OSAKA UNIVERSITY

Osaka University Graduate School of Medicine

The Center of Medical Innovation and Translational Research

2023

CoMIT

The Center of Medical Innovation and Translational Research Building

The University's Administration Bureau Floor

OSAKA UNIVERSITY

Graduate School of Medicine

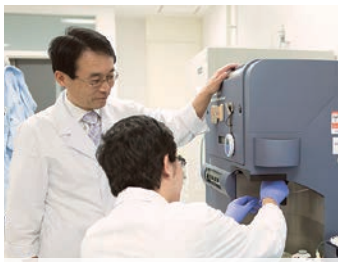
The CoMIT Building

The Center of Medical Innovation and Translational Research

Industry–Academia Collaboration Floors

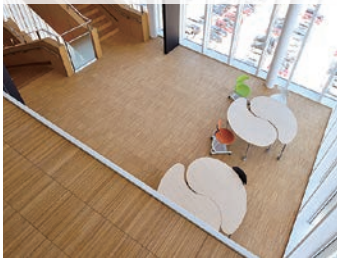
CoMIT

Faculty of Medicine and Hospital Floor



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

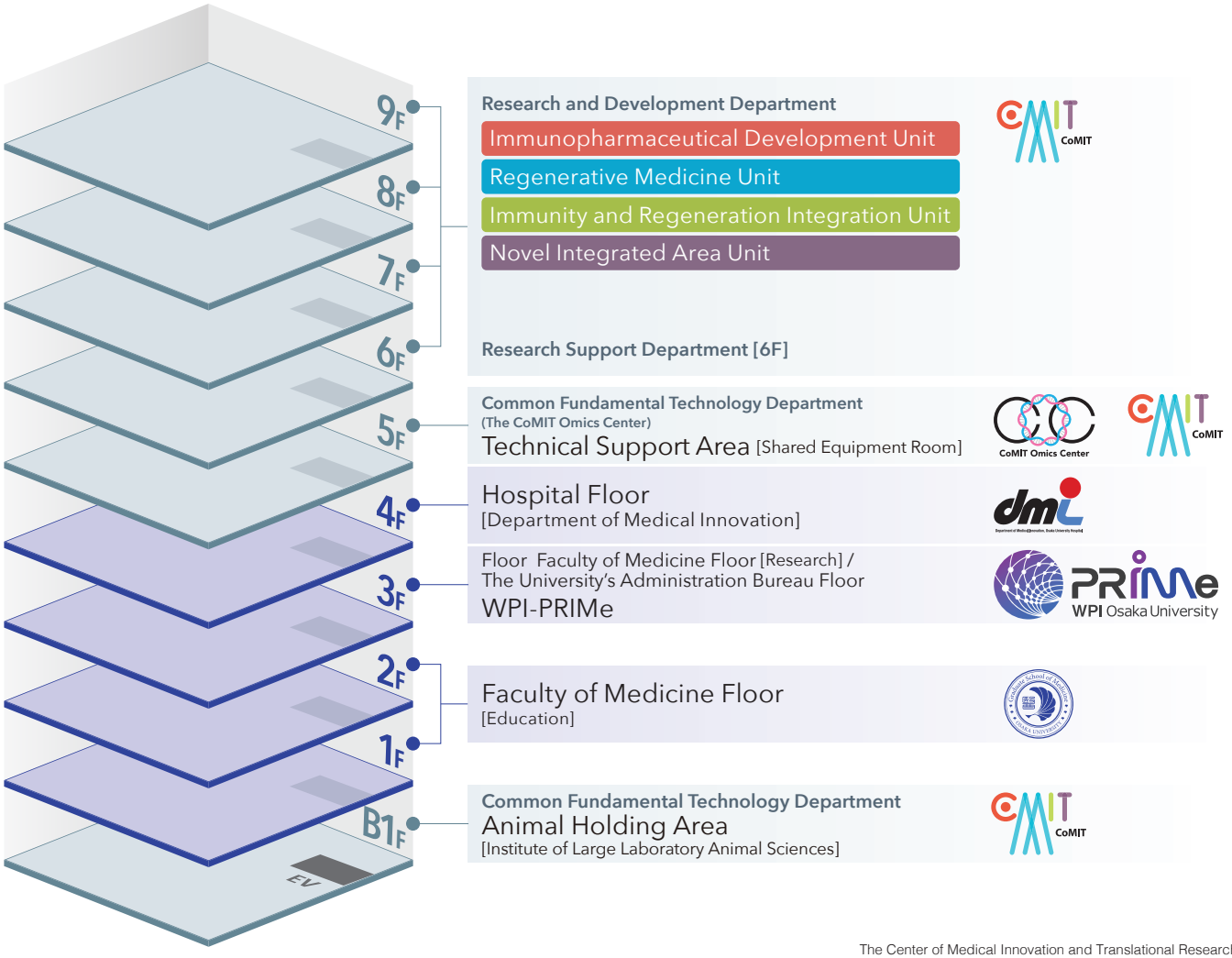
CoMIT is an R&D institute based on industry-academia-government alliance aiming to develop cutting-edge medical technologies. The center aims to promote open innovation and accelerate industrialization of promising research results in the life sciences.

● Educational Facilities

The first and second floors 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

Advancing the medicine of the future

Director
Osaka University Hospital
TAKEHARA Tetsuo

At Osaka University Hospital, we seek to uphold the principle of "providing high-quality medical treatment, and contributing to the development of medicine and medical professionals." Our main mission is to steadily and consistently implement the medical care of the present, and develop medical care and human resources that will enrich society in the future.

A healthy and active life is essential for a prosperous society. If we can improve our methods of preventing, eliminating, and coping with disease, people will be able to lead longer, happier, and more productive lives.

Osaka University has excellent seeds of basic research that can contribute to the future development of medicine. However, many hurdles must be overcome to nurture these seeds and transform them into actual pharmaceuticals, medical devices, or therapies, and this is not always easy. One such initiative was the establishment of the Medical Center for Translational Research in 2002 by Osaka University Hospital. The hospital has been one of the national leaders in efforts to bridge and apply the fruits of basic research to clinical practice. The center was later reorganized into the current "Department of Medical Innovation" and has become an important institution that promotes not only translational research but also clinical research as a whole. In recognition of such efforts, in 2015, Osaka University Hospital became the first hospital in Japan to be certified as a Clinical Research Core Hospital by the national government. All these efforts demonstrate how Osaka University has mobilized its strengths in basic and clinical research to realize the future of medicine.

To further accelerate this trend, we must also mobilize and leverage the power of industry. To this end, the university established the Center of Medical Innovation and Translational Research, or CoMIT in 2014 as a center for industry-academia collaboration. CoMIT currently has several projects underway in the Immunopharmaceutical Development, Regenerative Medicine, Immunity and Regeneration Integration, and Novel Integrated Area Units.

Osaka University Hospital is also currently undergoing a redevelopment project, and an integrated medical care building will start operations in 2025. This building will be equipped with the hospital's advanced medical treatment functions, and will house the new "Department of Medical Innovation" and the "Biobank". The building will also enhance the implementation of more advanced medical treatments and the development of medical care. Given this, I believe that it will provide a place for doctors who are active in CoMIT to play an even more active role.

I look forward to the development of industry-academia collaboration at Graduate School of Medicine, Osaka University for realizing a prosperous future society.

Under one roof: 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 and Clinical Research at Osaka University Hospital. The Graduate School of Medicine was among the first institutions in Japan to establish a system to develop basic technologies (from on and off campus) into advanced medical care. The innovation that needs to occur next is to prepare the “soil” for promising technologies to flourish. The Center for Medical Innovation and Translational Research (CoMIT) was conceived as a key way to prepare that “soil” by enhancing collaboration among industry, academia, and government.

As the concept of CoMIT was fleshed out, CoMIT was established in April 2014 thanks to a 2010 Subsidy to Cover the Costs of Constructing Facilities to Assess and Validate Advanced Technologies (the Project for Construction of Centers and Facilities “to Facilitate the Development of Technology”) from the Ministry of Economy, Trade and Industry. CoMIT is the culmination of leadership by 3 successive deans of the Graduate School of Medicine and hard work by numerous members of the faculty.

This year (2023) is the tenth year since CoMIT was established, and we have tripled the number of Joint Research Chairs overseeing joint research by the Graduate School of Medicine and companies. Many of these Joint Research Chairs work in the CoMIT Building, where they collaborate with representatives of many companies, government agencies, and research institutes on and off campus and where they are engaged in various efforts to bring about advanced medical care. One is constantly aware of society’s heightened interest in research being conducted in the CoMIT Building, as illustrated by a number of recent reports in the media.

The concept of CoMIT is development of joint research involving industry, academia, and government “under one roof,” and CoMIT will provide innovative medical care by promoting open innovation. My continued hope is three-fold: for CoMIT to promote advanced research projects, for it to foster links among research in different fields and links among researchers with different backgrounds, and for it to serve as a springboard for innovation through “integration.”

Director
Center of Medical Innovation and Translational Research
KANAI Yoshikatsu

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] / The University's Administration Bureau Floor WPI-PRIMe

WPI Premium Research Institute for Human Metaverse Medicine (WPI-PRIMe) –Tackling the 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.

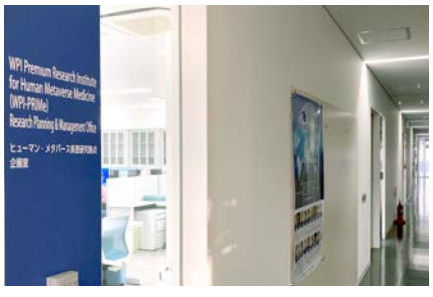
WPI-PRIMe enhances the integration of organoid biomedical science and information and mathematical science, and generates fused disciplines. Moreover, WPI-PRIMe creates worldwide research networks by building an international research environment.

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

WPI Poster



Research Planning and Management Office

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
EGUCHI Hidetoshi

- **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

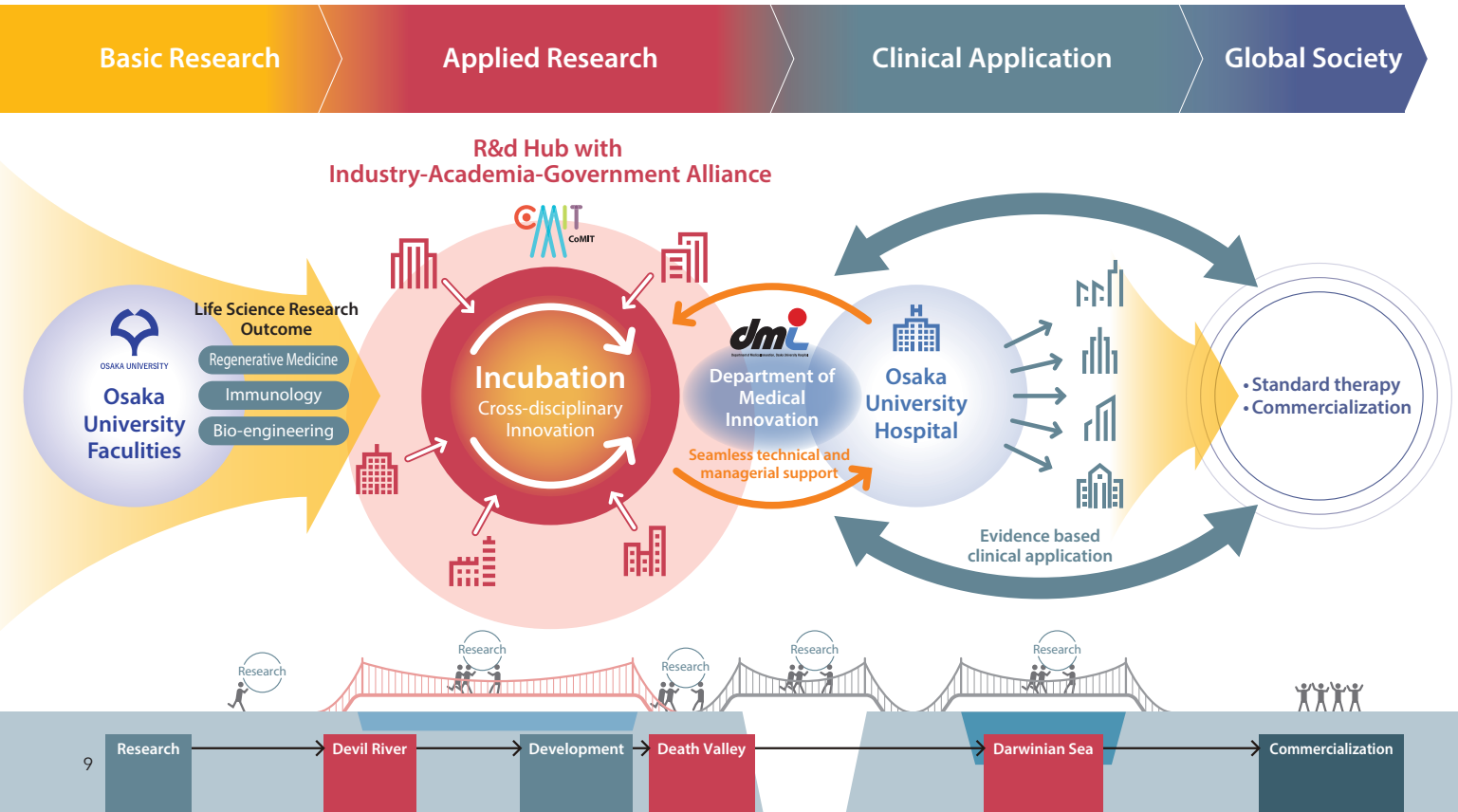
Research and Development in an International Center for Innovative Medical Science

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.

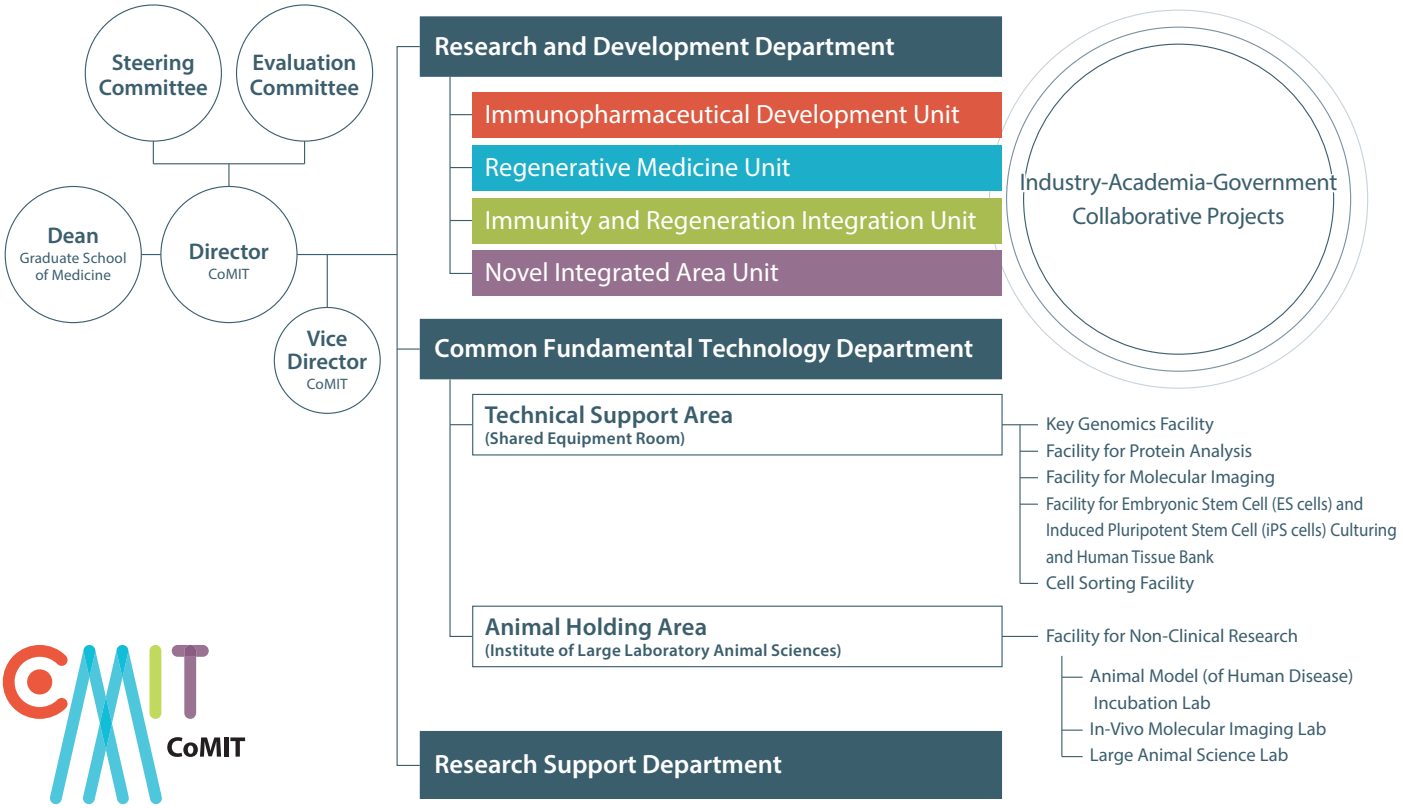
- **The Research and Development Department** implements numerous projects that involve collaboration among industry, academia, and government.
- **The Common Fundamental Technology Department** provides technological infrastructure and support for researchers.
- **The Research Support Department** is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

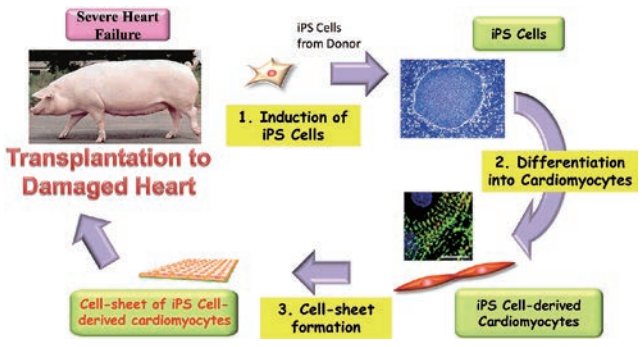
CT scan is available for *in vivo* experiments.

Sterilizer

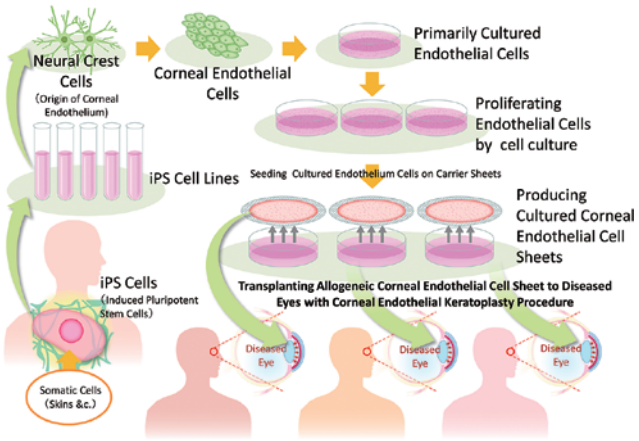
All the effluent is sterilized in two autoclaves (two tons/time).

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.

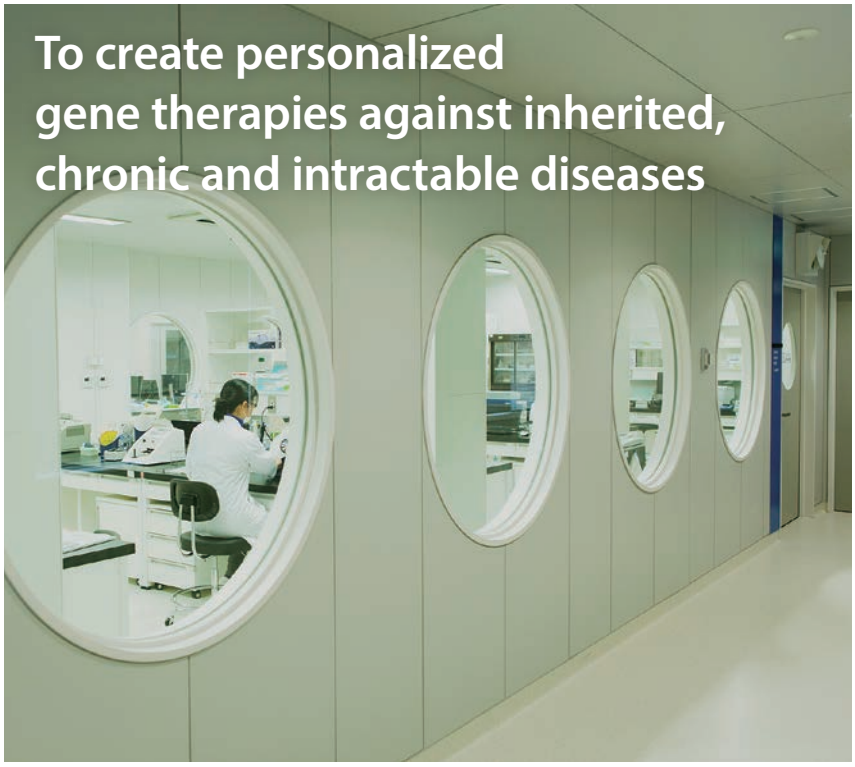
Manager
CoMIT Omics Center
Professor
Department of Integrative Physiology, Graduate School of Medicine
OKAMURA Yasushi

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

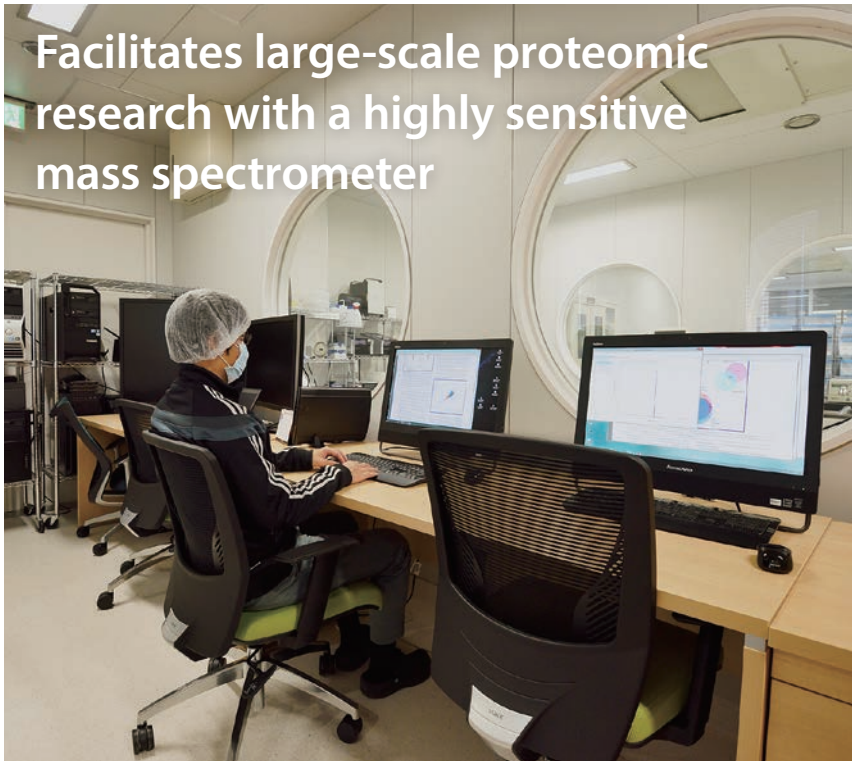
Key Genomics Facility



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

33 Projects※
Collaborative R&D projects

79 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
	26		Development of medical equipment and biomechanical evaluation methods of activity for physical therapy/prevention for treatment of sports injury and disorder	Department of Sports Medical Biomechanics	Professor **NAKATA Ken** Department of Medicine for Sports and Performing Arts
	22		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
	27		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
	27		Development of Personalized Medicine for Advanced Heart Failure using induced Pluripotent Stem Cells Combined with Genome Editing	Department of Medical Therapeutics for Heart Failure	Specially Appointed Associate Professor **HIGO Shuichiro** Department of Medical Therapeutics for Heart Failure
	23		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
	28		Research and development of Next Generation Endoscopic Intervention extra medical equipment based on industry-academia consortium	Department of Next Generation Endoscopic Intervention	Specially Appointed Professor **NAKAJIMA Kiyokazu** Department of Next Generation Endoscopic Intervention
	37		Research and development of neural informatics, modulation and restoration	Department of Neurological Diagnosis and Restoration	Specially Appointed Professor **HIRATA Masayuki** Department of Neurological Diagnosis and Restoration
	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	21		Analysis of the functions of pathological or physiological periostin	Department of Advanced Molecular Therapy	Specially Appointed Professor **TANIYAMA Yoshiaki** Department of Advanced Molecular Therapy
	21		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
	22		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
	32		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 Professor **TAMAI Katsuto** 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	Specially Appointed Professor **ISHII Hideshi** Department of Medical Data Science
7F	24		Development of new technology for the manufacturing, standardization and application of stem cell-based products	Department of Stem Cells and Applied Medicine	Endowed Chair Professor **HAYASHI Ryuhei** Department of Stem Cells and Applied Medicine
	35		Regenerative medicine research and development of cloud computing for regenerative medicine in Ophthalmology	Department of Vision Informatics (Topcon)	Professor **NISHIDA Kohji** Department of Ophthalmology
	25		Development of innovative medical devices using bionanotechnology	Department of Advanced Device 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
	35		Investigation of the effect of mouthwash on the reduction of salivary SARS-CoV-2 in patients with mild or asymptomatic COVID-19	Department of Oral Microbe Control	Professor **KUTSUNA Satoshi** Department of Infection Control and Prevention
	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	Professor **SAKATA Yasushi** Department of Cardiovascular Medicine
	25		Development of new therapy for cardiovascular diseases	Department of New Generation Cardiovascular Therapy	Professor **MIYAGAWA Shigeru** Department of Cardiovascular Surgery
	26		Development of novel musculoskeletal regenerative medicine using new cell biology and tissue engineering methods	Department of Musculoskeletal Regenerative Medicine	Professor **NAKATA Ken** Department of Medicine for Sports and Performing Arts
	31		Development of technology for regulation and quality control of immune cells in cancer therapy	Department of Immunology and Molecular Medicine	Professor **KUMANOGOH Atsushi** Department of Respiratory Medicine and Clinical Immunology
6F	34		Developing new molecular therapies using Pyro-drive Jet Injector	Department of Device Application for Molecular Therapeutics	Professor **KUMANOGOH Atsushi** Department of Respiratory Medicine and Clinical Immunology
	29		New drugs for refractory neurological diseases through translational research	Department of Neuro-Medical Science	Professor **YAMASHITA Toshihide** Department of Molecular Neuroscience
	19		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
	20		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	Specially Appointed Associate Professor **WATANABE Rei** Department of Medicine for Cutaneous Immunological Diseases
	30		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 Professor **HAGIHARA Keisuke** Department of Advanced Hybrid Medicine

Immunopharmaceutical Development Unit

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

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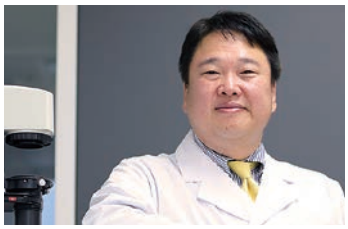


MORISHITA Ryuichi
Endowed Chair Professor
Department of Clinical Gene Therapy

Responsible Department

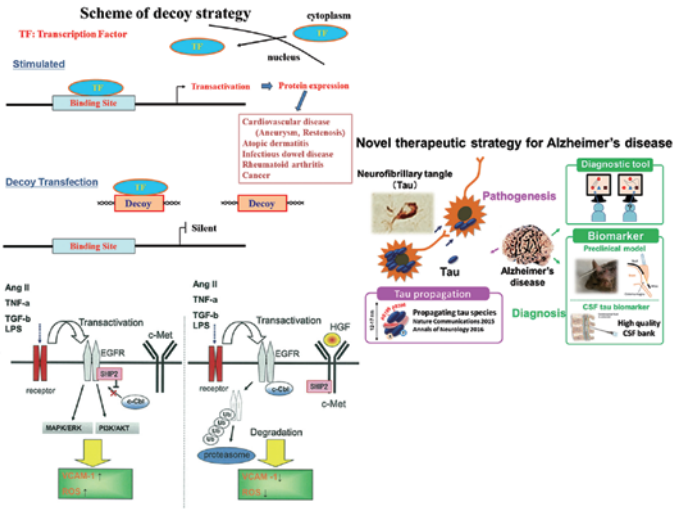
Department of Clinical Gene Therapy

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

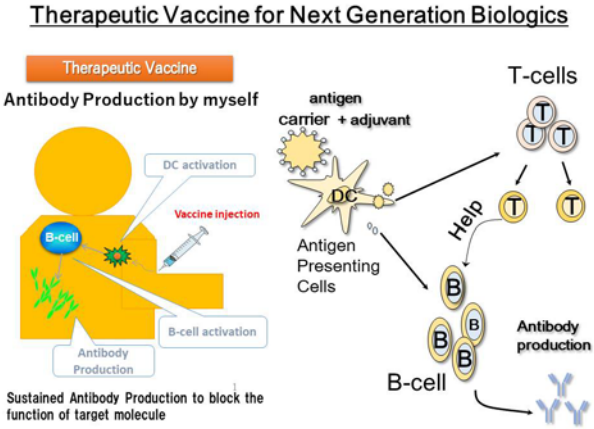
Responsible Department

Department of Health Development and Medicine

Research Partners

AnGes, Inc.
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

WATANABE Rei
Specially Appointed Associate Professor
Department of Medicine for Cutaneous Immunological Diseases

FUJIMOTO Manabu
Professor
Department of Dermatology

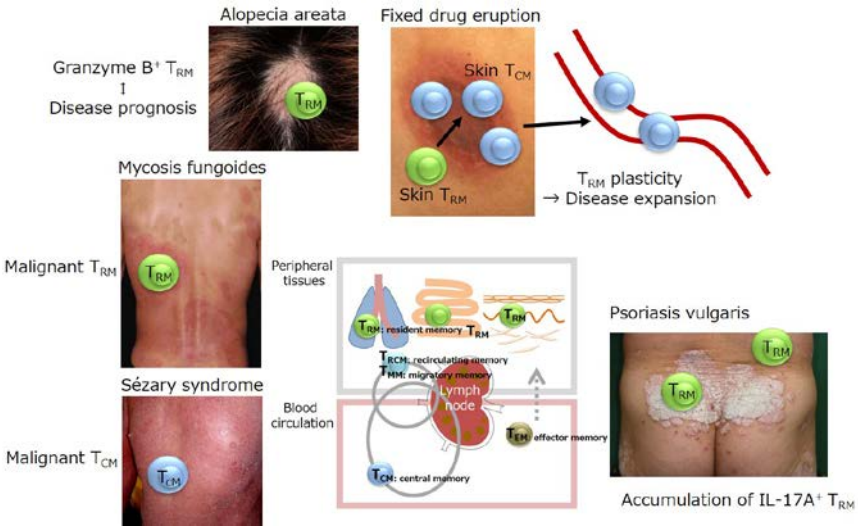
Responsible Department

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.



Analysis of the functions of pathological or physiological periostin

A-28 | 8F 0801

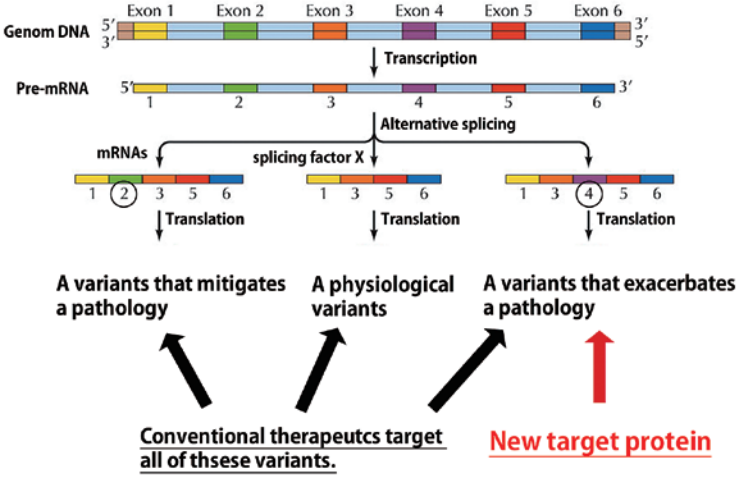
TANIYAMA Yoshiaki
Specially Appointed Professor
Department of Advanced Molecular Therapy

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

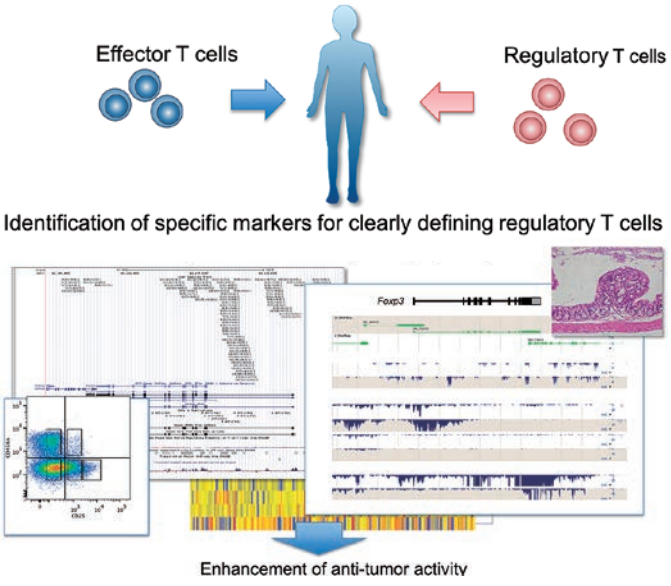
A-5 | 8F 0802

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

Responsible Department
Department of Frontier Research in Tumor Immunology

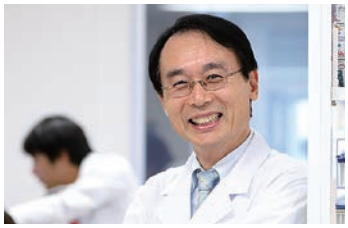
Research Partner
Shionogi & Co., Ltd.

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

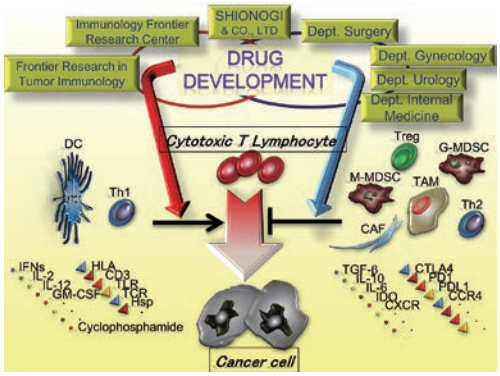
Department of Clinical Research in Tumor Immunology

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

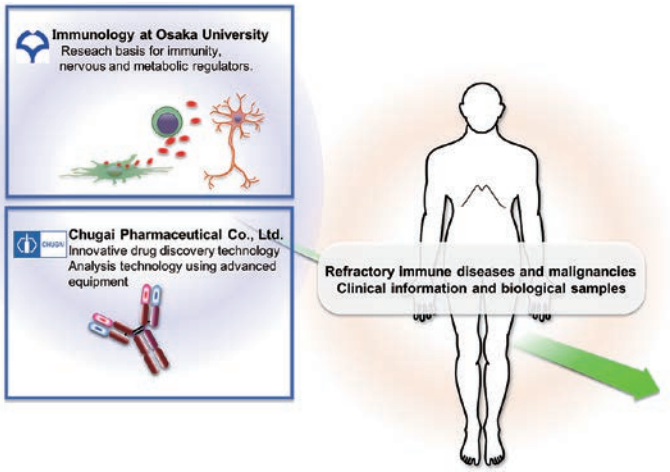
Department of Advanced Clinical and Translational Immunology

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

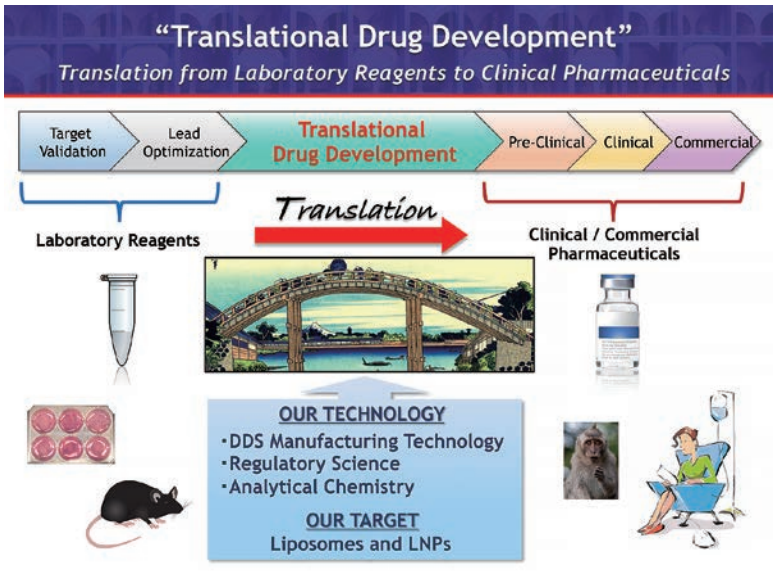
Responsible Department

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

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

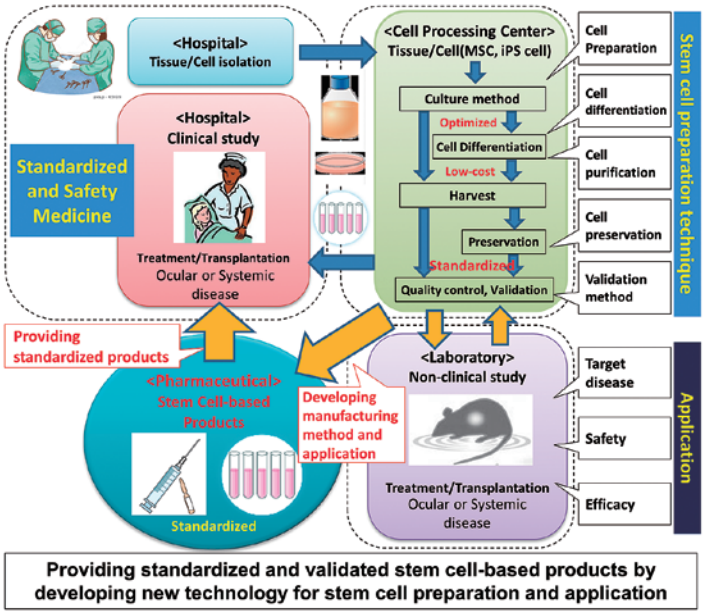
B-12 | 7F 0701

HAYASHI Ryuhei
Endowed Chair Professor
Department of Stem Cells and Applied Medicine

Responsible Department
Department of Stem Cells and Applied Medicine

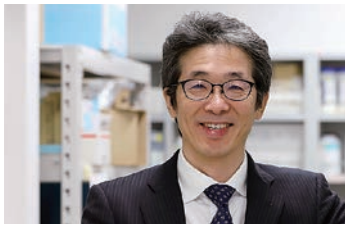
Research Partner
ROHTO Pharmaceutical Co., Ltd.

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

B-11 | 7F 0703



NISHIDA Kohji
Professor
Department of Ophthalmology

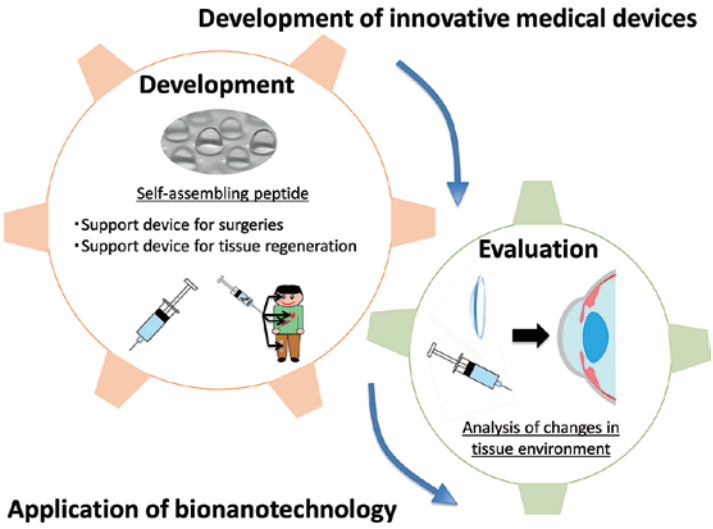
Responsible Department
Department of Advanced Device Medicine

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. At the same time, we will develop evaluation methods for analyzing the influence of medical devices on the tissue.

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.

For the development of the evaluation method, we use the latest biotechnology that can analyze phenotypes of the tissue under various conditions. Specifically, we will focus on contact lenses as a medical device and develop methods to evaluate the impact on ocular surface environment.



Development of new therapy for cardiovascular diseases

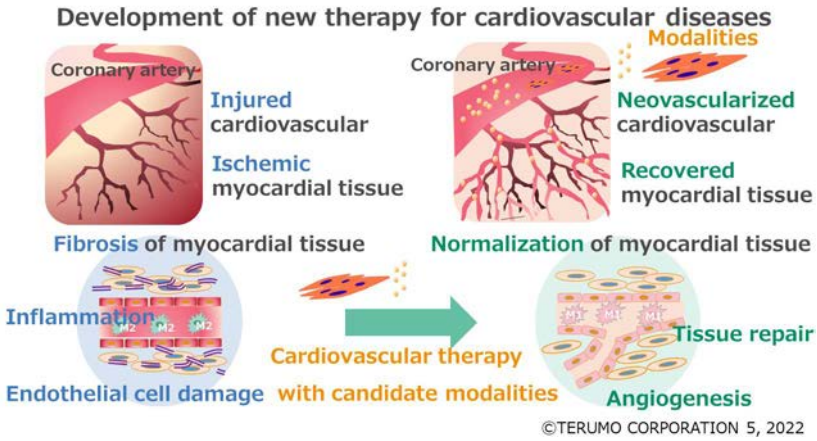
A-26 | 7F 0712

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 novel musculoskeletal regenerative medicine using new cell biology and tissue engineering methods

A-25 | 7F | 0713


NAKATA Ken
Professor
Department of Medicine for Sports and Performing Arts

EBINA Kosuke
Associate Professor
Department of Musculoskeletal Regenerative Medicine

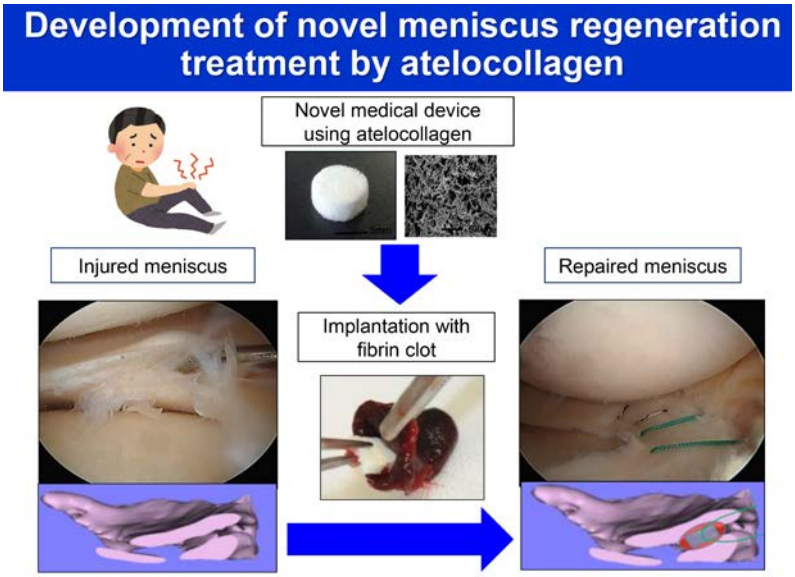
Responsible Department

Department of Musculoskeletal Regenerative Medicine

Research Partner

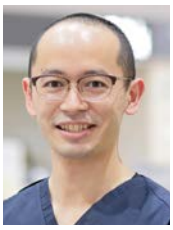
Taisho Pharmaceutical Co., Ltd.

We are developing novel medical device of meniscus regeneration using atelocollagen, which is now under clinical trial with our patents. Moreover, we are aiming to develop hybrid treatment methods using this atelocollagen and musculoskeletal stem cells, and other musculoskeletal regenerative medicine using novel nano-technology in cooperation with collaborating company.



Development of medical equipment and biomechanical evaluation methods of activity for physical therapy/prevention for treatment of sports injury and disorder

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

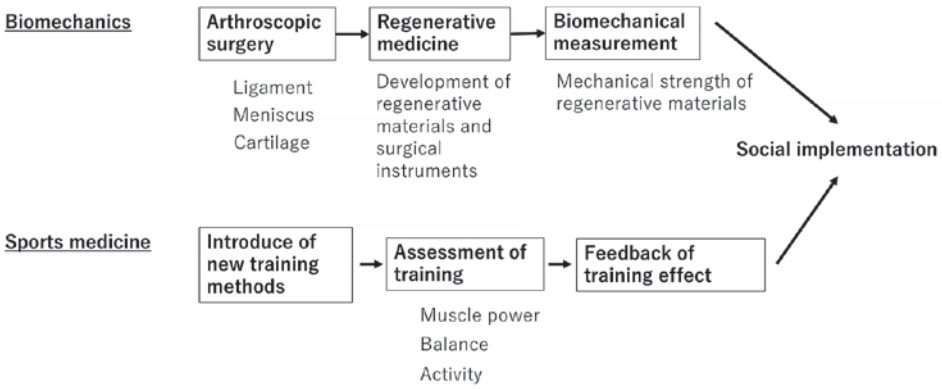
Department of Sports Medical Biomechanics

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.

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 and prevention of sports injuries, disorders and diseases will be advanced to social implementation.



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

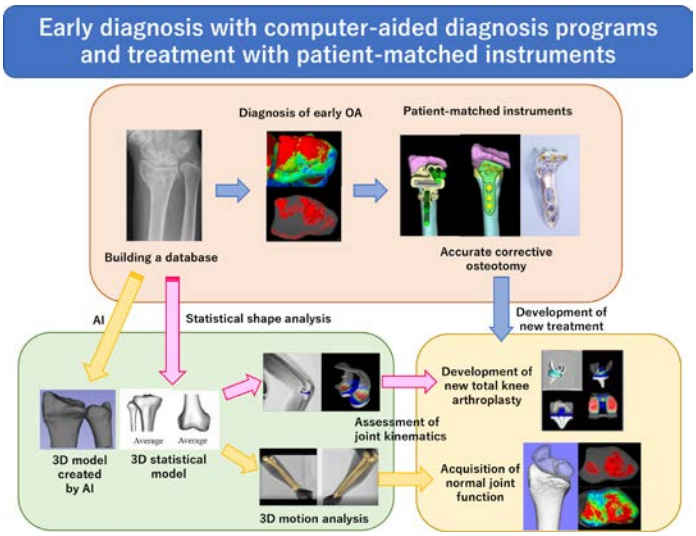
B-3 | 9F 0904

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.



Development of Personalized Medicine for Advanced Heart Failure using induced Pluripotent Stem Cells Combined with Genome Editing

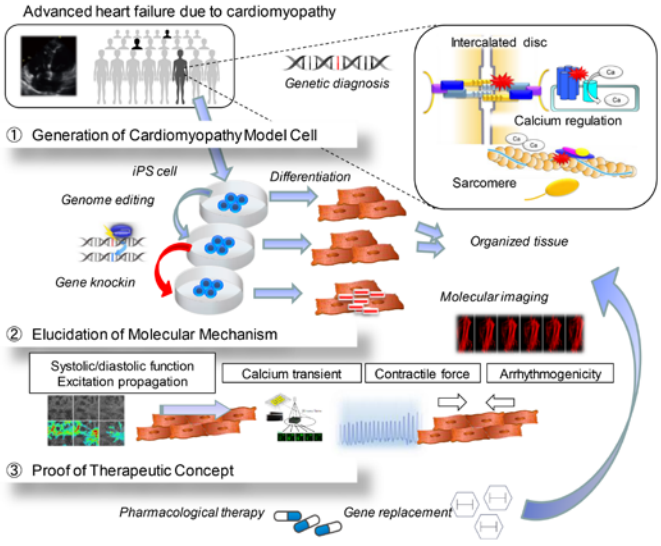
A-23 | 9F 0911

HIGO Shuichiro
Specially Appointed Associate Professor
Department of Medical Therapeutics for Heart Failure

Responsible Department
Department of Medical Therapeutics for Heart Failure

Research Partner
TOA EIYO LTD.

Advanced heart failure caused by intractable cardiomyopathy is refractory to the standard pharmacological and non-pharmacological therapies. Our research aims are “generation of human cardiomyopathy model cell” and “therapeutic development targeting molecular basis of intractable cardiomyopathy” using bidirectional approaches both from clinical information, clinical samples and from latest technologies including patient-derived induced pluripotent stem cells combined with genome editing.



Research and development of Next Generation Endoscopic Intervention extra medical equipment based on industry-academia consortium

A-15 | 9F 0912B

NAKAJIMA Kiyokazu
Specially Appointed Professor
Department of Next Generation Endoscopic Intervention

DOKI Yuichiro
Professor
Department of Gastroenterological Surgery

At the Department of Next Generation Endoscopic Intervention; we are collaborating with many companies through the open innovation community system and using long accumulated know-hows of Academia-Industry Collaboration, we are performing R&D of innovative medical devices needed to achieve next generation minimally invasive diagnosis and treatment. Based on the specific unmet medical needs given by doctors, companies will be organized into subgroups to work from basic research stage through up to pre-clinical / clinical stages for a speedy social implementation.

For example, we collaborate with domestic and foreign companies with necessary basic technologies need for R&D of medical devices such as plastic molding, processing technology, metal processing, polymer science, precision chemistry and so on. we will strive to jointly develop innovative medical devices for the next generation diagnosis and treatment, and by spinning off the innovative medical devices to current diagnosis / treatment, standardize the current technically difficult procedures and make them widely feasible.

Responsible Department
Department of Next Generation Endoscopic Intervention

Joint Research Companies		
AMCO Incorporated.	Sanyo Co., Ltd.	PILOT CORPORATION
SB-KAWASUMI LABORATORIES, INC.	3-D Matrix, Ltd.	Hakuzo Medical Corporation
Kaigen Pharma CO., LTD.	Daiei Co., Ltd.	HAKKO CO., LTD.
KAJITECH MEDICAL Co., Ltd.	TAKAZONO Technology Incorporated	FUSO Pharmaceutical Industries, Ltd.
CASTEM Co., Ltd.	TOP Corporation	Yamashina Seiki Co., Ltd.
Kohan Co., Ltd.	JAPAN CASHMACHINE CO., LTD.	

Immunity and Regeneration Integration Unit

New drugs for refractory neurological diseases through translational research

A-21 | 6F 0604

YAMASHITA Toshihide
Professor
Department of Molecular Neuroscience

ITOKAZU Takahide
Specially Appointed Professor
Department of Neuro-Medical Science

Responsible Department

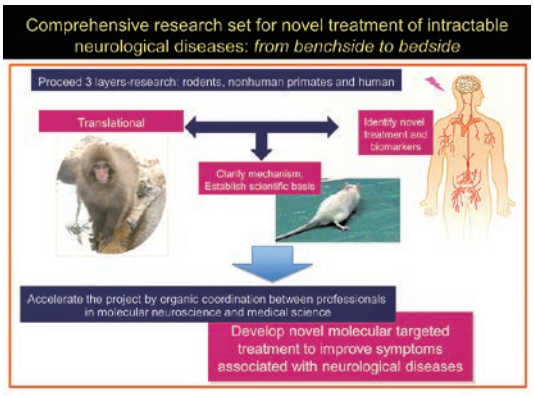
Department of Neuro-Medical Science

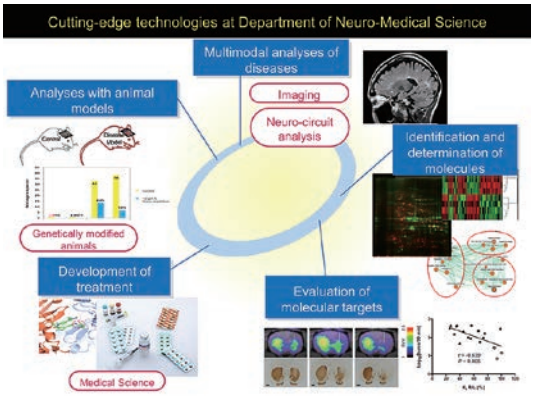
Research Partner

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

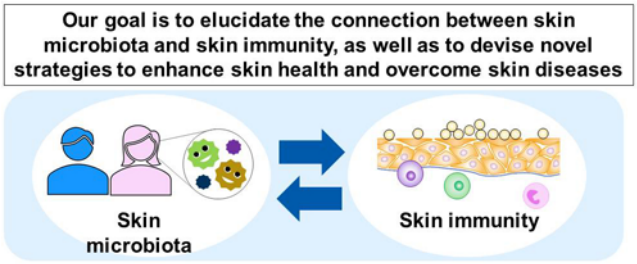

FUJIMOTO Manabu
Professor
Department of Dermatology

MATSUOKA Yuumi
Professor
Immunology Frontier Research Center (IFReC)

Responsible Department
Department of Cutaneous Immunology and Microbiology

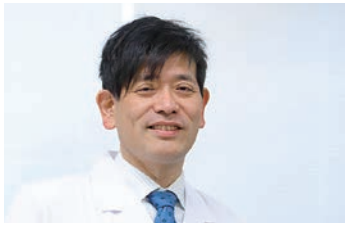
Research Partner
ROHTO Pharmaceutical Co., Ltd.

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

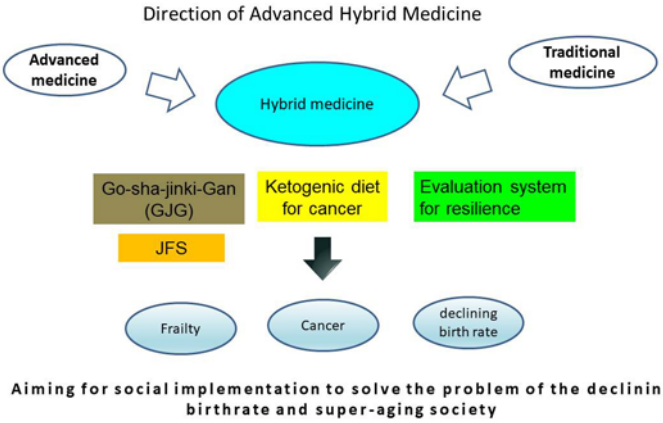


HAGIHARA Keisuke
Specially Appointed Professor
Department of Advanced Hybrid Medicine

Responsible Department
Department of Advanced Hybrid Medicine

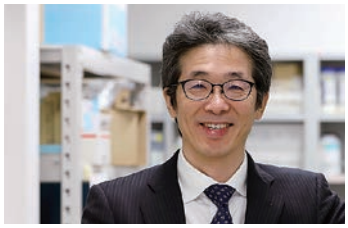
Research Partner
TSUMURA & CO.

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

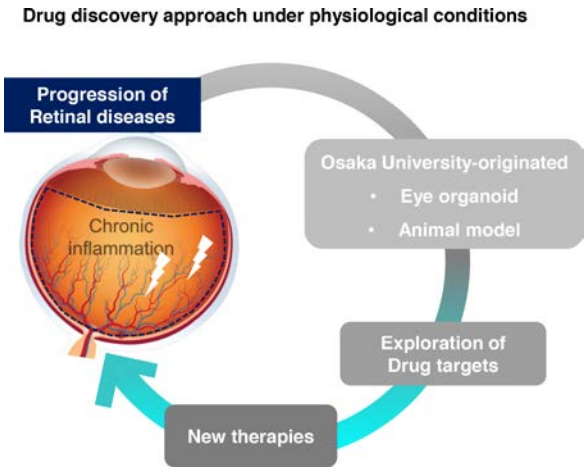


NISHIDA Kohji
Professor
Department of Ophthalmology

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 technology for regulation and quality control of immune cells in cancer therapy

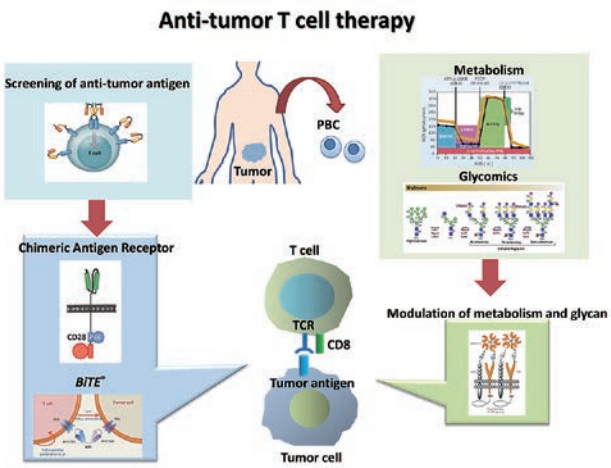
A-2 | 7F 0714

KUMANOGOH Atsushi
Professor
Department of Respiratory Medicine and Clinical Immunology

Responsible Department
Department of Immunology and Molecular Medicine

Research Partner
Otsuka Pharmaceutical Co., Ltd.

The new technology using glycomics proved to be useful for T cell immunity against tumor cells. Using quality-controlled T cell by this technology should be advantageous for future immune therapy against cancer. Chemokines and neural guidance factors involved in the regulation of T cell infiltration will be also planned to modulate as additional potential targets. Chimera antigen receptor (CAR) therapy, in which T cells are engineered to express CAR specific for certain cancer and transferred back to their own cancer host, is next promising immune therapy against cancer. We will focus on establishment of novel CAR therapy. CAR highly specific for cancer cells as well as quality of T cells are critical for CAR therapy. We developed new biological assay to screen CAR, which overcome the ordinal time-consuming screening steps. Combined with two technologies, we will establish new technology for cancer therapy.



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

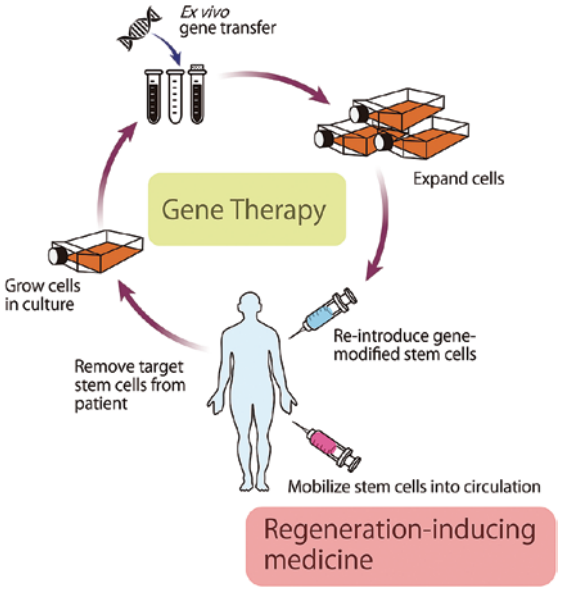
A-19 | 8F 0811

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

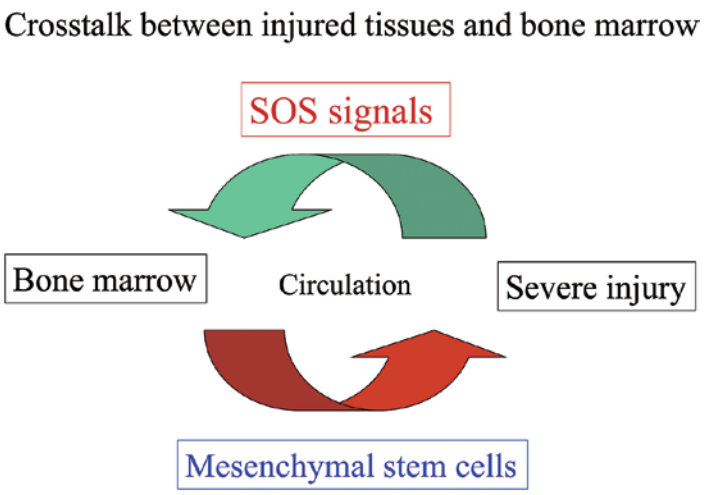
B-6 | 8F 0812

TAMAI Katsuto
Endowed Chair 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

ISHII Hideshi
Specially Appointed Professor
Department of Medical Data Science

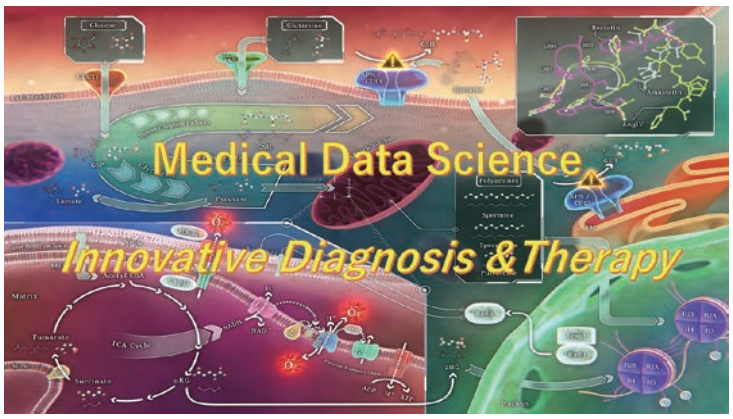
Responsible Department

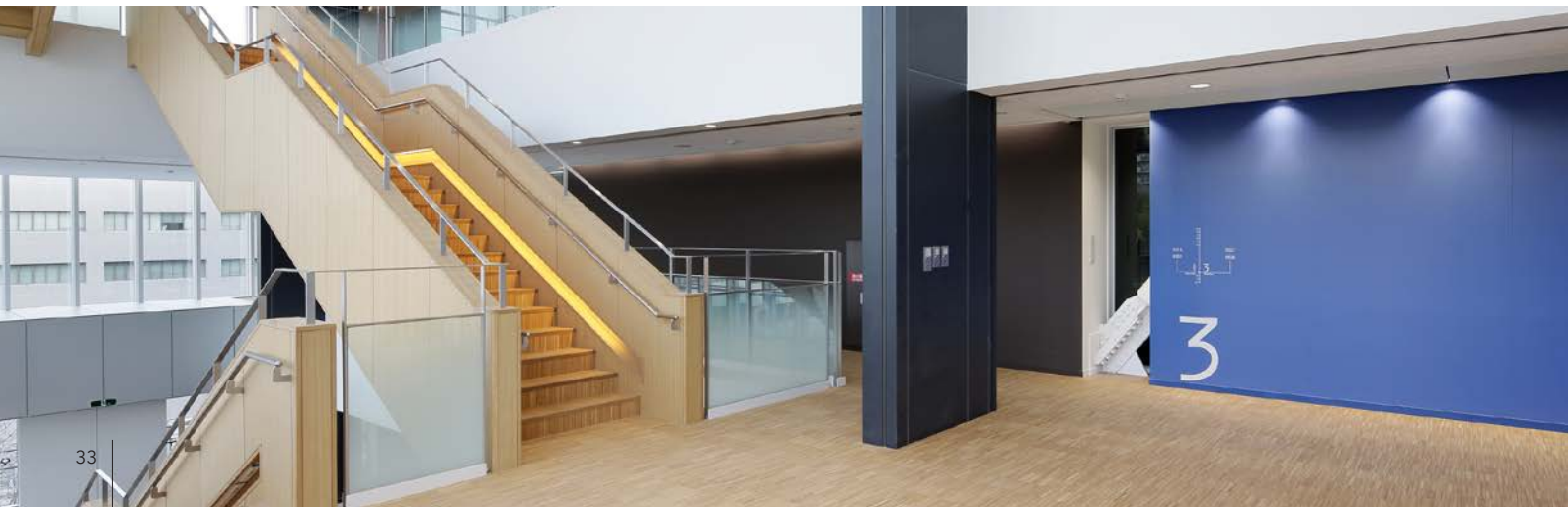
Department of
Medical Data Science

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

Developing new molecular therapies using Pyro-drive Jet Injector

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

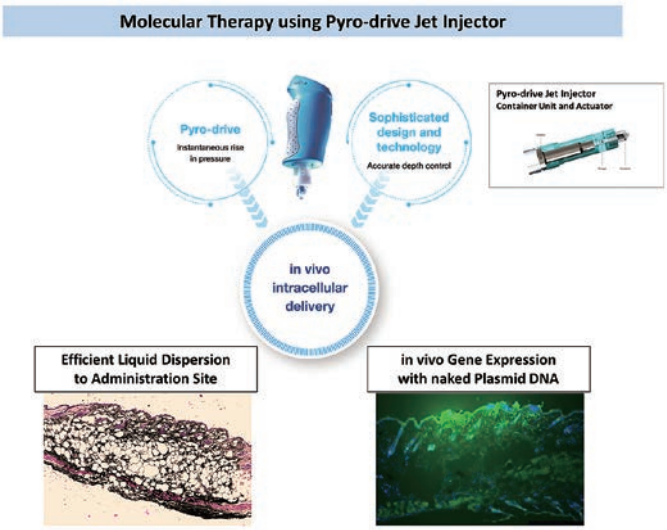
Responsible Department

Department of Device Application for Molecular Therapeutics

Research Partner

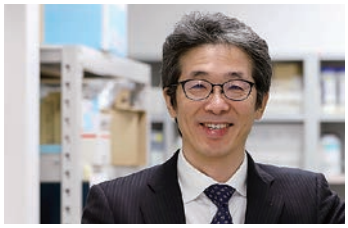
Daicel Corporation

This project aims to realize the promise of new therapies through development of new drugs such as gene therapy as well as other DNA- or RNA-based ones using new drug delivery method, Pyro-drive Jet Injector. This method is a new drug administration method that enables minimally invasive and precise targeting. Its priority is to pioneer and establish the innovative medical treatment in the fields of chronic diseases, infectious diseases, cancer, etc. This research advance cross-over efforts with researchers in multiple fields, such as medicine, pharmacy, and engineering making use of the mechanism of the Industry-Academia Collaboration and Cross Innovation Initiative, with the aim of accelerated establishment of clinical application.



Regenerative medicine research and development of cloud computing for regenerative medicine in Ophthalmology

B-2 | 7F 0702



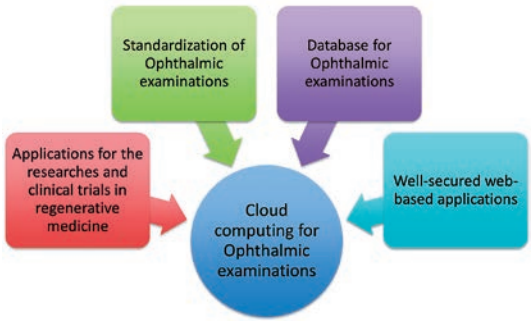
NISHIDA Kohji
Professor
Department of Ophthalmology

Responsible Department
Department of Vision Informatics (Topcon)

Research Partner
TOPCON CORPORATION

In the research and clinical application of cutting-edge regenerative medicine in ophthalmology, we will develop a data-integrated service that manages and provides treatment data, clinical examination data, and clinical findings, including images. We will build a database of diagnosis, treatment, and follow-up results together with advanced diagnosis by specialists in the cloud and realize an environment and functions that can be shared and deployed throughout the regional cooperation block centered on the base hospital. In addition, we are engaged in research for the development of new disease treatment methods using various types of stem cells, establishing and optimizing ocular disease diagnosis and treatment methods using ocular component cells derived from human iPS/ES cells, and evaluating the efficacy of various stem cell-derived humoral factors on eye-related diseases. In the future, we will create a database via a network and establish efficient retrieval and storage technologies for information linked to patients.

Development of cloud computing for regenerative medicine in Ophthalmology



Investigation of the effect of mouthwash on the reduction of salivary SARS-CoV-2 in patients with mild or asymptomatic COVID-19

A-27 | 7F 0709

KUTSUNA Satoshi
Professor
Department of Infection Control and Prevention

ONOZUKA Daisuke
Specially Appointed Associate Professor
Department of Oral Microbe Control

Responsible Department
Department of Oral Microbe Control

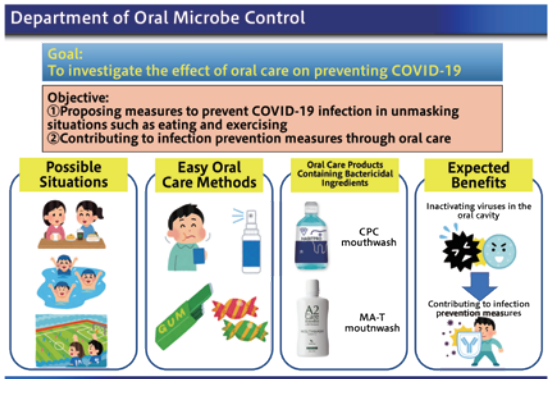
Research Partner
Earth Corporation

The Joint Research Course on Oral Microbial Control has been established as a part of the promotion of cross innovation by Earth Corporation and Strategic Global Partnership & X(Cross)-Innovation Initiative, Graduate School of Medicine, Osaka University.

We looked at the fact that COVID-19 increasing in the salivary glands caused droplet infection via saliva. We inferred that the antimicrobial ingredients used in oral care products could prevent droplet infection by inactivating the virus in the mouth (saliva) and focused on the control of the transmission of infection with oral care products.

The antimicrobial ingredients used in oral care products have demonstrated inactivation effects against COVID-19 in in vitro studies. To further promote clinical evaluation, we are conducting research to verify the effect of oral care products against COVID-19 in the oral cavity, saliva, and droplets of infected patients and its effectiveness for controlling transmission of infection.

This research not only contributes to the promotion and development of oral care products unprecedented in the world but also contributes to resolving social issues related to the presence of disease risks caused by the oral environment, informing the importance of oral hygiene by disseminating oral care products, realizing healthy and comfortable lives of people, and activating economy.



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 0711

SAKATA Yasushi
Professor
Department of Cardiovascular Medicine

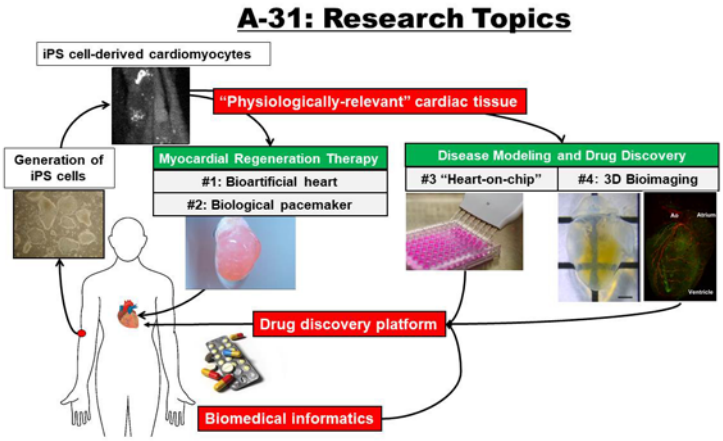
Responsible Department

Department of Cardiovascular Regenerative Medicine and Drug Discovery

Research Partners

CELLINK Bioprinting AB
SUZUKEN CO., LTD.
Alpha MED Scientific Inc.
AFI Corporation.

Focusing on drug discovery, biological pacemakers, and organ-like three-dimensional cardiac tissues, we will advance each system/technology development by employing innovative technologies. In addition, we will develop acquisition/evaluation techniques for obtaining and assessing biomedical information for the diagnosis and treatment of arrhythmias and heart failure, aiming to implement them in society.



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

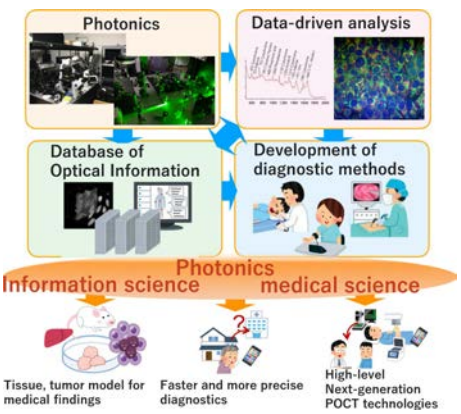
Responsible Department

Department of Neurosurgery

Research Partner

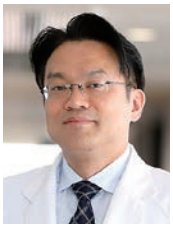
Sysmex Corporation

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

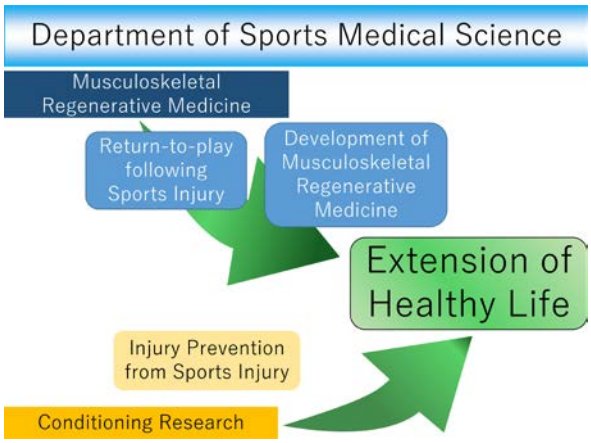
Responsible Department

Department of Sports Medical Science

Research Partner

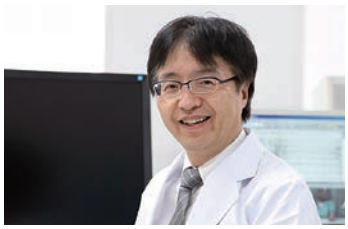
Saraya Co., Ltd.

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 and development of neural informatics, modulation and restoration

A-16 | 9F 0913



HIRATA Masayuki
Specially Appointed Professor
Department of Neurological Diagnosis and Restoration

Responsible Department

Department of Neurological Diagnosis and Restoration

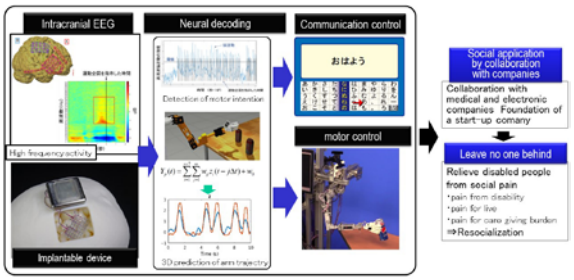
Research Partners

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

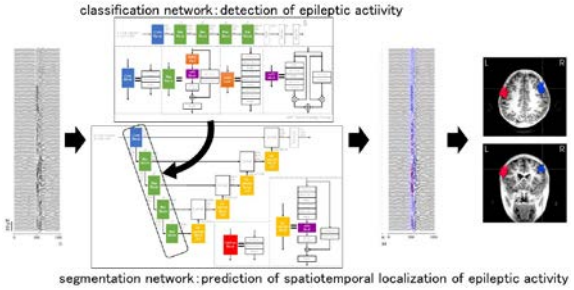
The aim of this project is to develop neural informatics, modulation and restoration. Main missions of this project are as follows,

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.

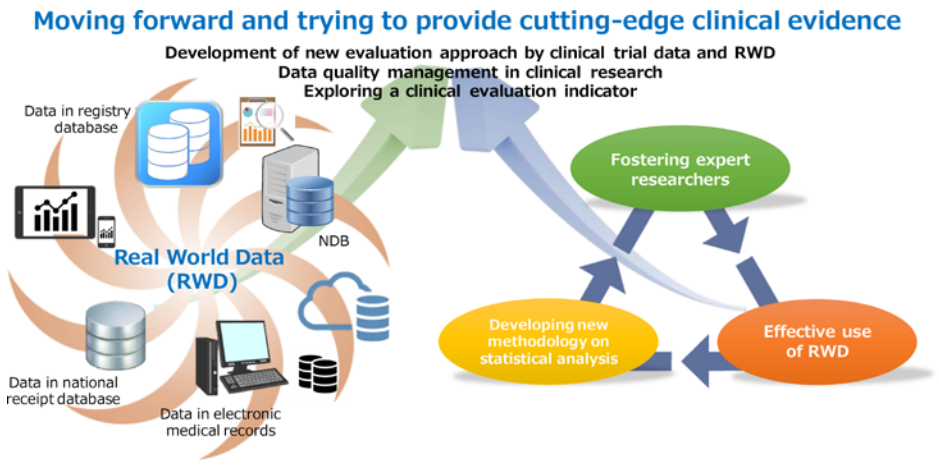


Fig. Scientific and innovative research for providing cutting-edge clinical evidence utilizing RWD and fostering expert researchers

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

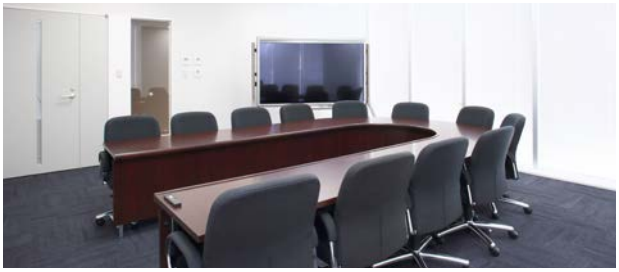
Meeting room (0810) — Screen

9F

Seminar room (0905) — Screen, Projector

Meeting room (0910) — Screen

2F | Seminar room

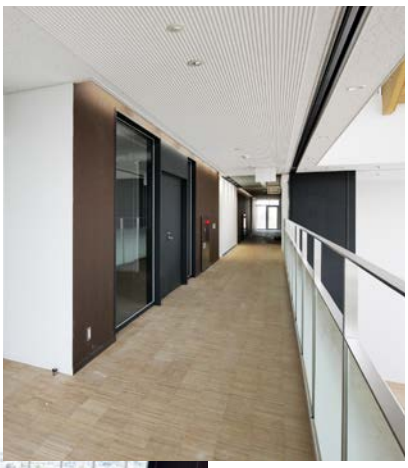


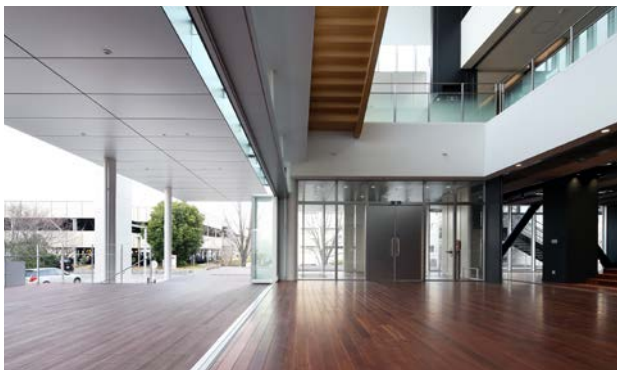
2F・6F | Meeting room

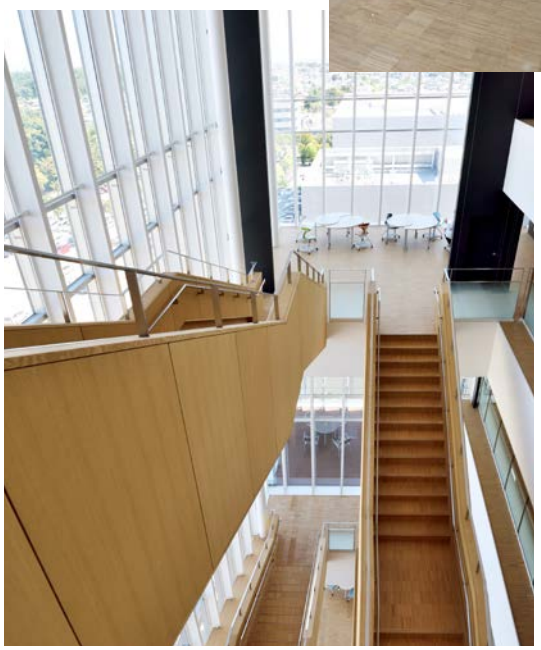
6F～9F | Seminar room

7F～9F | Meeting room

Free space

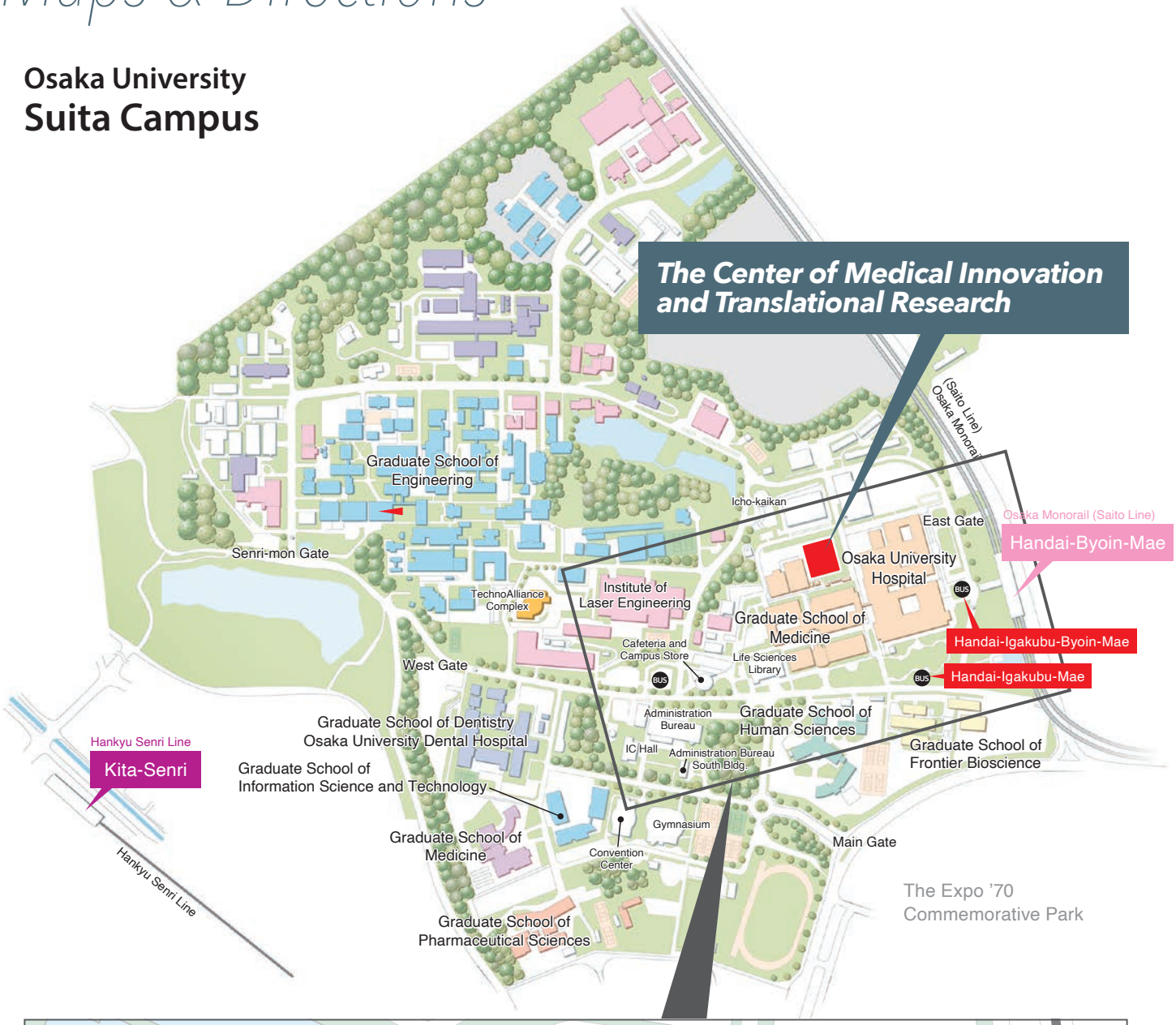


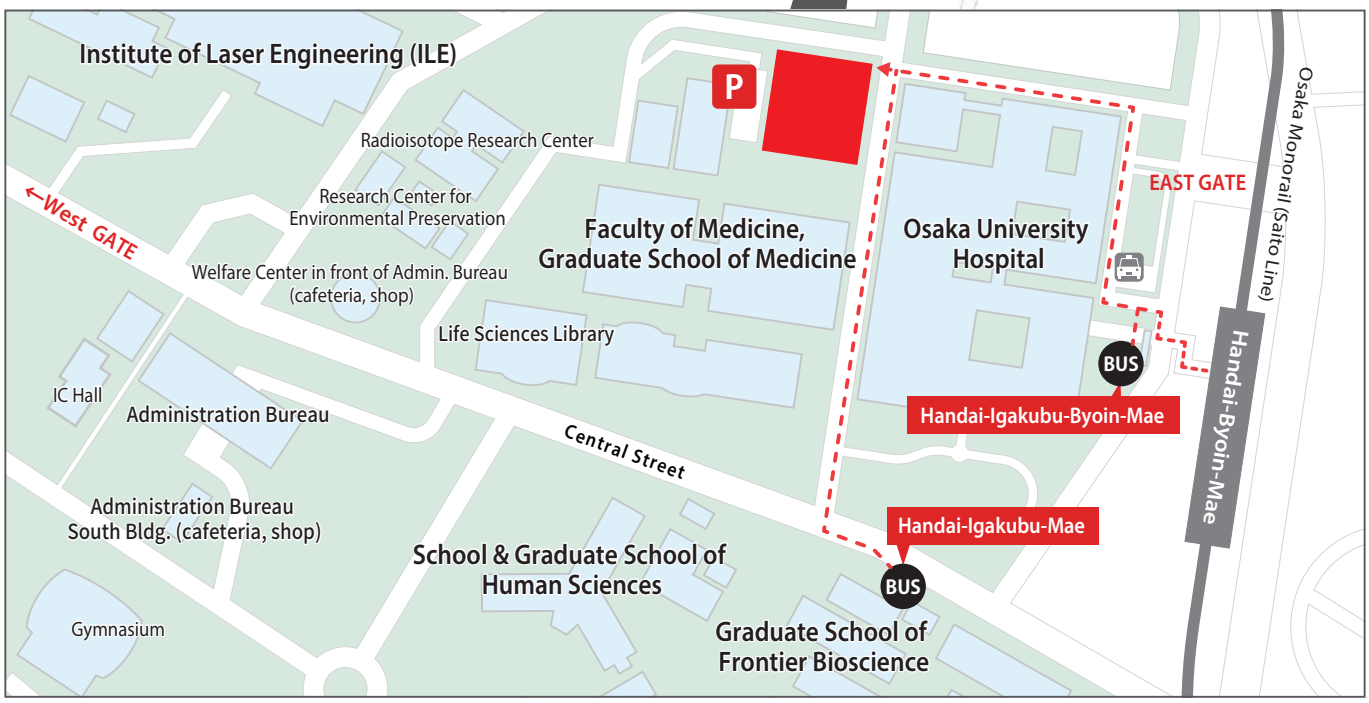




Maps & Directions

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

Hankyu Bus

●Bus for Handai-Honbu-Mae or Ibaraki-Mihogaoka at Senri-Chuo. Exit at Handai-Igakubu-Mae. (5 minutes)

Kintetsu Bus

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

From airport

From Osaka Airport (Itami)

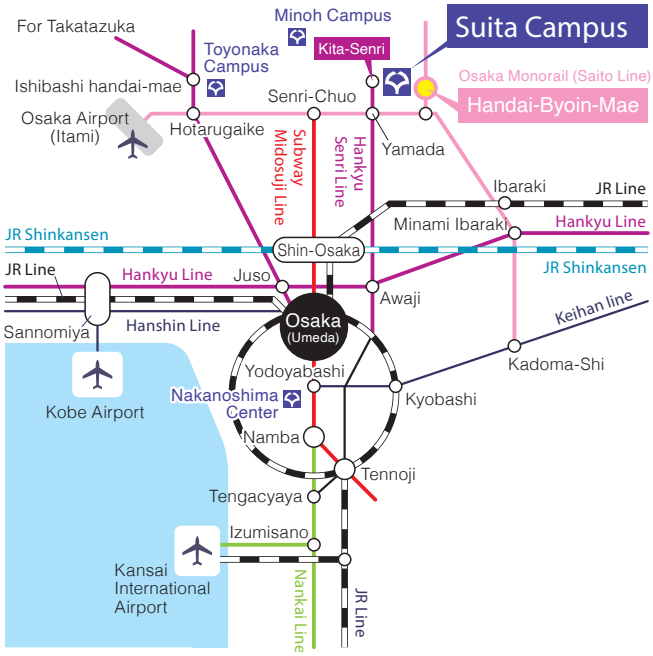
●Monorail to Handai-Byoin-Mae. (1 hour)

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)



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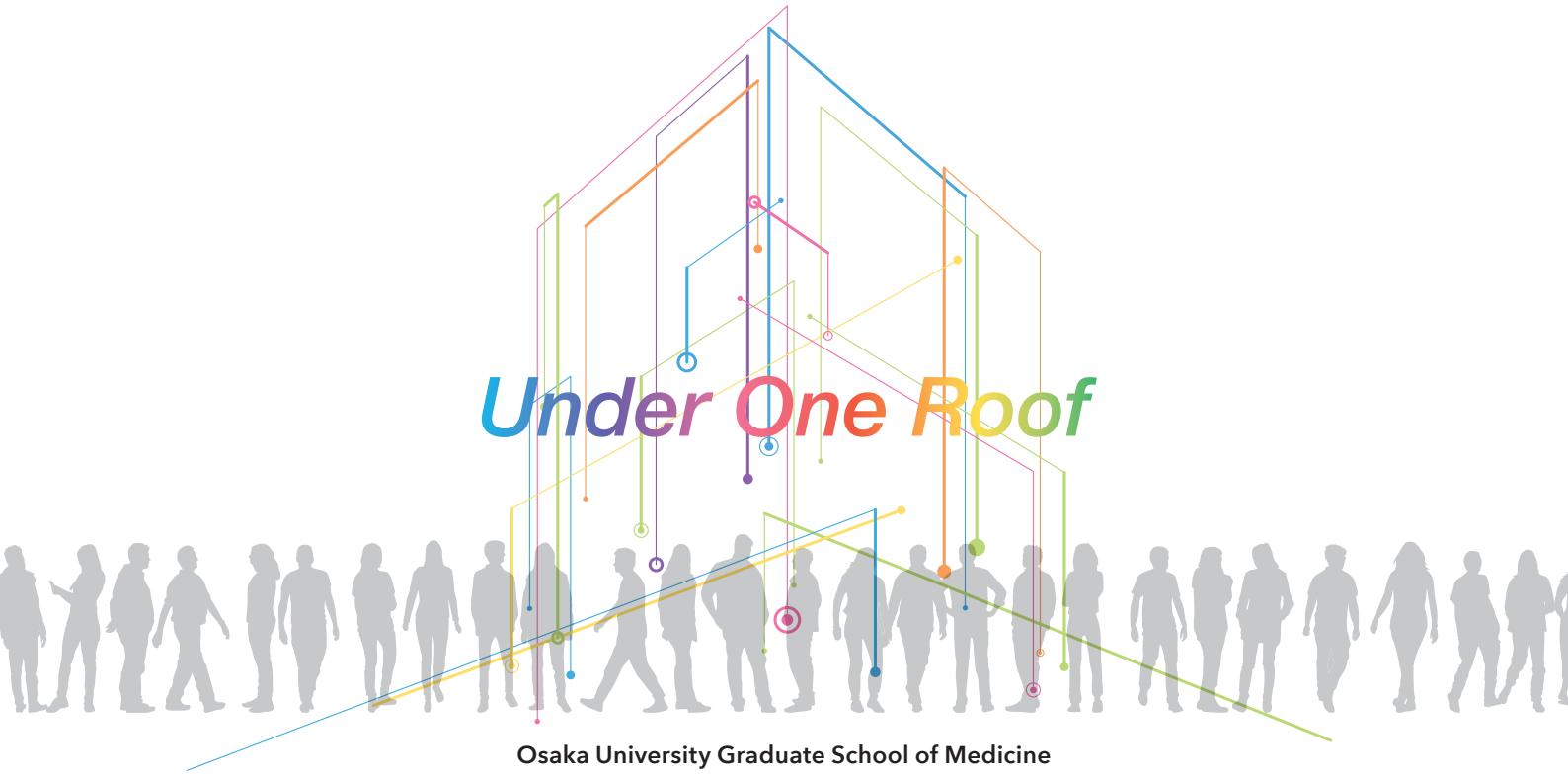
FAX +81-6-6210-8202
Email comit@office.med.osaka-u.ac.jp

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

CoMIT



Under One Roof

Osaka University Graduate School of Medicine

The Center of Medical Innovation and Translational Research

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

CoMIT

2023 202309-500