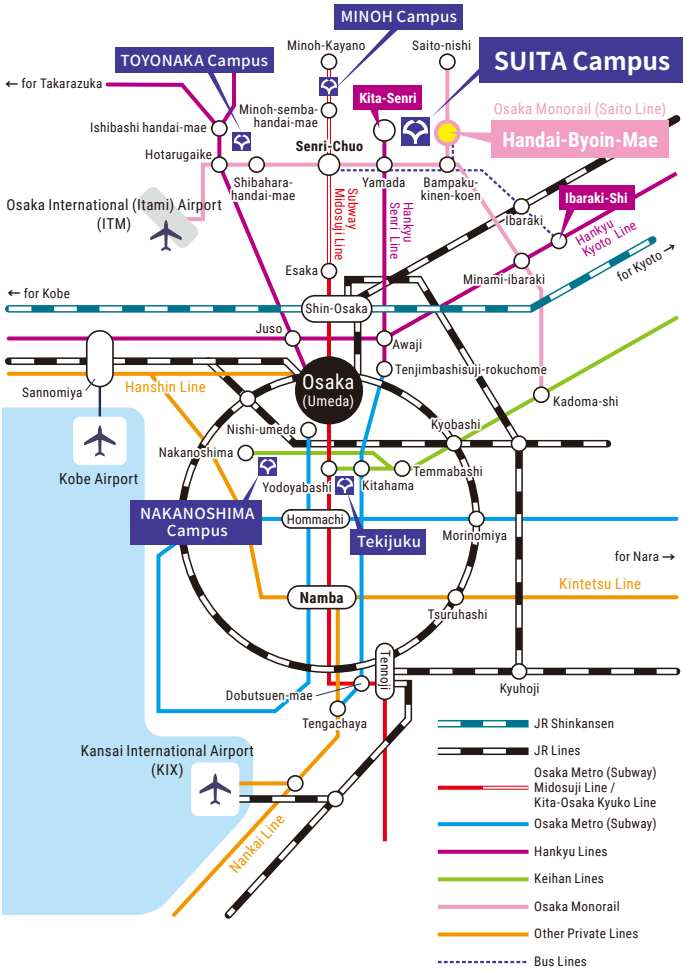
●Monorail to Handai-Byoin-Mae. (1 hour)

From Kansai International Airport (3 choices)

●JR line to Osaka
→(Change) Subway Midosuji Line to Senri-Chuo
→(Change) Monorail to Handai-Byoin-Mae. (2 hours)

●Nankai Line to Namba
→(Change) Subway Midosuji Line to Senri-Chuo
→(Change)) Monorail to Handai-Byoin-Mae. (2 hours)

●Airport Bus to Osaka Airport
→(Change) Subway Midosuji Line to Senri-Chuo
→(Change) Monorail to Handai-Byoin-Mae. (2 hours 30 minutes)



Contact Us

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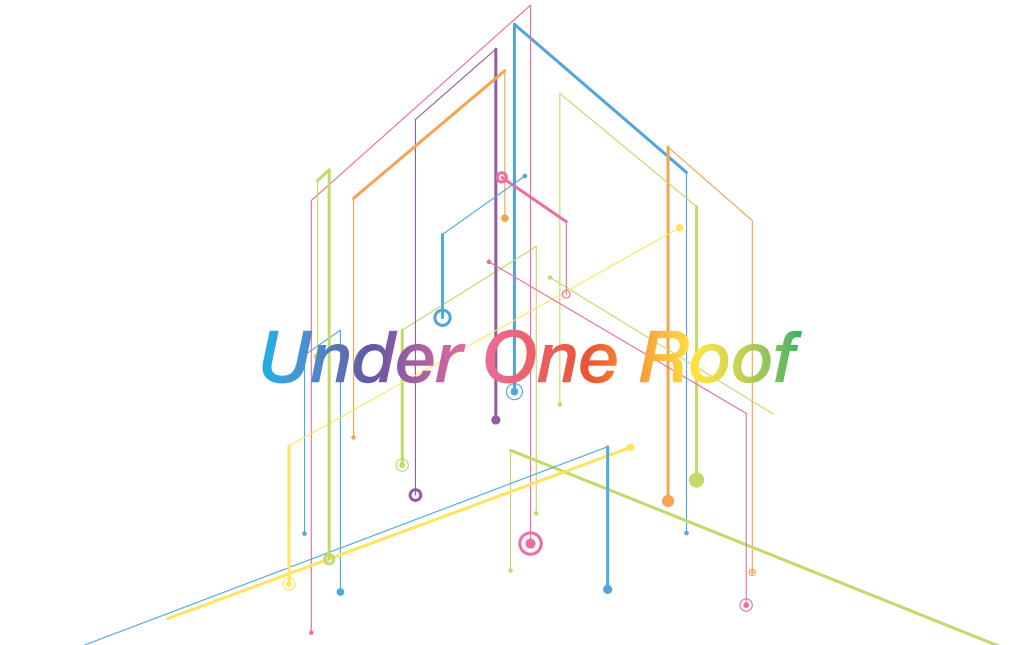
FAX +81-6-6210-8202
Email comit@office.med.osaka-u.ac.jp

https://www.med.osaka-u.ac.jp/pub/comit/en/

CoMIT



CoMIT

Osaka University Graduate School of Medicine

The Center of Medical Innovation and Translational Research

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