

Business Strategies by Process

Drug Discovery

Focus on expanding the pipeline and promoting open innovation

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Basic policy

The Sohyaku. Innovative Research Division strives every day to continually discover new drugs for the world that address unmet medical needs with the aim of becoming a “pharmaceutical company working with a sense of speed to be the first to deliver original value.”

In the area of diseases, the Company is focused on the priority areas of central nervous system diseases and immune-inflammation diseases. At the same time, we are working on additional new areas and modalities for the future and will identify the ones that will become our next pillar of business.

In drug discovery activities, we are aggressively promoting cooperative business through industry-academia-government collaboration and using external drug discovery resources to expand these discovery opportunities, such as identification of novel targets and technologies.

Fiscal 2018 summary and fiscal 2019 initiatives

In fiscal 2018, we sought to rapidly obtain PoC for our drug candidates and focused on strengthening translational research¹. One of the results is that we selected highly unique indications in several projects, which enabled us to advance the candidates to Phase 1. As we promote

the diversification of modalities, we seek to expand our research pipeline to achieve the continuous creation of development candidates.

In addition, with respect to our drug development project, a collaboration with our pharmaceutical development subsidiary in the U.S., Mitsubishi Tanabe Pharma Development America, and in Europe, Mitsubishi Tanabe Pharma Europe, was able to drive the PoC study for its first product as planned after the establishment of our global development system.

Meanwhile, an issue in fiscal 2018 was that we were unable to create drug candidates in priority areas, particularly central nervous system diseases and immunoinflammation diseases that lead to internal sales, especially in the U.S. following Radicava. It is necessary, more than ever before, to rigorously promote projects from a translational research perspective from the initial stage of research. Another issue was that the results of open innovation in basic research did not effectively lead to pipeline expansion.

In light of these issues, we will continue to steadily promote PoC studies and aggressively expand our pipeline focusing on priority areas in fiscal 2019. Furthermore, our policy is to focus on opening up the research environment. We created an environment where new synergies are easily produced, such as the Shonan Health Innovation Park

(see page 32), and we will collaborate with the best partners inside and outside the Company and incorporate leading-edge technologies. Moreover, we will encourage open discussions on new themes and ideas in the Sohyaku. Innovative Research Division and promote transparency in budget and human resource allocation. In addition, we will strengthen the connection between clinical practice (medical) and basic research (science) by collaborating with the Ikuyaku. Integrated Value Development Division. In cooperation with physicians inside and outside the Company, we will push forward with highly relevant project management that incorporates medical needs and a medical perspective from the early stages of research.

1. "Translational research" involves the connection from basic research to clinical practice. Its purpose is to bridge the excellent results obtained from basic research at universities with the development of innovative pharmaceuticals.

Medium- to long-term perspective

To achieve the goals of the Medium-Term Management Plan 16–20, the Sohyaku. Innovative Research Division should first focus on swift PoC confirmation of drug candidates and pipeline expansion through the continuous creation of drug candidates with a focus on priority areas. Continued discussions on the expansions of the pipeline are to be carried out, not only within the Sohyaku. Innovative Research Division, but also in joint effort with "Drug Discovery Strategy Team" set up in collaboration with the Global Portfolio Management Department and other departments.

The Sohyaku. Innovative Research Division's long-term goal is the "continuous creation of original drug candidates that meet future medical needs." Our strength lies in our drug discovery capabilities. We have a track record of creating the world's first unique pharmaceuticals leveraging our capabilities in chemical synthesis. In addition to conventional small-molecule drug discovery, we are also now expanding new modalities such as nucleic acid drugs and middle molecule drug discovery. Our ideas, creativity and tenacity for creating highly original products are also our strengths.

On the other hand, we need to accelerate drug discovery more than ever. To that end, one thing we should do is to streamline decision-making. In the initial stage of research, we need to emphasize taking on challenges and to not take too much time gathering information for streamlined decision-making. Furthermore, we believe that we can accelerate the entire drug discovery process by incorporating external knowledge and technologies through open innovation and better leveraging external assets. For example, as a new challenge that leverages open innovation, we are conducting drug discovery research on gene therapy in collaboration with Jichi Medical University.



Arisa Hisanaga

Research Unit/Neuroscience,
Sohyaku. Innovative Research Division

Develop reliable assay systems and basic technologies to challenge new themes with high medical needs

I was attracted by this work, drug discovery, that can contribute to the health of people around the world, so I studied brain and nerve functions at the faculty of pharmaceutical sciences during my university days. Since joining the company, I have been consistently engaged in central nervous system projects and primarily responsible for developing assays for compounds.

Before a new drug can be made, the cycle of (1) evaluating the compound and (2) synthesizing the compound based on those results must be repeated to improve the efficacy of the compound. Establishing an assay system that enables us to generate highly recapitulated results is critical to effectively repeat this cycle.

Recently, we created an assay utilizing iPS cell-derived neurons. iPS cells are relatively unstable and it was difficult to obtain highly reproducible results compared to the cells that we have dealt with so far. However, as a result of trial and error based on the advice from other members and my supervisors, I could successfully set up a stable assay, which now contributes significantly to the efficient progress of current drug discovery projects. Moving forward, I'd like to take part in developing functional assays that use patient-derived cells with the aim of discovering pharmaceuticals that can further help patients.

Currently, I'm investigating new projects as a member of the Neuroscience Research Unit. In the field of central nervous system, there are many serious diseases for which treatment has not yet been established despite significant needs from patients, their families, and medical professionals. To address those needs, I'm now conducting validation experiments on new concepts targeting ALS and other neurological diseases. I interact with US doctors and constantly study day after day while assimilating the latest information from domestic and overseas academic conferences and various papers.

I will continue to take on challenging themes that help us develop new pharmaceuticals while enhancing my expertise, and make every effort to improve our own drug discovery infrastructure from a long-term perspective so that I can contribute to the health and happiness of people around the world.

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It is also important to create a better environment for creating such innovations. We will create a more open research environment and promote collaboration with the best partners inside and outside the Company. The relocation of our research laboratory to Shonan Health Innovation Park in the current fiscal year is also viewed as laying the groundwork for pursuing this open innovation.

Furthermore, we also need to change researchers' way of thinking to challenge diseases with high unmet medical needs. We hope to generate new ideas by encouraging researchers who tend to stay in their own shells to break out and expand their perspectives and ideas through opportunities for dialogue and discussion with outsiders. I believe that creating a corporate culture that encourages taking on challenges is a vital mission as Head of the Sohyaku. Innovative Research Division.

Possible risks and countermeasures

Generally speaking, ideas that anticipate future needs, such as what drugs will be needed 10 years from now or ascertaining trends in diseases and technologies are highly important in drug discovery with a long development lead time, and misreading trends could be risky. Research and evaluation of disease trends is being led by three drug

discovery units, and technology trends by Modality Laboratories and the US research subsidiary Tanabe Research Laboratories U.S.A. We are proceeding with development for early commercialization of VLP vaccines, a new modality, in collaboration with Medicago and products that combine pharmaceuticals and medical devices in collaboration with NeuroDerm.

On the other hand, there are risks related to the development of new modalities and risks related to regulatory controls and drug price revisions by relevant authorities. With regard to these, we will closely monitor the international situation and industry trends, and take steps to reduce risks through prior consultations with relevant authorities.

Message to shareholders and investors

I think that many of our personnel thrive on adversity, understanding the true nature of problems and finding solutions by themselves. To create pharmaceuticals and medical services that offer new value by leveraging these personnel, we will integrate the individual strengths of each person in the Sohyaku. Innovative Research Division and continue to create original products that meet future medical needs.



Accelerate open innovation by leveraging Shonan Health Innovation Park

As initiatives for Medium-Term Management Plan 16–20 and beyond that toward fiscal 2023, we are reexamining the allocation of management resources, optimizing and streamlining our global management system, and reinforcing each function.

As part of this, to accelerate open innovation in drug discovery research, we decided to use the Shonan Health Innovation Park in Kanagawa Prefecture as one of the research centers starting from May 2019. The Company will swiftly and powerfully take on the challenge of addressing new technologies, new treatments, and new disease areas in this park.

In addition to pharmaceutical companies and drug discovery ventures, the Shonan Health Innovation

Park is occupied by companies that provide drug discovery support services, research and medical devices, and are engaged in AI and IoT business, and the park is working to attract more such companies. Approximately 250 researchers working in the Frontier Research Unit, the Modality Laboratories, and other facilities from the Yokohama Office, the Toda Office (closed in fiscal 2019) will move in to expand collaboration opportunities by building a human network with existing tenants. Above all, we will pursue initiatives based on the theme of achieving radical treatments using genetic drug discovery, which will lead to the provision of new pharmaceuticals and medical services for the prevention and cure of rare and intractable diseases.

