

RIKEN Center for Developmental Biology

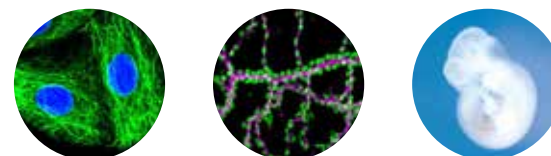
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<http://www.cdb.riken.jp/en/>

RIKEN Center for Developmental Biology



Access

To Sannomiya (Downtown Kobe)

Local train lines

JR, Hankyu, Hanshin train lines → Sannomiya Station

Shinkansen (Shin-Kobe Station)

Shin-Kobe Station →
Sannomiya Station (via Kobe Municipal Subway) (2 min.)

Airport limousine bus from local airports

Itami (Osaka) Airport → Sannomiya (40 min.)
Kansai International Airport (KIX) → Sannomiya (65–75 min.)

From Sannomiya to the CDB

By Port-liner monorail

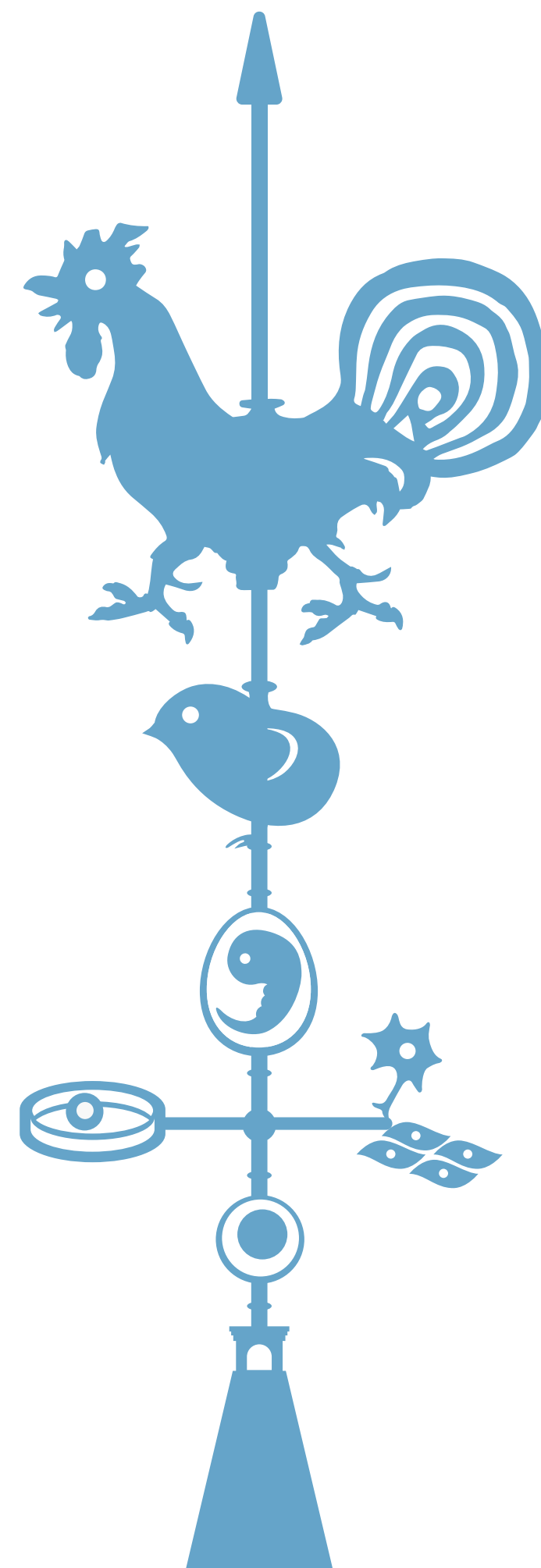
Sannomiya Station → Iryo Center Station (12 min.)
Take the train bound for Kobe Airport.

By taxi

From Shin-Kobe Station → CDB (25 min.)
From Sannomiya → CDB (20 min.)



RIKEN 2016-045 (09.2017)



RIKEN Center for Developmental Biology

Research Mission

The process of development is an extraordinarily complex phenomenon that scientists have long been trying to fully understand. While great strides have been made in discovering a wide range of molecules and genes, as well as mechanisms involved in development, many fundamental questions remain unresolved.

The RIKEN Center for Developmental Biology is committed to carrying out research that focuses on extending our knowledge of how individual bodies arise from a process that begins with a single cell (fertilized egg), and applying these new insights to reconstitute developmental processes in a culture system.

Through these efforts, the CDB aims to contribute to the understanding of pathogenesis of human diseases and also to the advancement of next-generation medicine, such as regenerative medicine.

Message from the Director

The RIKEN Center for Developmental Biology (CDB) has made fundamental contributions in the fields of development, regeneration and regenerative medicine since its establishment in 2000, and is recognized as a leading research institute both in Japan and at the international level. The Center's twofold mission continues to focus on gaining a better understanding of how complex organisms are formed during development and finding new ways of harnessing that knowledge to reconstitute developmental processes in culture, both of which holds promising applications in regenerative medicine and for understanding pathogenesis of human diseases.

The labs at the CDB are organized under multidisciplinary programs and are engaged in research

on a range of important topics in the field, spanning molecular to multicellular levels. Collaboration between labs is the norm at the CDB, and the Center offers wonderful opportunities for young scientists to make new discoveries and develop their careers, with ample lab space, mentorship and support services, and access to world-class equipment and facilities. Our research staff is also quite diverse, with 10% of our scientists coming from other countries, and a nearly equal male-female ratio in postdoctoral researchers and technical positions. Scientific talks are held in English, and our annual symposium is recognized as a truly global forum for discussing the latest advances and trends in the field.

Ensuring innovations and advances in science requires

working together with researchers in other fields. Our location in the heart of Kobe's thriving biomedical research cluster, with over 300 research institutions, medical centers, biotechnology startup and corporate companies, gives CDB scientists a wide range of opportunities to contribute to translational and other collaborative research initiatives, such as the world-renowned project in retinal regeneration to contribute to benefiting society. We are also committed to building strong ties with academic institutions in the surrounding Kansai region to help foster the next generation of leading scientists.

It is my great pleasure to welcome scientists from around the world to join us at the CDB in learning, exploring, and making new discoveries.



Hiroshi Hamada

Director,
RIKEN Center for
Developmental Biology



CDB Organization

Center Director Hiroshi Hamada

Deputy Director

Office of the Director

**Research Ethics
Education Officer**

Advisory Council

About CDB

The RIKEN Center for Developmental Biology was launched in April 2000 to conduct research into development and regeneration, key scientific foundations in addressing many of the greatest challenges in biomedicine and advancing the frontiers of human knowledge. The Center is located within a dynamically growing biomedical research park in Kobe, Japan, nearby to many other research and medical centers, including the RIKEN Center for Life Science Technologies, RIKEN Advanced Institute for Computational Science (K computer), and Kobe City Medical Center General Hospital. The CDB also benefits from belonging to RIKEN, Japan's largest and most comprehensive research organization for basic and applied science as well as its close ties to graduate schools and research institutes in Japan and other countries, giving our scientists access to a broad network of talent and technology across the country and around the world.

Kobe Biomedical Innovation Cluster:
<http://www.kobe-bic.org/english/index.html>

Cellular Environment and Response Research Program

This program includes labs focused on developing platforms for gaining a better understanding of fundamental control principles of animal development, aimed at learning new ways of overcoming developmental disorders.



Morphogenetic Signaling
Shigeo Hayashi



Growth Control Signaling
Takashi Nishimura



Chromosome Segregation
Tomoya Kitajima



Developmental Epigenetics
Ichiro Hiratani



Vascular Morphogenesis
Li-Kun Phng



Heart Regeneration
Wataru Kimura

Stem Cells and Organ Regeneration Research Program

Labs in this program work on identifying methods for controlling organ formation and regeneration through the study of stem cells and organogenesis.



Organ Regeneration
Takashi Tsuji



Lung Development
Mitsuru Morimoto



Tissue Microenvironment
Hironobu Fujiwara



in vitro Histogenesis
Mototsugu Eiraku



Human Organogenesis
Minoru Takasato

Research and Development Project

This program conducts research using induced pluripotent (iPS) and other types of stem cells to develop approaches to regenerate retinal function, in active collaboration with the Kyoto University Center for iPS Cell Research and Application (CiRA) and various Kobe-based research initiatives.



Retinal Regeneration
Masayo Takahashi

Organogenesis Research Program

Labs in this program study mechanisms underlying the formation of complex model systems, in the hopes of gaining insight into the bases of the higher order structure of organs and functional development.



Cell Adhesion and Tissue Patterning
Masatoshi Takeichi



Cell Asymmetry
Fumio Matsuzaki



Neocortical Development
Carina Hanashima



Sensory Circuit Formation
Takeshi Imai



Epithelial Morphogenesis
Yu-Chiun Wang



Comparative Connectomics
Kazunari Miyamichi

Developmental Biology and Mathematical Science Program

This program aims to develop a systematic understanding of the complex cellular interactions underlying tissue morphogenesis through quantitative mathematical approaches and the development of computational models of gene expression, signal modulation, and dynamic processes.



Axial Pattern Dynamics
Hidehiko Inomata



Organismal Patterning
Hiroshi Hamada

Technical Development and Supporting Program

This program aims to develop new technologies that meet the research needs of CDB and provide technical support to labs using these technologies.



Single-cell Omics Research Unit
Itoshi Nikaido

Collaboration Centers Program

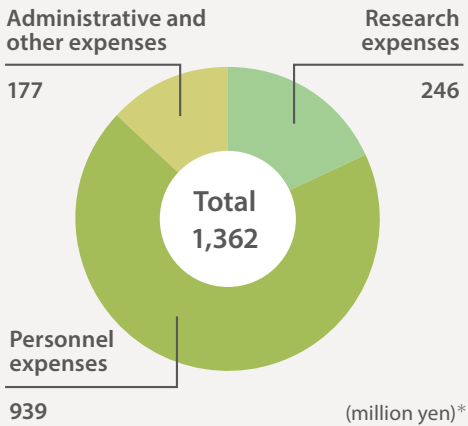
This program aims to facilitate collaborations with industry by pursuing longer term projects in areas related to neurodegenerative and kidney diseases, with a view to develop seeds of innovation that can be translated into practical applications.



**RIKEN CDB–Otsuka Pharmaceutical
Collaboration Center**
Hiroshi Hamada

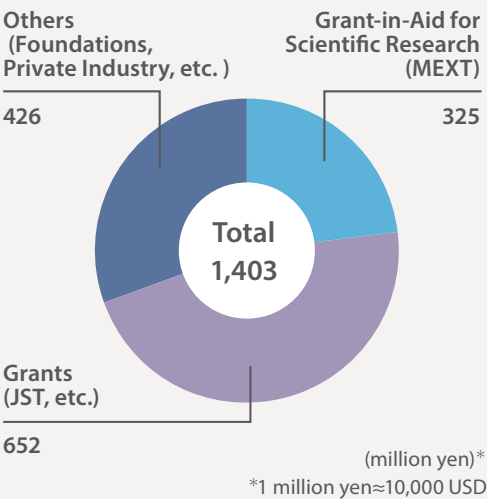
CDB Budget

**From Japanese Government
(FY2017)**



In addition to the dedicated funds outlined above, individual labs and investigators are encouraged to compete for external funding as well, from sources such as the Japan Society for the Promotion of Science (JSPS), the Japan Science and Technology Agency (JST), and other governmental and private sources. These external funds represent a significant component of the Center's total funding every year.

External Funds (FY2016)



CDB Staff Numbers

Laboratory heads	18
Deputy leaders	2
Research scientists	59
Research associates	3
Technical staff	67
Assistants	16
Visiting scientists	141
Student trainees	31
Part-time staff	23
Other	12
Total	372
Kobe Branch administration	85
(as of August 2017)	

Research Environment

World-class facilities and research support

CDB scientists and their collaborators have access to a wide range of state-of-the art research facilities, equipment, and support services onsite, which are jointly managed by the CDB and the RIKEN Center for Life Science Technologies (CLST) also located in Kobe. All facilities and services available on campus are staffed by specialists who are ready to assist researchers when needed. Core facilities include a large-scale animal facility, a research aquarium, light microscopy and electron microscopy facilities, and services for DNA sequencing, genome informatics and proteomics.

Animal Facility

The animal facility on campus is one of the largest in Japan, with nearly 23,000 cages providing capacity to house and care for approximately 100,000 mice and other small animals in a state-of-the-art environment under specific-pathogen free (SPF) conditions. Workspace is available in the facility's clean zone for phenotyping, surgery and micromanipulation. The CLST's Genetic Engineering Team and the Animal Resource Development Unit, both associated with the facility, provide a full range of services related to the generation of experimental mice. They produce transgenic and knockout mice to the specifications of the scientists working on a wide range of projects at reasonable costs, and work to develop new tools and technologies in reproductive biology as well as for bio-imaging to aid in the visualization of mouse development at tissue, cell, and organelle levels. Other services include handling transfer of mouse lines between institutions both domestically and abroad, and colony expansion and cryopreservation of mouse strains.

There is also a smaller-scale facility for small non-human primates, including marmosets and Japanese macaques, used for research in the area of pharmacodynamics and regenerative medicine.



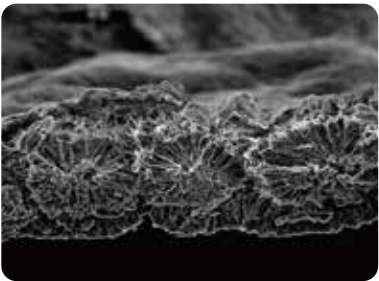
Research Aquarium

The research aquarium on campus houses a number of water-dwelling species used in research of development and regeneration, including zebrafish and the African clawed frog (*Xenopus laevis*) as well as more novel model organisms such as the lamprey and hagfish. The aquarium includes temperature and humidity-controlled rooms that provide optimized environments for handling and breeding both freshwater and marine species. These rooms are also equipped with reverse osmotic technology to maintain consistent tank-water purity tailored to the needs of specific species.



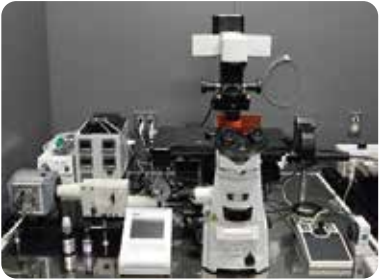
Electron Microscopy Facility

Electron microscopy (EM) is a valuable tool for studying detailed morphology of cell shape and fine subcellular structures. The CLST's Ultrastructural Research Team provides technical support services for scientists on the CDB campus and other RIKEN centers with all procedures related to conventional transmission (TEM) and scanning electron microscopy (SEM). Services include consultations with an expert to determine suitability and effective application of EM techniques for a particular project, sample preparation, operation of equipment, and support in analyzing and interpreting results. They can also provide instruction on use of equipment and sample preparation upon request.



Light Microscopy Facility

Light microscopy is an essential tool for life science research and the RIKEN Kobe Light Microscopy Facility, managed by CLST's Cellular Dynamics Analysis Unit, has over 20 high-end microscope systems available for use by scientists working at RIKEN as well as visitors. Four workstations equipped with a selection of various image processing tools and software are also available for analyzing acquired imaging data. The microscopes and workstations can be accessed at any time of day and can easily be reserved through an online booking system. The facility organizes technical seminars, training sessions, and tutorials throughout the year.



DNA Sequencing and Genome Informatics

The CLST's Phyloinformatics Unit provides a broad range of biologist-oriented support for Sanger and massively parallel sequencing, and genome informatics for scientists working on the campus, while conducting their own original research projects. They strive to create an integrative research support station with active communication between scientists relying on those solutions and the unit's technical specialists and bioinformaticians, and foster modern omics technologies for developmental biology and life sciences being carried out at RIKEN. The unit also organizes hands-on tutorials on various types of sample preparation and data analysis.



Mass Spectrometry for Proteomics

The CLST's Phyloinformatics Unit also provides support for proteomic analysis, such as the protein identification and detection of post-translational modifications by mass spectrometry (LC-MS/MS). Scientists need only submit SDS-PAGE gel slices of the target proteins to the unit, and a technical specialist will carry out the analyses and provide the results within a reasonable period of time. The technical specialist can also discuss and help interpret the results if needed. The unit can also undertake larger-scale shotgun proteome analyses if requested following a preliminary consultation.





Seminars, Meetings, and Symposia

Opportunities for interaction and learning

Scientists working at the CDB have unlimited opportunities for learning and discussing the latest research in fields related to developmental biology, regeneration and regenerative medicine. In addition to seminars and meetings organized at the CDB, its location in the successful Kobe Biomedical Innovation Cluster (KBIC), home to more than 300 research institutions, medical centers, and biotechnology and pharmaceutical industry sites, and close ties with a number of Japan's top graduate and medical school programs provides access to a steady stream of energetic young talent and lecturing opportunities for CDB scientists.

Annual CDB Symposium

The CDB has been holding yearly symposia every spring since the Center opened. The symposia is a three-day event featuring talks by top scientists from around the world, organized around themes of broad interest and relevance to developmental biology and related fields. The CDB provides a limited number of travel fellowships for graduate students and postdoctoral fellows to attend the symposium to encourage the participation and exchange of researchers from around the world at different stages of their career.



Staff Retreats

Research staff gather every autumn for a two-day retreat, designed to allow for open and active discussion of the work being done in all the labs through oral and poster presentations. As with all CDB scientific events, English is the official language spoken at CDB Retreats. There is also a biennially organized RIKEN Joint Retreat open to all members at RIKEN working in the life sciences, which offers CDB researchers the opportunity to meet with researchers working at other RIKEN centers and find new collaborative partners.



Invited and Closed Seminars

The CDB makes special efforts to provide a full and diverse series of invited seminars by scientists from around the world. These invited seminars are open to the local scientific community, including those working in the KBIC. There are also ample opportunities for research staff at the CDB to discuss research ideas with other members of the center through closed seminars, such as the weekly Luncheon Forum intended for researchers and students to present their ongoing work and the CDB Colloquium, held four times a year, featuring talks by CDB lab heads.



Institutional Partnerships

Building networks with the scientific community

The RIKEN CDB has established partnerships with leading universities and research organizations within Japan and abroad to facilitate the exchange of personnel and students, and foster research collaborations.

Partnerships with Japanese Universities

The Center has MOUs with a number of graduate school programs at Japanese universities in the Kansai region, and many CDB lab heads serve as adjunct faculty for one or more of these graduate schools. As part of these agreements, the CDB hosts graduate students in its labs, and also holds a two-day intensive lecture program featuring talks by CDB scientists for which students of partnering institutions may apply for credit.

Kobe University

- Graduate School of Medicine
- Graduate School of Science

Kwansei Gakuin University

- Graduate School of Science and Technology

Kyoto University

- Graduate School of Biostudies
- Graduate School of Medicine

Nara Institute of Science and Technology

- Graduate School of Biological Sciences

Osaka University

- Graduate School of Frontier Biosciences
- Graduate School of Science
- Graduate School of Medicine

University of Hyogo

- Graduate School of Life Science

RIKEN has positions for non-Japanese PhD candidates who are or will be attending a university participating in RIKEN's Joint Graduate School Program, including those listed above, and are interested in pursuing doctoral studies in Japan under the supervision of RIKEN scientists. Successful candidates are designated as International Program Associates (IPAs) and will receive a daily living allowance and have housing costs covered by RIKEN for up to a maximum of three years.

International Affiliations

The CDB has signed partnership agreements with leading institutions around the world to promote the cooperation, collaboration, and scientific exchanges between individual researchers in areas of developmental and regeneration biology, regenerative medicine and related fields.

Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG), Germany

Universitat Pompeu Fabra, Spain

Institute for Research in Biomedicine (IRB), Spain

Center for Genomic Regulation (CRG), Spain

Korean Advanced Institute of Science and Technology, S. Korea

Freie Universität Berlin, Germany

VU University Amsterdam, Netherlands

Chulalongkorn University Faculty of Pharmaceutical Sciences, Thailand



Help Desk

Support services for international research staff

Thinking about relocating to a new country can be an exciting, but sometimes stressful, decision. The RIKEN Center for Developmental Biology makes every effort to assist scientists who are considering coming to work at the CDB through a range of personalized international support services. Special attention is given to the transitional phase, from the time an agreement is reached to come and work in one of the CDB's labs to the first few weeks after arrival, as you settle into your new home. Of course, support is provided on demand to all international staff, and the Center's bilingual research environment means that all lab discussions and administrative communications can be conducted in English.

Help Desk Coordinator

Naoko Yamaguchi, the help desk coordinator at RIKEN Kobe Branch, is the first and in many ways, the most important point of contact for the CDB's non-Japanese staff. With years of experience assisting people with their transition and acclimatization to Japan, she can provide help with everything from apartment-hunting, to visa applications, to locating the best daycare for young children. Completely bilingual and extensively knowledgeable about all the best that life in Kobe has to offer, let her take the work out of the decision-making process for scientists coming to Japan from abroad.



Finding a home

Renting an apartment in Japan can be a challenge. To keep the startup costs and hassle to a minimum, the CDB has an agreement with the public housing authority to allow research staff to rent clean, modern and conveniently located apartments with no security deposit or key money and no requirement for a third-party guarantor—just pay the first month's rent and fire insurance fee in advance. Privately maintained apartments and homes are also available, and the help desk coordinator will help with every step of the process, from visits to prospective homes, the contract signing and moving day.



Learning Japanese

While it is entirely possible to conduct your research and get around town without knowing a word of the Japanese language, many scientists find that knowing even a few key phrases opens new doors of communication and convenience during their stay in Kobe. The Center provides lessons tailored to the needs of beginner, basic and intermediate speakers, free of charge to all CDB staff and their families.



Outside the lab

Life in Japan can be exotic and familiar, peaceful and stimulating—all in the same day. Its rich history, ultramodern urban spaces, its natural beauty and unique culture, all make this a land of unending discovery. The help desk has a wealth of information and references for staff and their families for things to do when not in the lab. Seasonal trips organized for staff to take in Japan's famous cherry blossoms, spectacular autumn foliage and other cultural experiences provide a great way to meet new people and make the most of your life in Japan.



Enjoy Life in Kobe

The city of Kobe sits at the heart of the Kansai region of western Japan, close to both the bright lights of Osaka and Kyoto's tranquility. The local climate is temperate, making it possible to enjoy a range of seasonal activities, all within a short train ride or drive from the city center. Japan's renowned public transport system allows rapid and convenient access to both local and national destinations, and the many area airports, including the Kobe Airport located less than ten minutes from the CDB and the Kansai International Airport, provide immediate gateways to any destination in the world. Costs of living are comparable to those in many major western cities, and comfortable modern homes and apartments are available to suit all budgets.

The bustling heart of Kobe includes a variety of distinct neighborhoods. The downtown area of Sannomiya sits square in the city's center, and its range of international restaurants and late-night bars promises a great evening out any night of the week. The neighboring Motomachi district offers a mix of upscale department stores and funky shopping arcades, standing in contrast to the colorful Chinatown right next door. Just to the north of the city center lies the old foreign settlement of Kitano, whose clapboard houses and well-kept parks are the perfect retreat from the dynamism downtown. Reflecting its heritage as Japan's premier port, a number of shops around the city specializing in imported goods ensure that even creature comforts from back home are readily available.

Nestled between the Rokko mountain range to the north and the shore of the Inland Sea to south, Kobe's unique setting allows for easy access to many natural spots while enjoying the comforts of an urban lifestyle.

A short drive or bus ride takes you to the island of Awaji a popular getaway with its pristine beaches and first-rate seafood, and the many hiking trails crisscrossing the Rokko mountains that span the entire length of the city guarantee a pleasant outdoor excursion. The city is also dotted with parks and rivers that come into bloom at the start of the cherry blossom season, and is home to *Arima Onsen*, one of the oldest hot spring resorts in Japan.

Living and working in Kobe offers a unique opportunity to conduct world-class research and experience an exciting new lifestyle, while enjoying the familiar comforts of home. Come discover why so many of our staff from abroad are calling Kobe one of the best places to live and work in the world.

