

Kawasaki City

Introducing the KING SKYFRONT Innovation Hub



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Kawasaki City: The KING SKYFRONT Innovation Hub for 21st Century Life Science

Adjacent to Tokyo International (Haneda) Airport lies a unique 40-hectare science and technology innovation hub, the Kawasaki INnovation Gateway (KING) SKYFRONT. The mission of this futuristic facility is to find actionable solutions to issues in regenerative medicine, cancer treatment, and the prevention of 'lifestyle' diseases such as obesity. Importantly, the Japanese government has designated the KING SKYFRONT to be a special zone for international competitiveness development, bestowing it special privileges including reduced corporate taxes and government-backed financial support for projects launched there.

"KING SKYFRONT is the first important step in establishing the Tonomachi area of Kawasaki City as Asia's Silicon Valley," says Nobuhide Kobayashi, executive director of the Coastal Area International Strategy Office, Kawasaki City. "We are confident that the easy access provided by Haneda Airport, in conjunction with the excellent research and development infrastructure, will form the basis for unprecedented business opportunities growing out of innovative science, medicine, and technology." Kobayashi has reason to be confident. Kawasaki City, with its 1.4 million inhabitants, is already home to many blue chip companies including Aji-

nomoto, Toshiba, Fujitsu, and NEC as well as other global brands that have played a central role in the growth of Japan's economy over the last century.

The KING SKYFRONT is at the heart of the Keihin Industrial Region, encompassing areas of Tokyo and Kanagawa Prefecture, and Haneda Airport. This location offers unprecedented land, sea, and air access to cities within Japan, and the international airport connects the area to Asia, North America, and Europe. "Life science is one of the strategic areas for KING SKYFRONT," says Kobayashi. "We envisage that visiting scientists, medical doctors, and business people will be able to arrive at Haneda in the morning, go directly from the airport to KING SKYFRONT, participate in meetings, and return to their country on an evening flight."

In addition to the excellent technological infrastructure and access, KING SKYFRONT is located within commuting distance of international schools and medical clinics run by English-speaking clinicians—important factors to consider for creating long-term collaborations with overseas partners.



Kazunori Kataoka

Launch of the innovation Center Of Nanomedicine

The innovation Center Of Nanomedicine (iCON) is set to be the flagship of the KING SKYFRONT development. With government startup funding of approximately ¥3.5 billion (US\$34.7 million), construction on the project is due to start in 2013, with a formal launch in 2014. Re-

search at the center—carried out by groups from academia, industry, and government—will address such diverse issues as the medico-economic impact of aging populations, curbing the increasing cost of medical care, improving point of care treatment, and establishing new medical markets in developing countries.

Translation of research ideas to the marketplace and fabrication/manufacture are two of the main strategic pillars of the center, emphasizes Professor Kazunori Kataoka of the University of Tokyo, who will be director of research in nanomedicine at the center. "The KING SKYFRONT will offer an open-innovation approach to meet our targets," says Kataoka. "The proximity of Haneda Airport, the availability of clean rooms and related infrastructure for nanofabrication, industrial participation, and professionals to advise on the commercial aspects of research are essential ingredients for taking creative ideas from the laboratory to the marketplace. KING SKYFRONT can be viewed as a highly condensed version of Silicon Valley."

Kataoka is no stranger to big ideas and translational research, having launched the company NanoCarrier in 1996 to commercialize nanosized micelles for targeted drug delivery for the treatment of cancer and other

intractable diseases. Notably, NanoCarrier is listed on the *Mothers* (market of the high-growth and emerging stocks) section of the Tokyo Stock Exchange and valued at ¥100 billion (US\$985 million).

Underscoring Kataoka's internationally recognized contributions to innovative research in nanobiotechnology, he recently received support from Japan's prestigious national Funding Program for World-Leading Innovative Research and Development on Science and Technology (FIRST) program. With funding of ¥3.6 billion (US\$35.7 million) over five years, Kataoka's team will address the following topics: (1) Treatment of cancer stem cells using targeted drug delivery systems in which nanometer-sized drug carriers are able to selectively bind to cancer cells; (2) Treatment of neurological diseases such as Alzheimer's disease using functionalized micelles capable of passing through the blood-brain barrier; (3) Development of nanovaccines that can be stored for long periods of time at room temperature; (4) Fusion of drug delivery platforms with medical devices for minimally invasive "chemical surgery"—such as ultrasonic waves that activate drugs at specific places in the body—to reduce the length of hospital stays for patients; and (5) Development of point-of-care diagnostic devices, such as the use of portable nanofabricated systems to detect microRNAs and specific enzymes.

Kataoka emphasizes the importance of what he calls 'smart healthcare.' "Reducing the time a patient stays in hospital would be a tremendous contribution to society. I am confident that research at iCON can achieve this." As an example of how nanomedicine may eventually be used by millions of people, Kataoka describes the development of the advanced technology necessary to produce hybrid cars. "These cars require a lot of expensive technology. But mass production has enabled cost reductions to within the price range of millions of people worldwide. I predict a similar scenario for nanomedicine."



Artist's Impression of the innovation Center Of Nanomedicine (iCON)



Hiromichi Kimura



Tomohiro Anzai

Participants in the innovation Center Of Nanomedicine include:

Academia and National Institutes

The University of Tokyo
Tokyo Institute of Technology
Tokyo Women's Medical University
National Cancer Center (Tokyo)
Central Institute for Experimental Animals
Keio University (Tokyo)

Stanford University (USA)
Karolinska Institutet (Sweden)

Industry

Fujifilm Corporation
Nikon Corporation
NanoCarrier Co., Ltd.

“We will not only have people from different academic backgrounds but there will also be people from industry as well as government administrators.” —Hiromichi Kimura

From Lab to Market

Technology transfer at iCON will be managed by two professors from the University of Tokyo: Hiromichi Kimura, in charge of Pharmaco-Business Innovation at the Graduate School of Pharmaceutical Sciences, and Tomohiro Anzai, a member of the Translational Research Initiative.

Kimura's academic background is in biochemistry. After graduating from the University of Tokyo, he joined a major life sciences-based company in Japan before moving to the U.S. to complete an Master of Business Administration and Ph.D. at Stanford University. “I now have my own consultancy company as well as the post at the University of Tokyo,” says Kimura. Anzai is also a graduate of the University of Tokyo where he trained as a molecular biologist. He spent some time at a consultancy company, because he “was interested in the commercialization of research ideas,” before joining KING SKYFRONT. Anzai also works with the University of Tokyo Hospital on technology transfer.

Kimura and Anzai stress that the interdisciplinary nature of the projects at KING SKYFRONT and iCON will require good communication skills between project members. “We will not only have people from different academic backgrounds but there will also be people from industry as well as government administrators,” says Kimura. “Our biggest challenge will be to formulate ways to ensure that physicists, medical doctors, and chemists can communicate with investment bankers, lawyers, and patent attorneys. They may speak different languages, but they have the same goal of making iCON a success.”

Laying the Foundations for a Global Innovation Hub

The Central Institute for Experimental Animals (CIEA)—internationally recognized for research on the use of induced pluripotent stem cells for the treatment of spinal cord injuries and Alzheimer's disease—was the first major research institute to move to KING SKYFRONT, transferring its facilities in July 2011.

March 2013 saw the opening of the Life Science and Environment Research Center (LiSE) to promote collaborative research in the life sciences, and consisting of a multipurpose facility housing laboratories from both Kawasaki City and the private sector.

In 2016, the Japanese National Institute of Health Sciences (NIHS) will move from Tokyo to the KING SKYFRONT. The NIHS plays a central role in regulatory science in Japan and at KING SKYFRONT it will establish global standards for new drugs and medical technology developed by researchers there.

KING SKYFRONT has attracted attention from overseas companies including Johnson and Johnson, which will establish an R&D and training center onsite.

“The world's life sciences community will continue to ‘organically’ lay the foundations for a global innovation hub for research,” says Kobayashi. “It's an exciting time at Kawasaki City as KING SKYFRONT evolves into a global base for research in the 21st century.”





Location of KING SKYFRONT

Convenient access to Haneda Airport (Tokyo International Airport)

Access to KING SKYFRONT

By car: 10 minutes from Haneda Airport

By train: 10 minutes from Kawasaki Station, 30 minutes from Tokyo Station, 75 minutes from Narita Airport

Thanks to its convenient location, you can enjoy a wide range of comfortable amenities close by, including residences, education, shopping, cultural attractions, and medical care.

Support for Companies and Institutes

Due to its designation by the government as a Special Zone for International Competitiveness Development, special benefits are available, including:

- Favorable tax treatment
- Financial support
- Exemptions from certain local regulations.

Additionally, generous assistance is available for startups and small- and medium-sized businesses in the form of incubation facilities and business matching services.

Attractions in Kawasaki City

Many exciting music, art, sports, nature, and shopping attractions are available throughout the city.

Music & Art

MUZA Kawasaki Symphony Hall
Montreux Jazz Festival in Kawasaki
Taro Okamoto Museum of Art
Japan Open-Air Folk House Museum

Sports

TAMA River Run Festa
Kawasaki Frontale (The city soccer club)

Nature

Tama River
Ikuta Ryokuchi Park

Shopping

Lazona Kawasaki Plaza
LA CHITTADELLA

