Osaka Bio Headquarters

2018

Towards the Development of the Life Sciences Industry

Special Feature

Immunotherapy and
Regenerative Medicine
in Osaka, Kansai

Osaka Bio Headquarters
Secretariat : Life Sciences Industry Division, Osaka Prefectural Government

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Strive to create a new hub capitalizing on the strengths of Osaka/Kansai such as regenerative medicine.

Background

After the adoption of the "system of approval with conditions and time limitations" in the revision of the Pharmaceutical Affairs Law in 2014, Japan has created an environment to lead the world in regenerative medicine. Furthermore, institutions in Osaka/Kansai such as Osaka University, Kyoto University, and the Riken Institute of Physical and Chemical Research are conducting advanced research as top runners in the world.
Under such circumstances, we aim to create an international hub for cutting-edge medicine (Medical Innovation) in Nakanoshima which adapts to advancements in future medical technologies based on regenerative medicine such as the utilization of genome medicine, AI, and IoT.

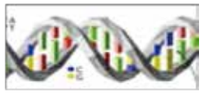
Open in 2021

Nakanoshima, where the International Hub for Medical Innovation is scheduled to be created

Nakanoshima is a major business district in Osaka as well as a hub for the transmission of culture and information featuring international conferences, art museums, etc. A station is scheduled to be built there on the new line which will connect directly to Kansai International Airport, the gateway to Osaka/Kansai (operation will start in 2031), and access from overseas will be strengthened with that.

The concept and vision of the hub

Development of Medical Innovation



◎Realization of open innovation bringing together businesses, academia, and medical institutions
◎Support for companies entering the field of regenerative medicine
◎Development of international cutting-edge research projects
◎Establishments of standards for inspection, etc. toward productization
◎Formation of high-quality big data and its application to genome and preemptive medicine
◎Promotion of clinical research and clinical trials

Implementation ⇔ Feedback

The promotion of Medical Innovation

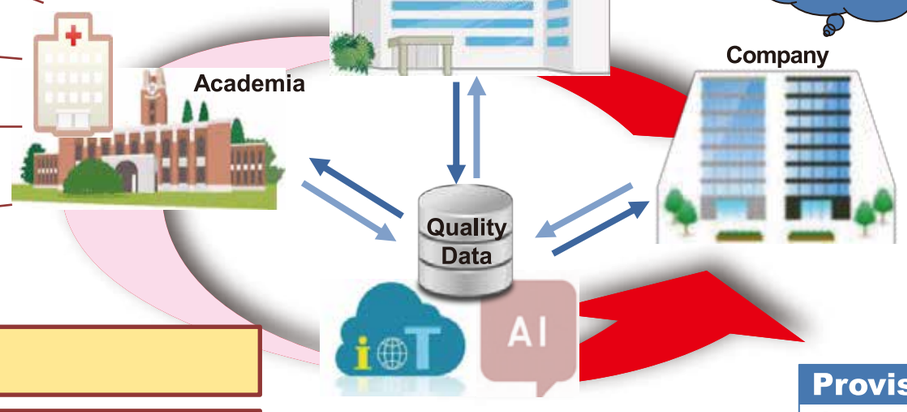
◎The practice of cutting-edge medicine which is developed
◎International contribution through the promotion of inbound/outbound of cutting-edge medicine
◎Overseas expansion of developed products and schemes, etc.
◎Cutting-edge examinations and prediction diagnostics
◎Training of advanced specialists

○○Research PJ
○○University
○○Doctor
○○Company

◆◆Research PJ
◆◆University
◆◆Doctor
◆◆Company

★★Research PJ
★★University
★★Doctor
★★Company

□□Research PJ
□□Research Lab
□□Fellow
□□Company



Genome medicine
Medicine utilizing AI
Individualized medicine
Promotion of regulatory science
Training of advanced professionals
Medicine-engineering collaboration
Regenerative medicine and other products

Japan Agency for Medical Research and Development (AMED)
Department of Innovative Drug Discovery and Development

Pharmaceuticals and Medical Devices Agency (PMDA) Kansai Branch

National Center for Industrial Property Information and Training（INPIT）Kansai Office

Provision of solutions to companies and patients

Businesses, academia and medical institutions all coming together to construct a platform to contribute to solving problems for companies and patients.
Provision of one-stop solutions.

An international hub open to the world making consistent advancements from clinical research into Medical Innovation to its implementation and industrialization

Gathering of Osaka's life science related universities and research facilities, etc.

Osaka has been known as "a town of pharmaceuticals" since about 400 years ago.
With many excellent life science related universities and research facilities, etc., in northern Osaka, Pharmaceutical companies, etc. are also gathering in places like Saito(International Culture Park) and Doshomachi in Osaka City.
Saito(International Culture Park) and Doshomachi in Osaka City.
In Osaka, industry, academia and government are working toward further development such as gathering drug discovery support agencies in Ume-Kita in central Osaka,
regarding life science field as one of our strengths.

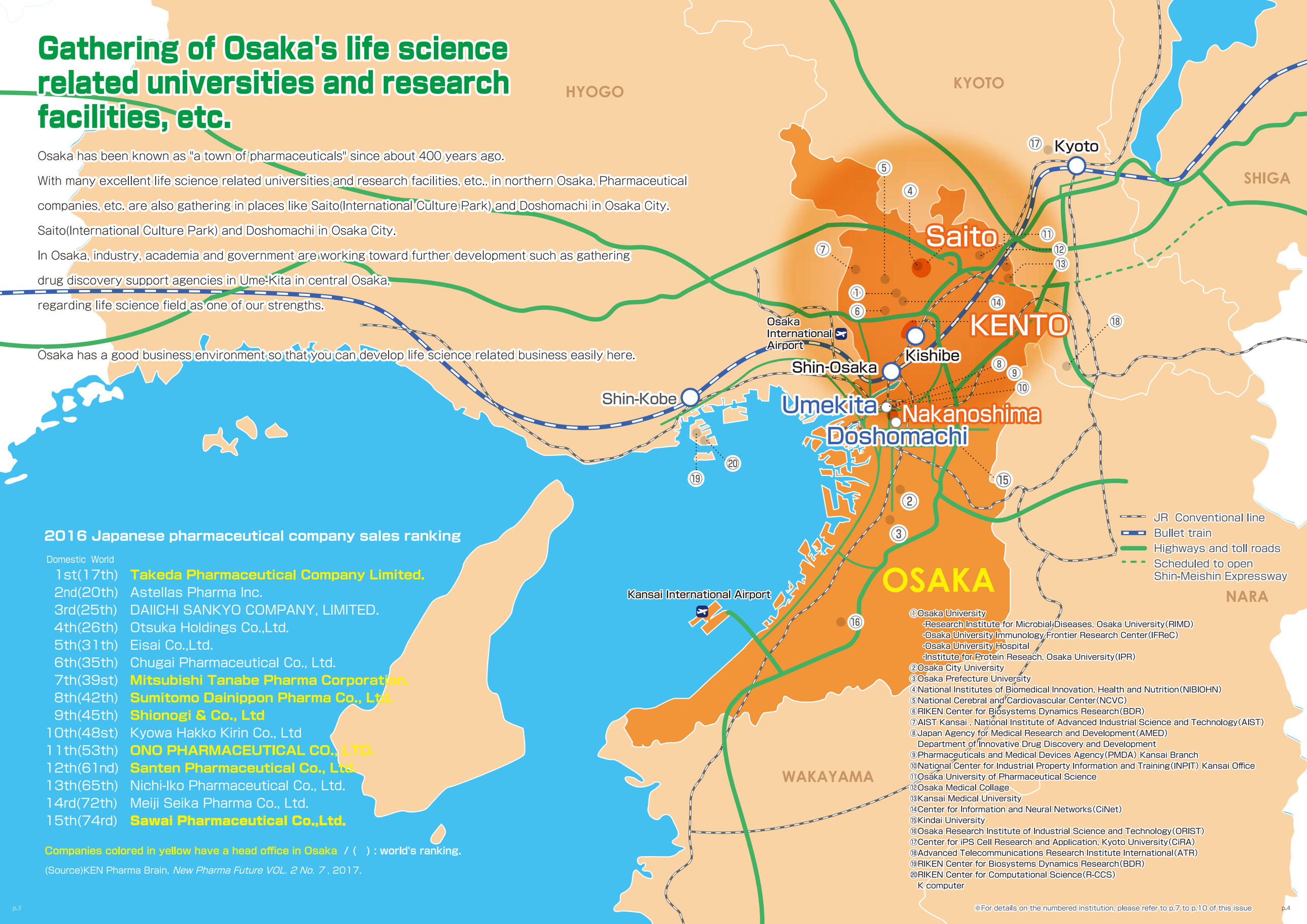
Osaka has a good business environment so that you can develop life science related business easily here.

2016 Japanese pharmaceutical company sales ranking

Domestic	World	
1st	(17th)	**Takeda Pharmaceutical Company Limited.**
2nd	(20th)	Astellas Pharma Inc.
3rd	(25th)	DAIICHI SANKYO COMPANY, LIMITED.
4th	(26th)	Otsuka Holdings Co.,Ltd.
5th	(31th)	Eisai Co.,Ltd.
6th	(35th)	Chugai Pharmaceutical Co., Ltd.
7th	(39st)	**Mitsubishi Tanabe Pharma Corporation.**
8th	(42th)	**Sumitomo Dainippon Pharma Co., Ltd.**
9th	(45th)	**Shionogi & Co., Ltd**
10th	(48st)	Kyowa Hakko Kirin Co., Ltd
11th	(53th)	**ONO PHARMACEUTICAL CO., LTD.**
12th	(61nd)	**Santen Pharmaceutical Co., Ltd.**
13th	(65th)	Nichi-Iko Pharmaceutical Co., Ltd.
14rd	(72th)	Meiji Seika Pharma Co., Ltd.
15th	(74rd)	**Sawai Pharmaceutical Co.,Ltd.**

Companies colored in yellow have a head office in Osaka / ( ) : world's ranking.

(Source)KEN Pharma Brain, *New Pharma Future VOL. 2 No. 7* , 2017.



⑪Osaka University
・Research Institute for Microbial Diseases, Osaka University(RIMD)
・Osaka University Immunology Frontier Research Center(IFReC)
・Osaka University Hospital
・Institute for Protein Reseach, Osaka University(IPR)
②Osaka City University
③Osaka Prefecture University
④National Institutes of Biomedical Innovation, Health and Nutrition(NIBIOHN)
⑤National Cerebral and Cardiovascular Center(NCVC)
⑥RIKEN Center for Biosystems Dynamics Research(BDR)
⑦AIST Kansai , National Institute of Advanced Industrial Science and Technology(AIST)
⑧Japan Agency for Medical Research and Development(AMED)
Department of Innovative Drug Discovery and Development
⑨Pharmaceuticals and Medical Devices Agency(PMDA) Kansai Branch
⑩National Center for Industrial Property Information and Training(INPIT) Kansai Office
⑪Osaka University of Pharmaceutical Science
⑫Osaka Medical Collage
⑬Kansai Medical University
⑭Center for Information and Neural Networks(CiNet)
⑮Kindai University
⑯Osaka Research Institute of Industrial Science and Technology(ORIST)
⑰Center for iPS Cell Research and Application, Kyoto University(CiRA)
⑱Advanced Telecommunications Research Institute International(ATR)
⑲RIKEN Center for Biosystems Dynamics Research(BDR)
⑳RIKEN Center for Computational Science(R-CCS)
K computer

※For details on the numbered institution, please refer to p.7 to p.10 of this issue

Symbol zone of Saito spreading in the hills of Ibaraki City, Minoo City, Osaka Prefecture

Saito Life Science Park

Saito Life Science Park that came up in 2004 is a major base of facilities having research and technology development functions in various life science fields such as biotechnology-based pharmaceuticals, food items, cosmetics, and healthcare related facilities association with the same.

Incubation facilities

Saito Bio Incubator	Saito Bio Hills Center	Saito Bio Innovation Center
		
Structure:Steel beam, 4-story Total floor:approx 4,900 ㎡ Lab:32rooms+1 floor There are Animal experimentation facility	Structur:steel beam, partially reiuforced concrete, 3-story and one basement floor 3rd floor: approx. 800 ㎡ Lab:10rooms	Structure:Steel beam, 4-story Total floor:approx 2,500 ㎡ Lab:18 rooms+1 floor There are investigational drug manufacturing facility
Maintenance:Organization for Small & Medium Enterprises and Regional Innovation Public-private rental lab Established:2004 July	Maintenance: YASHIMA PURE CHEMICALS CO.,LTD. Public-private rental lab Established:2006 April	Maintenance:Organization for Small & Medium Enterprises and Regional Innovation Public-private rental lab Established:2008 October
Rental grants: facilities grant system.		

An illustration of the Nucleic Acid Medicine API Development Center

Voice of a company located in Saito

GeneDesign, Inc.

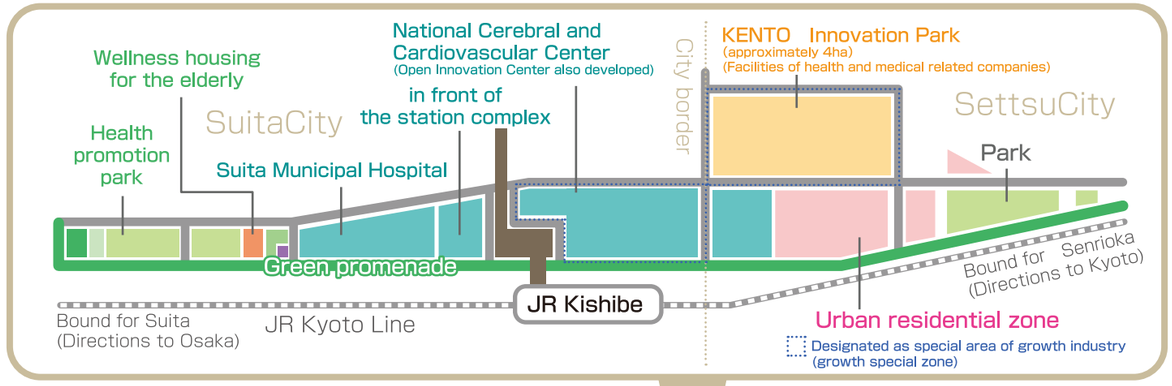
Quickly noticing the development of nucleic acid medicine which has been gathering attention as a next-generation medicine, in 2010 they developed the nation's largest nucleic acid investigational new drug manufacturing facility in Saito Bio-Innovation Center, and obtained the license for the production of nucleic acid medicine in Japan. In 2013 they established "Nucleic Acid CMC Research Center", the first nucleic acid medicine related research center in Japan within the Saito Life Science Park. In 2016 they merged with Ajinomoto Group, which they had been advancing joint research with for some time. In 2019 they are planning to open the "Nucleic Acid Medicine API Development Center" as a base for the large-scale production of nucleic acid medicine.
CEO Yuyama states: "Research universities and research institutions from around the country have gathered around Saito, enabling the acceleration of development in industry-academia-government projects. We were certified as a special zone business and allowed to receive funding support. Through the completion of the new base we hope to meet the demand for nucleic acid medical products which will grow in the future."

"Saito Hills Club" is also available as a place for information exchange, research exchange, human exchange, etc. of companies and research institutes around Saito.
For inquiries regarding incubation facilities, please contact Bio · Site · Capital Co., Ltd./TEL.+81-72-640-1060/URL http://www.bs-capital.co.jp/

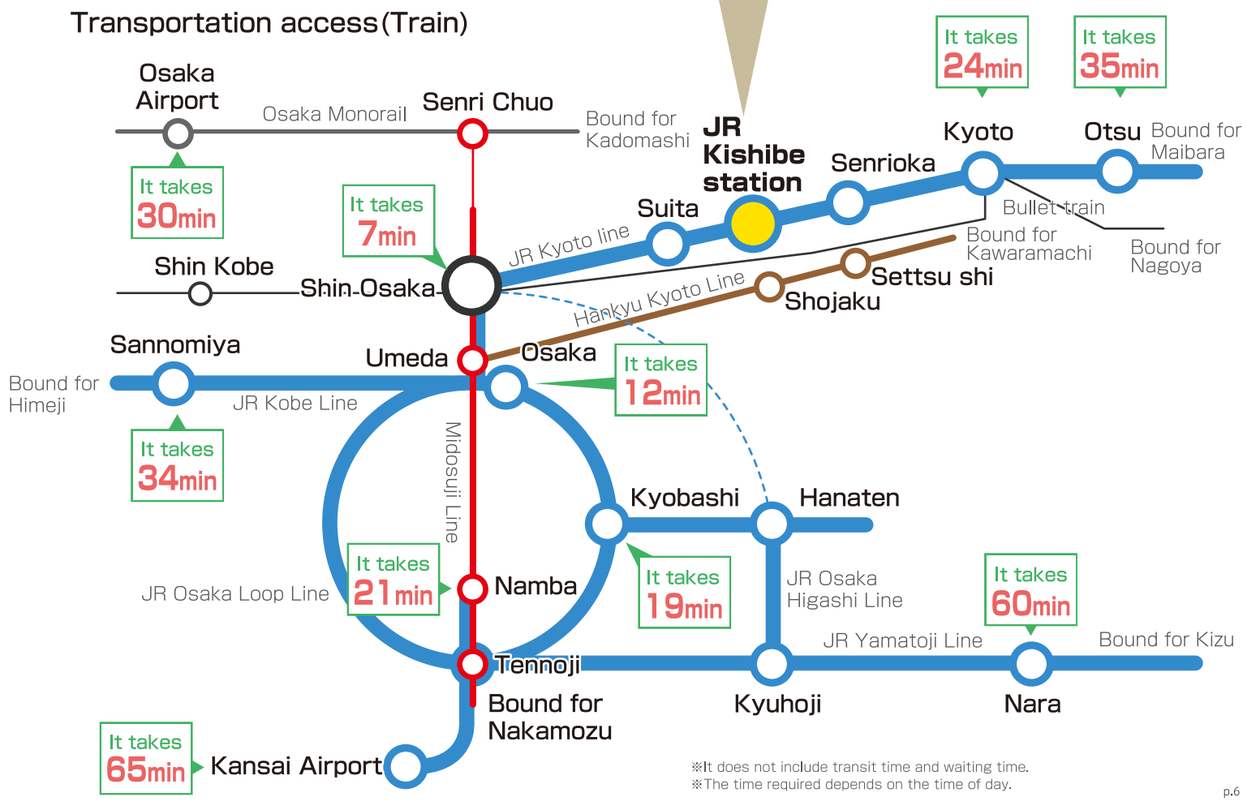
Town of "health and biomedical"

Northern Osaka Health and Biomedical Innovation Town (KENTO)

KENTO (approximately 30ha), where the creation of health and medicine hubs is proceeding, focusing on the National Cerebral and Cardiovascular Center which will start operations from July 2019 and the National Institute of Health and Nutrition which has established a policy to be relocated there from Tokyo.
It has excellent transportation access because of its proximity to Umeda and Shin Osaka.
As health and medicine related facilities steadily increase, we are planning for research facilities, etc. such as health and medicine related companies to gather in KENTO Innovation Park.



Transportation access (Train)



※It does not include transit time and waiting time.
※The time required depends on the time of day.

Consolidated presence of major universities and research institutions

For the location of institutions, please refer to p.3 to p.4 of this issue

① Osaka University

Overview of activities

It is one of the leading universities in Japan with 11 undergraduate faculties, 16 graduate schools, 6 affiliated research institutes, and 2 affiliated hospitals. It is famous as a university that is strong in biotechnology related studies, especially immunity research. It has produced many researches from the Graduate School of Medicine and the Graduate School of Biological Function who have made remarkable contribution to research in the biomedical field. In addition, it is actively working on the initiatives for commercializing the research outcomes.

Main initiatives

At Osaka University, we proactively promote collaborative activities between industry, academia, and government, such as the establishment of "Joint Research Chairs" and "Research Alliance Laboratories," based around the Techno-Alliance Building of our Suita Campus, as we strive for the construction of a platform that can continuously produce new research topics leading to innovation.

Notes (appeal points etc.)

- Realization of inter-organizational cooperation among industry and academia through Joint Research Chairs and Research Alliance Laboratories.
- In addition to joint and contracted research systems, establishment of the Professional Advisory Services Consultation system which provides advice regarding scientific problem solving.
- Promotion of technology transfer of intellectual property created from research.
- Construction of a regional ecosystem through the creation and support of venture businesses started at the university under the "Public-Private Innovation Program."

Inquiries

Address: 1-1 Yamadaoka, Suita-shi, Osaka 565-0871.
TEL: +81-6-6877-5111
URL: http://www.osaka-u.ac.jp/en/index.html

Osaka University Suita Campus

Techno Alliance building

② Research Institute for Microbial Diseases, Osaka University (RIMD)

Overview of activities

Research Institute for Microbial Diseases (RIMD), Osaka University is the world's foremost institute for basic and clinical researches including microbiology, immunology, and oncology.

Main initiatives

Our mission is:

- To explore the mechanisms of the pathogenesis of microbes and elucidate how our immune system works against those pathogens.
- To understand our body system through genome analysis.
- To explore regulatory mechanisms in cancer cells and try to elucidate how cancer develops and progresses in our body.
- To develop new therapeutic approaches to diseases including infectious diseases, hereditary diseases, and autoimmune diseases.

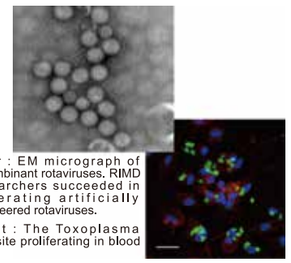
Notes (appeal points etc.)

RIMD is certified as a "joint use/joint research location" by the Ministry of Education, Culture, Sports, Science and Technology. We maintain specialized facilities to study microbiology, immunology, and oncology, equipped with BSL2 and 3 laboratories in Animal Resource Center for Infectious Diseases and Central Laboratory for Biological Hazardous Microbes.

These research resources, facilities, and technologies are open to the research community and researchers are conducting collaborative projects with other research institutions and corporations.

Inquiries

Address: 3-1 Yamadaoka, Suita-shi, Osaka 565-0871
TEL: +81-6-6879-8264 (Administration)
URL: http://www.biken.osaka-u.ac.jp/en/
Email: biken-info@biken.osaka-u.ac.jp



Over : EM micrograph of recombinant rotaviruses. RIMD researchers succeeded in generating artificially engineered rotaviruses.
Right : The Toxoplasma parasite proliferating in blood cells.

③ Osaka University Immunology Frontier Research Center (IFReC)

Overview of activities

The Immunology Frontier Research Center (IFReC), an international hub for immunology research, was established in 2007 as part of the World Premier International Research Center (WPI) Initiative program by the Ministry of Education, Culture, Sports, Science and Technology, Japan.By fusing immunology with biological imaging and bioinformatics, we have strived to cultivate new fields and conquer immune-related diseases. Reaching our 10th year in 2017, we are accelerating our expansion into medical science.

Main initiatives

- Elucidation of molecular mechanism of innate immunity
- Elucidation of the pathogenesis of immune related diseases
- Functional elucidation of regulatory T cells and translation into development of medicinal studies
- Elucidation of mechanisms of parasite infection and development of vaccines
- Elucidation of immune disease genes through bioinformatics
- Application of bioinformatics in the development of antibodies

Notes (appeal points etc.)

A large number of foreign researchers work in IFReC and research environment and support system here meet the international standards.

We are working on explaining immune phenomenon using an 11.7 T MRI, two-photon excitation microscope, etc., and prediction of immune reaction making full use of bioinformatics. In addition, as an initiative to collaborate with companies, we are building an open innovation laboratory and actively conducting joint research.

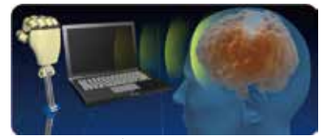
Inquiries

Immunology Frontier Research Center,
Osaka University
Address: 3-1 Yamadaoka, Suita-shi, Osaka 565-0871
TEL: +81-6-6879-4777
(Research Planning and Management Office)
URL: http://www.ifrec.osaka-u.ac.jp/en/

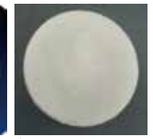
④ Osaka University Hospital

Overview of activities

Osaka University Hospital is one of the leading advanced medical development hospitals in Japan, and its philosophy is to provide high-quality medical care and contribute to nurturing of healthcare professionals and development of medical treatment.



Brain-machine interface wherein a robot is moved by one's thoughts under development



Collagen meniscal prosthetic material

Main initiatives

＜Efforts toward accelerated development of innovative pharmaceuticals and implementation of special zone medical devices and pharmaceutical affairs strategy consultations as a clinical study core hospital.＞

On August 7, 2015, Osaka University Hospital became the first hospital in the country to be approved by the Ministry of Health, Labour and Welfare as a clinical study core hospital under the Medical Care Act.Furthermore, from November 20 of the same year a "special zone medical devices and pharmaceutical affairs strategy consultations" was implemented targeting innovative medical device development projects in clinical study core hospitals within national strategic special zones, and on December 15, 2017 a further "accelerated development of innovative pharmaceuticals" was implemented targeting the development of pharmaceuticals.
Through these efforts we can expect to contribute to the expansion of Kansai's as well as Japan's medical industry.

Inquiries

Address: 2-15 Yamadaoka, Suita, Osaka 565 -0871
TEL: +81-6-6879-5111
URL: http://www.hosp.med.osaka-u.ac.jp/english/

⑤ Institute for Protein Research, Osaka University (IPR)

Overview of activities

Institute for Protein Research, Osaka University was founded in 1958 with the mission of shedding light and explaining the principles of life activities through fundamental research on proteins. As a shared facility and collaborative research center for protein research, it promotes joint research through use of facilities and equipment with domestic and overseas protein researchers including the industry, and it is also working on developing young human resources.

Main initiatives

- Joint use of SPring-8 synchrotron and beamline, group of ultra-high magnetic field nuclear magnetic resonance (NMR) equipment group and cryo-electron microscope. Development and publication of protein data bank (PDB) as a member of the Worldwide Protein Data Bank (wwPDB)
- Promotion of multi-scale structural life science in the Division of Multiscale Integrative Protein Science which was established in 2016.
- Conducting numerous protein research laboratories seminars and international seminars

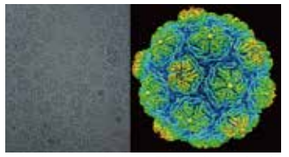
Notes (appeal points etc.)

A large number of shared equipment is available at Institute for Protein Research, Osaka University that even corporate researchers can use without any cost (some of the equipment are available for a fee).

It is designated as a shared collaborative research center of the country and it is equipped with the management system for conduct high quality research that meets the international standards

Inquiries

Address: 3-2 Yamadaoka, Suita-shi, Osaka 565-0871
TEL: 06-6877-5111
URL: http://www.protein.osaka-u.ac.jp/en/



Left : A protein of a huge Pf virus-like molecule which weighs 7 million Da taken by the latest cryogenic electron microscope

Right : A solid structure with a resolution of 3.8 angstrom of the protein

⑥ Osaka City University

Overview of activities

Osaka City University fulfills the role of think tank for urban Osaka, and it aims to conduct educational research and contribute to the community in the field of “urban studies”. Its goal is to promote the creation of new industries by consolidating the knowledge and wisdom of the university beyond the barriers of faculties, strengthening the brand power by creating new research and business areas, and developing new health areas.

Main initiatives

Consolidating the knowledge and wisdom of the university and developing new health areas

Development of next generation energy

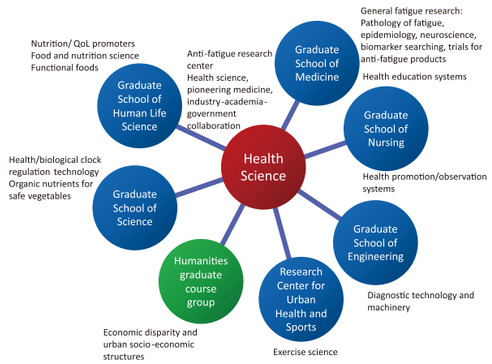
Base of urban disaster management

Inquiries

URA Center
Address: 3-3-138 Sugimoto, Sumiyoshi-ku, Osaka-shi 558-8585
TEL: +81-6-6605-3550
URL: http://www.osaka-cu.ac.jp/en/research

Notes (appeal points etc.)

The Center for Health Science Innovation has established a system to create new products and services through industry-university collaboration with enterprises, with medical science of fatigue and anti-fatigue as the core. It accelerates cross-innovation in different industries and fields by leveraging the strengths of a university located in a large city, offering the possibility to make use of its system for innovative device development.



Position of "health science" at Osaka City University

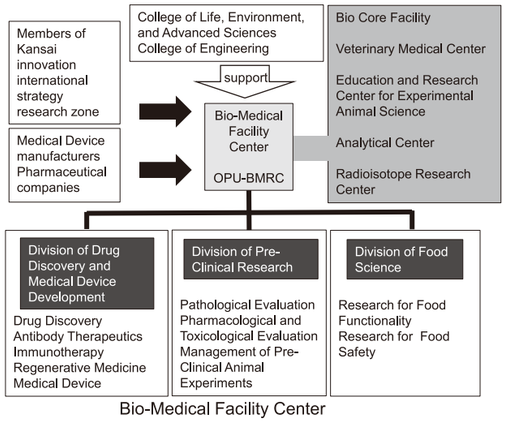
⑦ BioMedical Forum, Osaka Prefecture University

Overview of activities

Osaka Prefecture University is an important member of the "Osaka Bio Strategy Promotion Council" established by Osaka Prefecture, and it has set up the Bio-Medical Forum for disseminating opinions and information on research strategy and initiatives for the bio industry.

Main initiatives

Bio-Medical Forum is comprised of three centers and two research laboratories, plans and proposes the strategy of biomedical research, and promotes good relationship between each member.



Contact Us
Research Administration Center
TEL: +81-7-2254-9128
URL: http://www.osakafu-u.ac.jp/english/

⑧ National Institutes of Biomedical Innovation, Health and Nutrition (NIBIOHN)

Overview of activities

By working to promote joint research which contributes to the development of medical products, medical devices, etc. as well as medicinal plants and other living resources and research and development conducted by private companies, etc., we aim for the creation of a foundation to improve medical product and device technology while also engaging in investigation and research into the maintenance and improvement of people's health and investigation and research into people's nutrition and other dietary matters, thereby working to improve and increase public health and contribute to the improvement of national health preservation. With this as our goal, we are engaged with the 6 projects to the right as well as operations based on the Health Promotion Act.

Main initiatives

- Research and support of drug discovery related to fundamental technologies
- Research and support of drug discovery related to biological resources
- Promotion of development of drugs and other products
- Surveys and studies pertaining to the maintenance and promotion of the health of people
- Surveys and studies regarding the nutrition and diet of people
- Nutrition physiology tests of food

Inquiries

Address 7-6-8 Saito-Azaki, Ibaraki-shi, Osaka 567-0085
TEL: +81-7-2641-9811 (Main)
URL: http://www.nibiohn.go.jp/en/

⑨ National Cerebral and Cardiovascular Center (NCVC)

Overview of activities

National Cerebral and Cardiovascular Center is a national center for advanced and specialized medical care and research. It promotes survey and research of cardiovascular disease and aims eradication of cardiovascular, setting its sights on advanced medicine. Our hospital is one of the world's leading centers conducting cooperative research in heart disease and cerebrovascular disease which were caused by the same risk factors in one facility by specialists of each field. Research institute clarifies pathology and develops technology to fulfill the clinical members' needs. It enables problem solution more quickly that hospital and research institute work together. Moreover, research and development initiative center connects clinical field and research strongly.

Main initiatives

- Implementation of the greatest number of heart transplants in Japan
- Establishment of mobile telemedicine system
- A core facility of intravenous t-PA therapy and endovascular thrombectomy for acute stroke
- Basic research about pathogenesis and pathophysiology of cardiovascular diseases
- Development of artificial heart and blood vessels
- Cardiovascular surgery with less invasiveness
- Advanced check-up for cerebral and cardiovascular disease before onset

About moving

In July 2019, NCVC will move to the site of Suita marshalling yard "KENTO," directly connecting JR Kishibe Station.

In KENTO, new NCVC is aiming to form a large medical cluster. In addition, it is also aiming more contribution toward community medicine with Suita Municipal Hospital, that is opening in 2018 in the same KENTO ground.

New NCVC is focusing cardiovascular disease prevention, in addition to the forefront medical technique and research development with which NCVC has coped.

"Open Innovation Center (OIC)" will be set in new NCVC to advance the cooperation with companies and universities for the purpose to create whole new medicine and medical machines.


Present facilities


New facilities

国立循環器病研究センター
National Cerebral and Cardiovascular Center

Inquiries

Address 5-7-1 Fujishirodai, Suita-shi, Osaka 565-8565
TEL: 06-6833-5012 (Main)
URL: http://www.ncvc.go.jp/english/

⑩ RIKEN Center for Biosystems Dynamics Research (BDR)

Overview of activities

In BDR Osaka campus we develop the underlying technology for analysis and simulation of molecular dynamics inside living cells in order to comprehensively understand the systemic properties essential to living things such as resilience and robust homeostasis, leading to the development of better treatments and medicines.

Technological developments

- Various high-performance microscopes for live cell imaging
- High throughput imaging technologies combined with robotic automation and artificial intelligence
- Organ transparency technology
- Noninvasive sleep analysis technique based on respiration
- Creating model animals economically and efficiently by triple-targeted CRISPR method
- New fluorescent probes that enable various types of live cell imaging
- Special purpose supercomputer for drug discovery simulation
- E-Cell, whole cell biochemistry simulation technology
- Glass microfluidics lab-on-a-chip embedded with fine flow paths

Inquiries

Business Partnerships
Address: 6-2-3 Furuedai, Suita-shi, Osaka 565-0874.
E-mail: partner@ml.riken.jp
URL: https://www.bdr.riken.jp/en/

⑪ AIST Kansai , National Institute of Advanced Industrial Science and Technology (AIST)

Overview of activities

AIST Kansai Center is working on developing diagnostic devices, drug discovery infrastructure technology, health and welfare equipment for "healthy society" centered on the biomedical research department.

Notes (appeal points)

We are strengthening industry-academia collaboration through AIST Kansai informal gatherings.

We cooperate and collaborate with research institutions, government agencies, and companies including not only domestic but also international ones.

Main initiatives

- Developing diagnostic devices such as ultrafast gene inspection system
- Bioproduction by genome editing and other technologies
- Studies and search marker for brain disease

Inquiries

Industry-academia-government collaboration promotion office
Address: 1-8-31 Midorigaoka, Ikeda-shi, Osaka 563 -8577
TEL: +81-7-2751-9681

Support Organization(Drug discovery etc.)

⑫ Japan Agency for Medical Research and Development (AMED) Department of Innovative Drug Discovery and Development

Overview of activities

By organizing Drug Discovery Support Network, we support biomedical R&D toward creation of novel drugs in cooperation with industrial and academic sectors. Moreover, we support development of innovative drugs and medication for orphan diseases through promotion of research activities regarding identification of drug targets and development of platform technologies for drug discovery as well as research for clinical application of medical technologies

Inquiries

Tel: +81-6-6372-1771
URL: http://www.amed.go.jp/en/

AMED

⑬ Pharmaceuticals and Medical Devices Agency (PMDA) Kansai Branch

Overview of activities

Focusing mainly on academia and venture companies for the creation of innovative drugs, medical devices, regenerative medical products in Japan, we conduct regulatory science (RS) general consultations and RS strategic consultations (pre-consultation meeting) where we provide guidance and advice regarding planning the designs of studies and clinical trials which are required at the early stage of development. We can also provide advice regarding clinical trials and application materials in interviews utilizing the high-performance video conferencing systems connecting our Tokyo HQ and Kansai branch. Furthermore, we conduct investigations into whether the manufacturing facilities and manufacturing and quality controls of medical products, etc. comply with GMP/QMS/GCTP, etc.

Inquiries

URL: http://www.pmda.go.jp/english/index.html
TEL: +81-6-6374-6820

Pmda