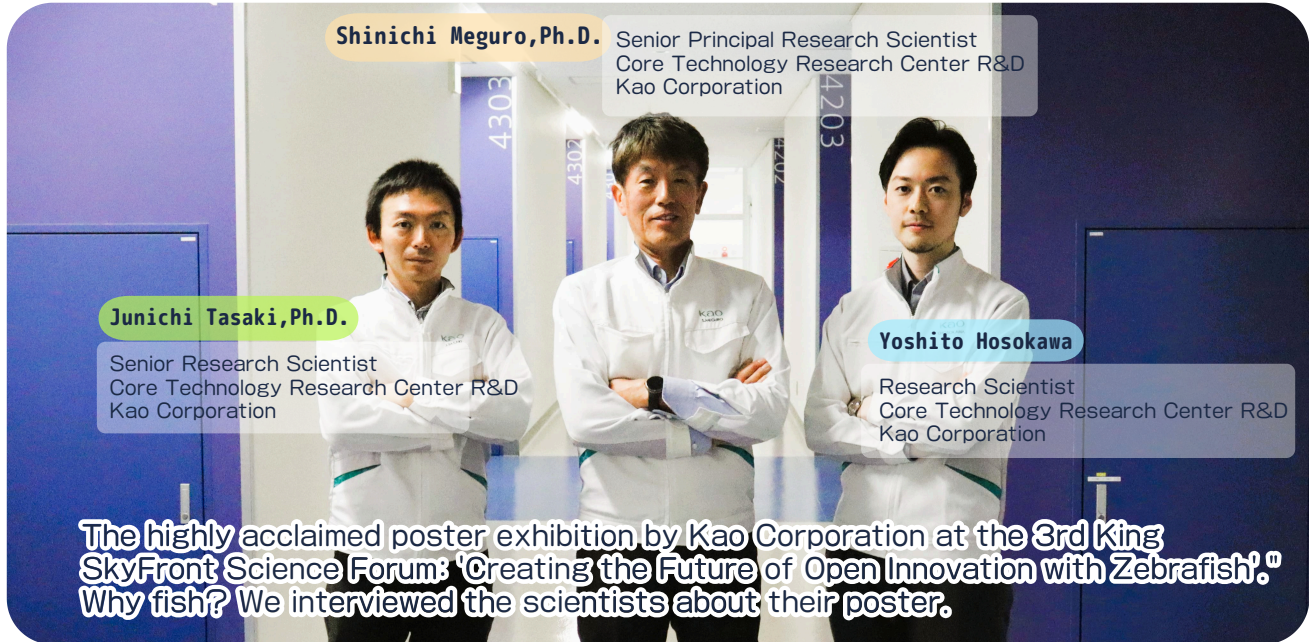


Wonder of Zebrafish

- Interview with Kao scientist



First, could you tell us why you chose to establish your base in King SkyFront?

Tasaki

In today's world, if you would like to create innovation, it is important to collaborate closely with scientists from different fields and academic backgrounds. Our research center is based in Tochigi, so it has not always been easy to take part in research events and collaborations which are usually held in central Tokyo. One of the advantages of King SkyFront is its location—close to numerous companies, universities, and research institutions, as well as its excellent accessibility from Kansai and abroad via nearby Haneda Airport. We wanted to engage in face-to-face discussions with a diverse range of people and to advance our research through direct interaction, so we decided to set up our lab here.

How was your experience presenting the poster at the forum?

Hosokawa

It was the first time for Kao to participate in the event, but was a valuable opportunity to engage in open communication with researchers from academia and companies in a wide range of fields. Some of the other posters offered fresh perspectives, especially those focusing on local communities—topics that are rarely seen at academic conferences. That made me realize the potential for contributing to regional development through research.

Meguro

At academic conferences, the participants usually come from closely related fields, but what makes the Science Forum unique is the diversity of its participants. We received feedback from people with vastly different perspectives, and I found it fascinating — it made me realize, "Ah, so that's one way to interpret this data," or "That's what caught their interest."

Why Zebrafish?

Meguro

I took the lead in launching this research. Before I started my work with zebrafish, I engaged in foundational research and development in health sciences. I helped to launch edible oils and tea-based beverages approved as FOSHU (Foods for Specified Health Uses) in Japan. I took pride in believing that I had contributed to the company's success. At the same time, as a research institute, we are always looking ahead to what is next. At the time, the trending keywords were things like metabolic syndrome, locomotive syndrome, and cognitive function. Since many companies are already focusing on this field, simply doing the same things would not lead to innovative technologies or products. That is when my boss gave me the green light saying, "If it's something interesting enough to surprise me, go ahead and do whatever you like!"

That is when I came up with the idea of creating the foundational technologies and value of a product from a new angle, which eventually led me to focus on the use of zebrafish as a model organism.

As Kao offers many products for daily use, it is especially important to take an in-vivo approach that looks at the whole-body physiological state. Rodents such as mice are commonly used as model organisms, however as we began conducting research using zebrafish, we discovered many advantages that rodents do not offer. You might think fish are nothing like humans, right? But in fact, they share more similarities than you would expect.



Image provided by Kao Corporation

In what respects are they similar to humans?

Hosokawa

For example, in terms of sleep, zebrafish are also diurnal organisms like humans. The regulatory mechanisms of sleep conserved between humans and zebrafish are gradually being uncovered. One of the strengths of using zebrafish is that we can directly assess potentials of drugs and extracts by behavioral changes, like sleeping and waking, which helps us efficiently pinpoint materials that “truly have an effect.”



Meguro

In fact, the first research theme we undertook using zebrafish was research on obesity prevention. We were surprised when we obtained data showing that a tea extract containing catechins could reduce visceral fat (Note 1). Given that exercise is widely recognized as effective in combating metabolic syndrome and locomotive syndrome, we also began developing a zebrafish “Exercise Physiology Model” (Note 2). By increasing the water flow and encouraging the fish to swim more vigorously, we confirmed enhanced muscle development and we are also beginning to see evidence that exercise may improve memory and learning functions.

Applications in health maintenance and sports are anticipated. I heard the individual ID method is the first in the world—is that right?

Meguro

When we were studying whether tea extracts could reduce visceral fat, we had to tell which zebrafish had lost weight and which had gained it. One of the colleagues had an idea: we made a custom tank that let us line up each fish sideways and used a high-speed camera to film them. We discovered that the stripes on their tail and anal fins are different for every fish, like fingerprints—and they do not change, even after a month or two. You might think all zebrafish have the same pattern, but they do not!

Hosokawa

Methods of individual identification commonly used in mice and rats are not suitable for zebrafish. This is because zebrafish have a remarkable regenerative capacity and the marks disappear over time. That is why this kind of identification method is particularly useful for zebrafish. We have obtained an international patent for this method and recently published our findings in a scientific journal (Note 3).

Meguro

In addition, this method has the advantage of eliminating the stress on animals caused by marking. It allows for identification without causing any stress to the animals.

I can feel your affection for the zebrafish. Do you ever give each of them a name?

Meguro

No, I didn't go so far as to call them ‘○○ chan’ or anything like that(laughs). At the time, my child was starting to become more independent, slowly needing me less. Meanwhile, the zebrafish would still turn toward me every time I opened the tank. I found that oddly comforting.

Toxicity assessment was also introduced, which is an essential aspect when dealing with products we use in our everyday lives, isn't it?

Tasaki

Since Kao products are used by people of all ages, we place significant importance on ensuring customer safety in our R&D. In the field of safety assessment, there has been a significant shift away from animal testing. We started exploring zebrafish embryos as an alternative toxicity model back in 2017. At that time, Meguro and Hosokawa had already established the breeding techniques and genetic tools we needed, which enabled us to rapidly advance the research. Because the developmental process of zebrafish embryos is like that of mammals, including humans, toxicity in humans can be predicted by exposing fertilized zebrafish eggs to chemical substances and observing the resulting effects. In humans and other model animals, it is not possible to directly observe internal development. But fish eggs are transparent, allowing us to monitor the developmental process in real time. If we see any effects, we interpret them as potential signs of toxicity—not just for the fish, but for humans as well. This research started with the observation of neural crest cells, which play a key role in forming the ‘face’—a nod to the origin of our company name, Kao (meaning ‘face’ in Japanese) (Note 4). Today, our work has expanded to evaluating developmental toxicity in the heart, nervous system, and blood vessels (Note 5).



Could you tell us what the goal of this research is?

Hosokawa

We really hope to continue contributing to society through the power of science and biology. In Japan, zebrafish research has been driven by academia, and its industrial application is still in its initial stages. At Kao, however, we have accumulated over 15 years of experience since Meguro began this line of study, and we hope to give back to society by sharing the knowledge we have gained.

Meguro

We hope to connect the zebrafish research we have done to the development of new products. To achieve this, we especially want to share the excitement and value of this study with many people in the industry. I have continued this work because I enjoy it, and along the way, I have been discovering more fascinating things. When I gave my talk at the Science Forum, I was happy to see that people from other companies were more interested than I thought. It made me confident that what we have been doing is on the right path.

Tasaki

I hope this technology will contribute to a better understanding of diseases and support its application in patient care. It is my sincere hope that it can help those suffering from undiagnosed or unexplained conditions.

Note 1 : Hasumura et al., Nutrition & Metabolism 2012; Meguro et al. PLoS ONE 2015

Note 2 : Hasumura and Meguro Journal of Comparative Physiology B 2016

Note 3 : Meguro and Hasumura PLoS ONE 2024

Note 4 : Liu et al., Toxicological Sciences 2023

Note 5 : Liu et al., Toxicological Sciences 2025

Find more about the research here ►



About KING SKYFRONT Science Forum 2024 ►



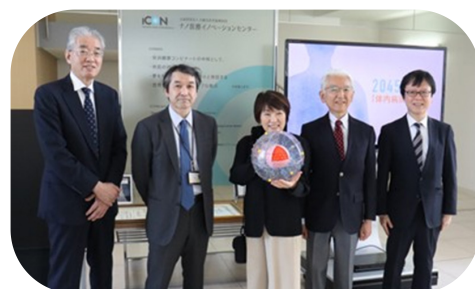
Visit by Minister of Education, Culture, Sports, Science and Technology (MEXT), Ms. Toshiko Abe

On April 21, Minister of Education, Culture, Sports, Science and Technology, Ms. Toshiko Abe, visited King SkyFront, where she toured the Innovation Center of NanoMedicine (iCONM) and Central Institute for Experimental Medicine and Life Science (CIEM). At iCONM, an overview of research on smart nanomachines and in-body hospitals system was presented, as well as an introduction to "Project CHANGE," which promotes collaboration among medical, engineering, and nursing.

At the Central Institute for Experimental Animals (CIEA), explanations were given during a lab. tour on how the institute contributes to medicine and medical research through advanced technologies such as laboratory animal development, pathology, and image analysis.

Through this visit, Ms. Toshiko Abe expressed high expectations for the creation of new outcomes through open innovation.

For more details ▶



US Maryland Business Seminar was held

On April 15, the US Maryland Business Seminar, hosted by Kanagawa Prefecture, was held at Shimadzu Tokyo Innovation Plaza.

Kanagawa Prefecture has an Agreement on Friendship and Cooperation with the State of Maryland and in 2014, a Memorandum of Understanding (MOU) was signed to promote collaboration in the life sciences sector.

This MOU was recently updated to further strengthen the partnership, with the addition of the healthcare field, including the concept of ME-BYO (pre-disease conditions).

At the seminar, Governor Wes Moore highlighted Maryland's strengths in the life sciences industry. In addition, representatives from Shimadzu Corporation and Reprocell Inc., both of which have operations in the state, gave presentations on the appeal and advantages of doing business locally.

For more details ▶



Future kitchen!? Real Cultured Meat Created with a 3D Printer - 'Home-Made Marbled Meat' is exhibited at the Osaka-Kansai Expo.



Image provided by
Consortium for Future Innovation by Cultured Meat

Shimadzu Corporation is participating in Expo 2025 Osaka, Kansai as a member of the Consortium for Future Innovation by Cultured Meat and is co-hosting an exhibit featuring real cultured meat and a concept model of the "Meat Maker" utilizing 3D bioprinting technology at the Osaka Healthcare Pavilion.

The concept of this exhibition is "From 'store-bought meat' to 'homemade meat.'" The exhibition expresses the image of the "future kitchen" in which "everyone has a meat maker in their home that can create marbled steaks tailored to the health and preferences of the individual consumer.

Shimadzu Corporation is responsible for advancing peripheral technologies, including the automation of 3D bioprinting, analysis and evaluation of the flavor and aroma of cultured meat, analytical techniques related to the culturing process, development of culture media suitable for automated production, tissue formation and maturation, as well as monitoring and feedback of the cultivation process. Do stop by and enjoy the "Kitchen of the Future" experience when you visit EXPO. Shimadzu is also showcasing its products and technologies at other pavilions, so please check them out as well.

For more details ▶



Image provided by Goldilocks Inc.

In full swing! Tonomachi drinks!

On May 28, "Tonomachi drinks! Vol.4" was held at HARENOSOB. This event is planned and organized by DAIWA LIFENEXT Co., Ltd. with the aim of interaction among people working at King SkyFront. Since its first event in October 2024, it has been well received, and it has now reached its fourth round. This time, many new members who joined in the spring participated, creating a lively atmosphere at the venue throughout the event. There is also a unique rule of toasting with people you meet for the first time, which naturally sparks conversations. This event is easy to drop by after work and provides a perfect opportunity to build new connections in a relaxed atmosphere. We look forward to seeing you at the next event!

School of Health Innovation Kanagawa University of Human Services has been designated as a WHO Collaborating Center.

School of Health Innovation (SHI) Kanagawa University of Human Services, a public university corporation, was designated as a WHO Collaborating Center by the World Health Organization (WHO) on March 26, in recognition of its ongoing educational and research activities in public health related to preventive care and healthy longevity.

[Name of the Designated Organization]
WHO Collaborating Centre for Innovations in Healthy Ageing

Activities

- (1) Policy Research
Conducting policy research and publishing academic papers on healthy ageing, including initiatives related to age-friendly cities.
- (2) Human Resource Development
Nurture future leaders who will promote healthy ageing in various countries and regions through seminars and the implementation of entrepreneurship education.
- (3) Public Awareness and Outreach
Global dissemination of the outcomes of healthy ageing initiatives implemented in Kanagawa Prefecture.

Kanagawa University of
Human Services



WHO Collaborating Centre
Innovations in Healthy Ageing

For more details ▶



Notice of Company Name Change –ONODERA GT Pharma, Inc.

On March 28, Gene Therapy Research Institution Co., Ltd. changed its company name to ONODERA GT Pharma, Inc.

Representative Director & CEO Yosuke Sakuma
※Management Team → <https://www.onodera-gtp.com/en/about/>

New Official Website : <https://www.onodera-gtp.com/en/>

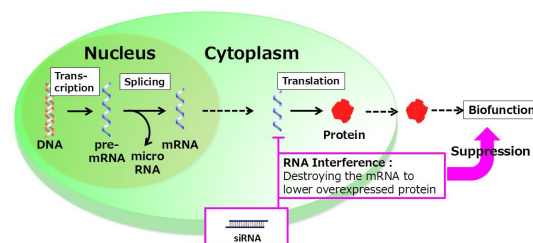


iCONM NOW Expectations for the Treatment of Refractory Cancer and Intractable Diseases Using siRNA

Organisms maintain homeostasis through a mechanism where specific proteins play key roles by fitting into corresponding "keyholes" within the body. A disease occurs when the increase or decrease of these functional proteins cannot be properly regulated for some reason. For example, knee osteoarthritis, which causes knee pain and walking difficulties in the elderly people, is a condition that arises from an imbalance between bone resorption (the action of osteoclasts breaking down roughened bone surfaces) and bone formation (the action of osteoblasts creating new bone and smoothing the surface) in the knee joint, which is worsened by aging. Since the proteins that promote bone formation decrease with age, it has been confirmed in mice that joint regeneration can occur by replenishing the mRNA that produces these proteins. Conversely, in the case of "cancer," tissues enlarge due to the excessive production of growth factors (proteins that promote cell division and tissue proliferation) caused by genetic mutations, which are normally produced in minimal amounts in healthy cells. Therefore, drugs that suppress these growth factors are being developed as anticancer agents. Organisms have a mechanism to prevent the excessive production of specific proteins by degrading surplus mRNA. This phenomenon, known as RNA interference, was awarded the Nobel Prize in Physiology or Medicine in 2006. siRNA (small interfering RNA) is a short double-stranded RNA consisting of 21-23 base pairs that plays a central role in this process, allowing for the targeted degradation of specific mRNA by designing its sequence.

On May 1st in this year, iCONM entered into a joint research agreement with TOA Gosei Co., Ltd. The company has technology for rapidly and accurately designing siRNA, but a key challenge remains: developing a method to deliver the unstable siRNA to target tissues in a stable form. Initially, we plan to create siRNA pharmaceuticals targeting refractory breast cancer and aim to start clinical trials within five years.

Reference: Collaborative Press Release from Toagosei Co., Ltd. and iCONM ▶



How RNA interference destroys mRNA and suppresses physiological effects
©Miyata Lab, Graduate School of Engineering, University of Tokyo

This magazine shares a variety of information about King Skyfront-affiliated institutions. Please send us your feedback via the QR code survey. Additionally, please send inquiries regarding news publication requests to the email address below.

Date of issue : July 17th, 2025

Publisher : TONOMACHI LifeScience Cluster Division, Kawasaki Institute of Industrial Promotion

Email : pr-ksfcl@kawasaki-net.ne.jp

