

National Cancer Center (NCC) at Kashiwa-no-ha Smart City

World-leading Cancer Drug Discovery Ecosystem in Japan



May 2023

WASHINGTON | CORE

Washington CORE recently had the opportunity to meet with Dr. Toshihiko Doi of the National Cancer Center (NCC), a leading force in cancer research and treatment in Japan, on the sidelines of the 2023 American Association for Cancer Research (AACR)¹ conference in Florida. Dr. Doi shared his thoughts on NCC's vision, and their participation in an ongoing US-Japan collaboration on translational research areas, working together to accelerate clinical success from their research efforts.

What is the background of NCC?

The National Cancer Center (NCC) has long been considered one of the leading health care and research organizations in Asia. With two campuses, Tsukiji and Kashiwa, NCC has attracted researchers and patients from around the world. NCC's campuses are unique in that the hospitals and research facilities are within walking distance of each other, resulting in unusually close clinical and research collaborations between the two. The world-renowned Higashi Hospital and the cutting-edge Exploratory Oncology Research & Clinical Trial Center (EPOC) are both located at the Kashiwa campus.

What is Kashiwa-no-ha Life Science Frontier?

Kashiwa-no-ha (Oak Leaves) Smart City hosts such esteemed academic institutions as the University of Tokyo, Chiba University, and the National Institute of Advanced Industrial Science and Technology (AIST), as well as many startups and small businesses. Kashiwa-no-ha Smart City is the brainchild of Japanese real estate developer Mitsui Fudosan, who envisioned a digital-data-driven innovation hub -- "an advanced urban development project through collaboration of public, private, and academic institutions." Life science, mobility and energy are the 3 focus areas of Kashiwa-no-ha Smart City, and the life science campus area is known as Kashiwa-no-ha Life Science Frontier, which aims to accelerate the transition from clinical research to treating patients.

The opening of the Mitsui Garden Hotel Kashiwa-no-ha Park Side, adjacent to NCC Higashi Hospital, illustrates efforts to make the city a comprehensive life science hub. The hotel has made it easier for patients and families to receive advanced medical care and to monitor their condition using wearable devices. Outside researchers can stay at the hotel while conducting collaborative work with the physicians and scientists at Kashiwa-no-ha research facilities.

NCC's facility is compact, enabling closer collaborations between "clinical" and "research" sides. Patient specimens can be transferred from hospital collection sites to the laboratory for analysis in as little as a minute, resulting in higher quality data. NCC also has a capability to analyze cells at the molecular level and to create images of high-quality clinical specimens.

Kashiwa-no-ha Smart City also plans to launch a funding mechanism to nurture startups and research activities. While being a government entity, NCC's ability to pursue private funding to invest in internal research is limited, Kashiwa-no-ha Smart City is working with local companies to set up a venture capital fund to invest in startups. With its first-class lab space, NCC's hospitals and research facilities, and premier institutions, Kashiwa-no-ha could serve as a new ecosystem model for medical research and healthcare in Japan.

Japan is now investing in state-of-the-art technologies such as single-cell sequencing and spatial transcriptome analysis to "visualize" cancer cells and "analyze" cancer micro-environments. The work is expected to help support the discovery and development of new drugs. Recently, Mitsui Fudosan built an open-space laboratory that will be equipped with the latest equipment, which will provide new opportunities to conduct R&D using high-quality specimens and a state-of-the-art analysis platform, all on site.

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What are some of the recent notable medical innovations coming out of Japan?

Japan is accelerating its efforts to be a leading innovator in the health care and life sciences field and has been active in conducting first-in-human trials, where drugs are administered to humans for the first time. Japanese companies are also deeply involved in developing sensors for single-cell sequencing and other technologies that look at spatial

and temporal axes. NCC often receives inquiries from overseas researchers and companies about using similar technologies and collaborating with NCC.

In addition, Japanese antibody-drug conjugates (ADCs) – a class of antibodies and anticancer drugs designed as a targeted therapy for treating cancer, previously referred to as “missile therapy” - are now available for use in patient care. One example is Daiichi Sankyo Pharmaceutical's Enhertz, which is a very successful new-generation ADC.²

Japan is also a major innovator in the medical equipment field. For example, there are plans to develop applications such as nuclear isotope medicine using a test research reactor.³ It will be built on the site of the “Monju”, a fast breeder reactor (FBR) which is being decommissioned. Another technology developed in Japan is endoscopic mucous membrane resection used for early cancer treatment.⁴ The world’s first equipment for proton beam therapy was developed at Kashiwa-no-ha Smart City. It is also home to an organization specializing in medical devices called the "NEXT Medical Device Development Center," which is well equipped to collaborate with foreign research centers to develop medical technology and devices.⁵

What are the characteristics and challenges of cancer research in Japan and how do you collaborate with the U.S.?

Collaboration between US and Japan in cancer research is important. It is necessary to compare research results as the types of cancers that tend to afflict Americans and Japanese are different and the efficacy of drugs is also different. NCC is participating in a U.S.-Japan joint project as part of the United States’ National Cancer Institute (NCI)’s ‘Cancer Moonshot’ program "make the world a place where people can live 100 years with immunity," led by Dr. Hiroyoshi Nishikawa. Collaboration between two countries will facilitate the discovery new targets and drugs which will eventually contribute to the cancer research and cure on a world level. While many Japanese students study abroad, some international students have recently started to come to study in Japan too. NCC hopes to see more partnerships built, not only between Japan and the US, but also with the rest of the world.

Japan is ready to show its capability to undertake "translational" innovation - translating basic research into clinical practice, developing new marketable drugs, and implementing technologies and treatments developed from research at the bedside. Japan’s new innovation model that integrates "research" and "clinical practice" by leveraging manufacturing capabilities and abundant human resources has begun to take shape.



Dr. Toshihiko Doi

Dr. Doi is the Head of the Department of Advanced Medical Development at NCC Hospital East, the Head of the Center for Promotion of Translational Research (CPOT). He is the leader of the Exploratory Oncology Research & Clinical Trial Center (EPOC) at the National Cancer Center (NCC)⁶, the leading the cancer treatment research institution in Japan.

Endnote

¹ <https://www.aacr.org/>

² https://www.daiichisankyo.com/media/press_release/detail/index_3140.html

³ <https://www.3.nhk.or.jp/news/fukui/20230324/3050014273.html>

⁴ https://www.onaka-kenko.com/endscope-closeup/endoscopic-therapy/ep_06.html

⁵ https://www.ncc.go.jp/en/nccce/specialist_ctr_depts/NEXT_Medical_Device_Innovation_Center/index.html

⁶ <https://www.ncc.go.jp/en/epoc/about/greeting/index.html>

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Author



Chiyo Kobayashi,
Co-CEO



Yuki Shinzaki,
Research Associate