

Special Feature 2

Three Intellectual Resources Resonate at Shimizu Where Kumiai Was Founded Chemical Research Institute Shimizu Innovation Park (ShIP)

The Chemical Research Institute ShIP is the latest, cutting-edge research institute in Shimizu-ku, Shizuoka Prefecture, integrating Kumiai's three Chemical Research Centers (New Molecule Research Center, Formulation Technology Research Center, and Process Chemistry Research Center), which were previously scattered at different locations in Shizuoka Prefecture. The concept of ShIP consists of the following five points: (1) an environment for imagination and free thinking, (2) an environment for tireless improvement of technological capabilities and challenge, (3) shared innovation, (4) a safe, secure, and comfortable working environment, and (5) enhancement of the brand image. We believe that the ideas of researchers in different fields gathered in a single space will resonate, generating diverse innovations. Our expectation is that ShIP will be a venue for creation of new technologies and new businesses that transcend the boundaries of agricultural chemicals and fine chemicals. The integration project started in 2018 and ShIP began full-scale operation in October 2023.



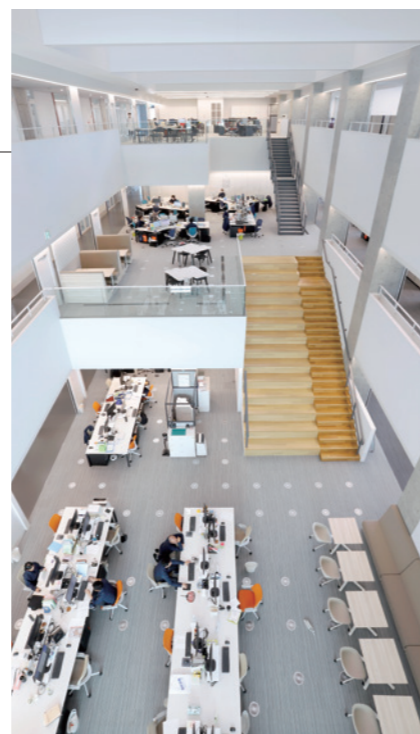
ShIP's Role

ShIP, along with the Life Science Research Institute, is the core of Kumiai's research and development. In collaboration with the Life Science Research Institute, ShIP is engaged in research on creation and development of new agricultural chemicals and is studying how best to achieve their stable production. Moreover, ShIP will take on the challenge of expansion of business domains by expanding research areas beyond agricultural chemical research to include biostimulants and the development of greenhouse gas emissions reduction technology. Furthermore, ShIP is taking the lead in research on fine chemicals and aims to contribute to realization of a prosperous society through the use of Kumiai's proprietary technologies and new technologies.

A Sustainable Research Institute That Promotes Communication

With the start of operation of ShIP, researchers who previously worked at different centers with different facilities and specialties now conduct their research in one building. We expect that the researchers from the three research centers will interact, transcending their specialty fields, and this broad and deep mixing of human capital will lead to a stream of innovations. To promote interactions among researchers in different research fields, ShIP has strategically placed spaces connected by an atrium and grand staircase, meeting rooms with an open atmosphere, and a cafeteria.

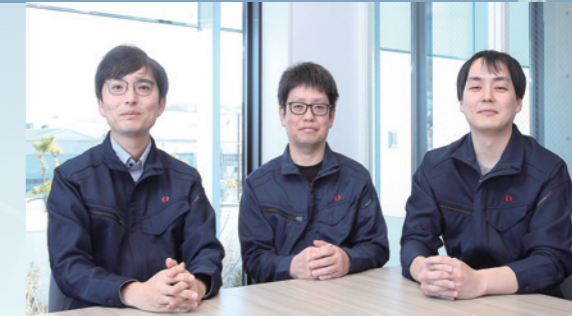
By improving the research environment, a safe, secure, and comfortable workplace has been realized. Laboratories are equipped with cutting-edge equipment and energy-efficient low air draft chambers to improve both experimental efficiency and to ensure a safe working environment for researchers through the use of ICT. Specifically, ShIP features laboratory equipment networked in a wireless LAN environment extending throughout the entire building, electronic lab notebooks have been adopted, and a reagent management system has been introduced. Also, there is a web conferencing system and a range of different meeting spaces are available. We believe that the latest cutting-edge laboratory equipment in a new research institute will enhance our researchers' motivation.



Strengths of Kumiai from the Viewpoint of the Researchers

Researchers of Research & Development Division

- Research Manager, Herbicide & PGR Discovery Laboratory, New Molecule Research Center **MURAKAMI Seiya** (middle)
- Research Manager, Manufacturing Process Research Laboratory, Process Chemistry Research Center **ABE Takashi** (left)
- Senior Researcher, Fungicide & Insecticide Formulation Laboratory, Formulation Technology Research Center **OKADA Yuya** (right)



Role of Research Centers

MURAKAMI The main task of the New Molecule Research Center is to create physiologically active compounds that will be the seeds of active ingredients for agricultural chemicals. Initially, compounds are synthesized based on the findings, ideas, and inspiration of each researcher. If any positive results are found, a team will be created to conduct further research to explore highly active and safe compounds. Researchers find their research themes by such means as referring to patent information, papers, etc.

ABE The Process Chemistry Research Center develops optimal manufacturing processes for active ingredients created by the New Molecule Research Center. With an eye to factory production, we will establish a high value-added, environmentally-friendly manufacturing process suitable for upscaling and create a process that ensures safe manufacturing at factories. Specifically, we are working on the creation of world's first, innovative new reactions and the development of new catalysts that can achieve such a process, as well as research with an eye to upscaling factors to ensure stable yields and quality in the transition from laboratory to factory.

OKADA The Formulation Technology Research Center designs formulations to maximize the effects of the active ingredients by considering how the agricultural chemicals will be used and how they will actually work in the fields and croplands. The Formulation Technology Research Center has a wide range of roles, ranging from creating formulations of active ingredients to product development and through to follow-up of production at the formulation factory. The crops for which I am responsible are diverse, including rice, vegetables, and fruit trees. In order to achieve both ease of use and maximization of the effects of the active ingredients, we develop formulations suitable for each situation by devising secondary ingredients.

Kumiai's Strengths in the Eyes of the Research Centers

MURAKAMI Kumiai's strengths are the diversity of our researchers, the atmosphere of freedom that encourages us to explore new paths, and the closeness to biological evaluation. The Life Science Research Institute is working closely with the New Molecule Research Center from the early stages of chemical discovery themes and supports the various aspects of chemical discovery research.

ABE The researchers are excellent and capable of working at a high level. In addition, we have a full range of facilities and laboratory equipment. As in the case of ShIP, Kumiai invests vigorously in R&D, and so I think we are agile in terms of development speed.

OKADA I think Kumiai's strength is that it can handle everything from chemical discovery and process chemistry to formulation

with a view to commercialization. I sometimes attend chemical discovery meetings and provide opinions from the viewpoint of the Formulation Technology Research Center. As we have people with diverse backgrounds who see things from many different perspectives, the range of ideas generated is impressive.

MURAKAMI Another strength of Kumiai is the knowledge we have accumulated over the years. The database allows us to go back in time and verify the results of tests and studies, leading to more efficient research.

Changes since Relocation to ShIP

MURAKAMI Ever since the three separate research centers were integrated at ShIP, I have felt the convenience of being close to one another in many situations. In the chemical discovery phase, scheduling has become faster and the exchange of information with the Process Chemistry Research Center can now be used in chemical discovery.

ABE I used to contact other research centers via the Head Office, but now that we are together, I can ask questions right away. We have been working on a new theme recently in collaboration with the New Molecule Research Center. We are now able to meet in person for cross-referencing of detailed data and information on temperature, raw materials, etc.

OKADA At the Formulation Technology Research Center, we sometimes are unsure how the active ingredients behave in a formulation. Now we can immediately consult with other research centers. I think many researchers recognize that communication has become more efficient.

Aspirations at ShIP

MURAKAMI I feel that bringing together various researchers in the same space has created even more diversity. I would like to receive more opinions from other research centers than ever before about the compounds created by the New Molecule Research Center.

ABE Although the organizations have been consolidated into ShIP, the analytical instruments are still located in their respective research centers. I think if researchers can use them regardless of their affiliations, research efficiency will be even better. I would like to further accelerate the speed of R&D throughout ShIP.

OKADA The Formulation Technology Research Center is focused on mixing active ingredients with surfactants and other secondary raw materials to create formulations. So I think it is rather a special research center within ShIP. I hope researchers at other research centers will be interested in formulation technology, a field different from what they are used to, so that new ideas will be created.