Chemicals

Most of the products of this division are comprised of industrial chemicals, such as ammonia and sulfuric acid, and derivative products/high-purity products that have been developed downstream with added value. These products are supporting people's lives in a wide range of fields. By building an efficient production system, we strive to provide excellent products and technologies while reducing the environmental burden.

MATSUOKA Takeshi
Executive Officer
Head of Chemicals Division

Social Issues and Needs

With the advent of a smart society and worsening of global environmental issues, new needs have been created in various fields. In addition to general industrial use, we currently provide customers with products and technologies that contribute to solving social issues. Efforts include providing high purity chemicals for electronic component manufacturing applications, a high-grade urea solution for removing air pollutants, and use of proprietary cyanuric acid derivatives for improving water quality.

Business Vision

Our Chemicals business started with the manufacture of sulfuric acid and ammonia, which are basic raw materials for fertilizer. We contribute to the realization of a prosperous, safe, and continuously developing society by supplying materials used in a wide range of fields, from basic chemicals to high purity chemicals and cyanuric acid based high-performance products.

Business Overview

Basic Chemicals

We sell melamine, sulfuric acid, nitric acid, ammonia and other industrial chemicals to a wide range of industries. The Company is further improving the efficiency of our production system in order to create a stronger business foundation to minimize the impact on our earnings due to external factors, such as changes in economic trends in Japan or oversea and fluctuating fuel prices.

We are also manufacturing and supplying products to support cutting-edge fields, and providing products to the market such as high-purity sulfuric acid, nitric acid, aqueous ammonia and liquid ammonia from which impurities are removed to utmost level.

In addition, we established a manufacturing and supply system for our high-grade urea solution AdBlue®* that decomposes nitrogen oxide contained in exhaust gas from diesel vehicles, which is considered to be the cause of air pollution, into nitrogen and water, thereby reducing environmental impact.

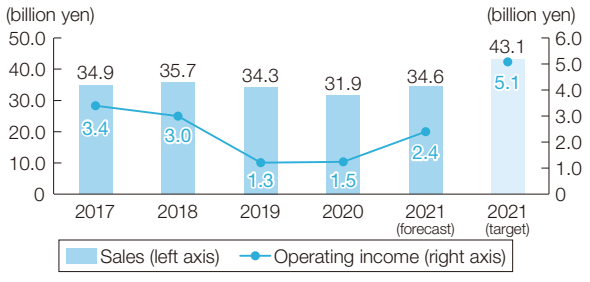
* AdBlue® is a registered trademark of the Verband der Automobilindustrie.

Fine Chemicals

We offer environmental chemicals such as HI-LITE®, used for sterilization and disinfection of swimming pools and water purification tanks, and Venus® Oilclean, a microorganism formulation that decomposes oils and fats in wastewater from food factories, as well as other chemicals such as FINEOXOCOL®, higher alcohol used in products including cosmetics.

We position TEPIC® and melamine cyanurate, high performance chemicals derived from cyanuric acid, as key products for earnings growth. In addition to being used as a curative agent for coating powders, TEPIC® is seeing an increase in demand for use in electronic materials such as solder resist ink and sealants for LED. Melamine cyanurate is used as a non-halogen flame retardant or an auxiliary flame retardant for various engineering plastics. In addition to focusing on the expansion of applications for these existing products, we are promoting research and development of our own cyanuric acid derivatives.

Business Results and Outlook



Stage II Business Strategies

Opportunities and Risks

- **Strong global demand for cyanuric acid**
- **Increasing social demand for water sanitation**
- **Increasing demand for products for information & communication field**
- **Increase of issues at plants due to aging facilities**

Strengths

- **Manufacturing process for products with high self-extinguishing rates as well as high value-added products by developing derivative products using ammonia as a core raw material**
- **Accumulation of more than half a century of research and know-how regarding ultra-high purity of industrial chemicals**

Main Measures

- **Promote sales of cyanuric acid, melamine cyanurate, TEPIC®, HI-LITE®, AdBlue®, and high-purity sulfuric acid**
- **Enhance maintenance technology through the adoption of digital technology**

Progress of Main Measures

1. Cyanuric Acid

Cyanuric acid is a material used in TEPIC®, HI-LITE®, and melamine cyanurate, which is used as a flame retardant. In order to facilitate the stable provision of TEPIC® and HI-LITE®, which are sources of growth of this division, to the market, we expanded our cyanuric acid production facilities in December 2020.

2. TEPIC®

The high-performance chemical TEPIC®, which has a distinctive triazine ring, is used in a wide range of applications. For electronic material applications, we expect that demand for TEPIC® will continue to grow in various fields, including the information & communication field (5G base stations for solder resist ink applications, substrates for autonomous driving, etc.). In FY2020, sales decreased in the first half of the fiscal year due to the spread of COVID-19 infections but recovered in the second half of the fiscal year with sales performance almost the same as the previous fiscal year. We will pursue a well-balanced sales strategy by expanding sales of high-quality grades while avoiding low-price competition in general-purpose grades.

3. HI-LITE®

“Clean Water and Sanitation,” one of the SDGs, is an important global issue. We have started exporting some grades of HI-LITE® since they have been certified as materials for disinfectants for drinking water in areas where hygiene management is insufficient, such as in developing countries. We will respond to the global demand for disinfection, such as the prevention of the spread of COVID-19 infections, as well as the demand for disinfectant applications for drinking water.

4. High-Purity Sulfuric Acid

Demand for high-purity sulfuric acid is expected to grow in the information & communications field, a business field which will continue to grow. We also witnessed an increase in sales in FY2020 due to a favorable level of demand by the semiconductor business. We will continue to maintain high quality and high availability.

Efforts Started After Stage II Initiation

The Chemicals business is susceptible to the effects of fuel prices, supply demand balance, and market environment. Therefore, we will continue to strive to secure stable earnings while flexibly reviewing business strategies in response to environmental changes.

We are focusing on the development and deployment of new products, mainly cyanuric acid derivatives, as a source of sustainable business growth. We started the full-fledged commercialization of STARFINE® (zinc cyanurate), from which effects as an additive for paints and adhesives can be expected. Together with the new grades of TEPIC®, it has already been evaluated by many users for various purposes.

Dry film resist made with TEPIC®-VL (new grade TEPIC®)

Provision of Products for Helping to Enrich People's Lives

High-grade Urea Solution (AdBlue®)*

AdBlue® is used in Selective Catalytic Reduction (SCR) which is a system for purifying nitrogen oxide contained in exhaust gas from diesel engines. When sprayed into exhaust gas, AdBlue® converts nitrogen oxide into harmless nitrogen and water, which helps to reduce environmental impact. Urea, the main component of AdBlue®, is a substance which is so safe that it is used in cosmetic products as a moisturizing agent, pharmaceuticals, fertilizers, and so forth.

* AdBlue® is a registered trademark of the Verband der Automobilindustrie.

AdBlue®

Venus® Oilclean

Venus® Oilclean is a microorganism formulation that decomposes oils and fats in wastewater from food factories and other facilities. Compared to the pressurized floating facility, which is a typical oils and fats in wastewater treatment system, the facility using Venus® Oilclean significantly reduces odors and workload as well as waste with simple equipment. Some major food factories have reduced the amount of waste derived from oils and fats to almost zero by introducing this product.

Performance Materials

We will contribute to the realization of a smart society by promoting profitability of display, semiconductor, and inorganic materials, the three pillars of this business, and further expanding business size through new product development.

ISHIKAWA Motoaki
Managing Executive Officer
Head of Performance Materials Division

Social Issues and Needs

With the expansion of IoT and 5G as well as the evolution of AI and autonomous driving technology, our current society is transforming into a smart society where diverse systems interact to provide advanced services to everyone. The semiconductors, sensors, and displays that bring these technologies to life are also required to evolve. It is also expected to provide products that help protect the global environment and solve energy issues.

Business Vision

In this rapidly evolving business, it is necessary to quickly and accurately grasp the needs and technological trends of the market and customers. For this, sales, research, and production, including overseas bases, are integrated, and we emphasize activities that are closely related to customers. In addition, we aim to contribute to the development of society by providing products and services that are useful to the world based on the high technological capabilities that we have cultivated.

Business Overview

Display Materials

SUNEVER®, a coating material to align liquid crystal molecules in a certain direction, serves as our primary display material. This product was made available for sale in 1989, and we have expanded our market share by increasing the functionality of alignment materials, even when the liquid crystal type used is changed from TN to STN or TFT. In addition, we started the sale of Rayalign®, a photo-alignment material for IPS liquid crystal, in 2014. This product is currently used in many smartphones that offer high screen resolutions. It is expected that product demand for Rayalign® will further increase in the future as tablet and monitor resolutions increase.

Semiconductor Materials

We started the manufacture and sale of ARC®*1 in 1998 based on a licensing agreement with US company, Brewer Science, Inc. ARC® is a coating material designed to prevent issues such as irregular reflection and interference of light, and coating failure during micro-fabrication of the photoresist through lithography process. We launched OptiStack®*2 (multi-layer process material) in 2007 which greatly expanded our business.

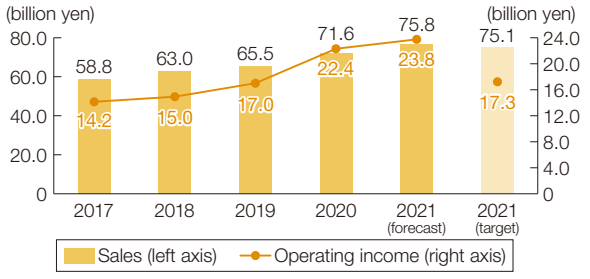
Currently, with the adoption of EUV exposure technology (wavelength: 13.5 nm, semiconductor circuit width: 7 to 3 nm), we are promoting the mass production and next-generation development of EUV materials and also focusing on three-dimensional (3D) packaging technology preparing for the limits of optical shrink.

*1, *2 ARC® and OptiStack® are registered trademarks of Brewer Science, Inc.

Inorganic Materials

SNOWTEX®, a nano silica water dispersion serving as a fiber processing agent, went on sale in 1951. Now we also offer organosilicasol serving as an organic solvent dispersion, and monomer sol, a product that can be used without solvent. These products are indispensable materials used in coating materials for optical films and in abrasives for electronic recording devices and for other purposes. We are aiming to further expand product applications, including use as an agent to increase oil and gas extraction efficiency.

Business Results and Outlook



Stage II Business Strategies

Opportunities and Risks

- Increasing demand due to the development of the information & communication field
- Change in demand for shale oil due to fluctuations in crude oil prices
- Advent of innovative technology
- Intensification of inter-corporate competitions

Strengths

- A sales and research system closely linked to customers in China, Taiwan, and South Korea
- Optical control technology
- Functional polymer design technology
- Ultrafine particle control technology

Main Measures

- Develop and launch new products
- Improve existing products and expand their application
- Strengthen evaluation technology
- Improve and maintain facilities

Progress of Main Measures

1. Liquid Crystal Alignment Materials for TVs

Currently, our major materials for displays are alignment materials for smartphones and tablets, and especially the photo-alignment material for liquid crystal IPS. In the future, we will also use them for TVs. Although demand for LCD TVs is predicted to decrease somewhat, we predict that demand for alignment materials will continue to increase based on screen sizes. Also, since we believe that screen resolutions will continue to improve, we recognize that it is an important theme to accurately respond to technical requests from customers and expand the market share of our products. In FY2020, we were able to partially expand our customer share for sales of alignment material for VA liquid crystal.

2. Agents to Increase Oil and Gas Extraction Efficiency

Crude oil development is concentrated in specific areas with excellent oil and gas wells and the production in those areas is increasing. However, it is said that extraction efficiency has reduced due to the phenomenon that oil recovery amounts have generally decreased due to crowded conditions in areas where oil wells are in close proximity. Based on this issue, we aim to improve extraction efficiency by developing applications for use of our inorganic materials. In FY2020, sales declined due to the spread of COVID-19 infections and the drop in crude oil prices, especially during the first half of the fiscal year. Sales remained at the same level as the previous fiscal year and lower than planned. Under these circumstances, we will actively conduct field tests and strive to increase sales in order to focus on developing new applications for existing wells that are not easily affected by crude oil prices, including those outside the United States.

Shale oil drilling site

Efforts Started After Stage II Initiation

OLED Materials

OLEDs are thinner and lighter than liquid crystals, offer high-speed response, and possess excellent design characteristics, such as flexibility. They are being used more often in smartphones, high-resolution, large screen TVs and other products. Recently, sales of foldable smartphones with screens of OLED have begun. We are developing proprietary materials, including hard coat materials for surface protection, materials that enhance light extraction efficiency, anti-reflective coating alignment materials, and release layer materials, which contribute to improving the characteristics of smartphones. In addition, our company is also accelerating market development for ELsource®, a soluble hole injection material, NPAR®, a liquid-repellent bank layer material, and other materials which can contribute to reducing the cost of large TVs, production efficiency, and characteristics enhancement. We are also developing materials for next-generation self-luminous displays which will be the future display technology following OLEDs.

Foldable display

Semiconductor Packaging Materials

Technologies related to high-speed, large-capacity information and communication such as IoT, 5G, and sensors, are making rapid progress. For this reason, further miniaturization and higher integration in the formation of electronic circuits are occurring. However, we are coming close to physical theoretical limits for shrinkage of interconnect and integration, so it is expected that issues will be overcome through further evolution of semiconductor packaging technology. In addition to circuit miniaturization, we have focused early on technology for 3D packaging with thinned semiconductor wafers. In 2013, we acquired all shares of German company, Thin Materials AG and incorporated their advanced processes and material development technology necessary for semiconductor packaging, making them our own technologies. We are also actively working on other next-generation semiconductor packaging technologies and development of markets related to sensors.

Image of integrated circuits board with 3D package

Provision of Products for Helping to Enrich People's Lives

SNOWTEX®, Aluminasol, Organosilicasol, and NanoUse®

Our inorganic materials on base of our ultrafine particle control technology can be used for a wide range of applications since it can be dispersed in various types of solvents. By using them for transformers and motors, it is possible to improve insulation performance and reduce energy loss. They also function as a catalyst binder and base material reinforcing material in the process of removing exhaust gas from factories and automobiles. By making the equipment more energy efficient and longer-life, these materials contribute to reducing environmental impact.

Image of exhaust gas removal

Agricultural Chemicals

We contribute to a stable food supply through consistent business activities from the research for new agricultural chemicals to their development, manufacture, and sales, and expansion of a broad product lineup through the acquisition of ingredients from other companies and joint development of products.

HONDA Takashi
Director, Senior Managing Executive Officer
Head of Agricultural Chemicals Division

Social Issues and Needs

In addition to the conventional agricultural issue of efficiently preventing damage caused by pests and weeds during crop production, there is an increasing consumer needs to reduce pesticide residues on crops and reduce environmental impact.

We also recognize the importance of increasing agricultural sustainability by small family-owned farmers, especially in Japan.

As a company that provides agrochemicals, we are making various efforts to solve social issues.

Business Vision

In Stage II of Vista 2021, we aim for our entry into new agriculture related fields while focusing on our current business of providing distinctive chemically synthesized agrochemicals to farmers. For smart agriculture, which is expected to contribute to the maintenance and development of domestic agriculture, we started to provide a service since previous fiscal year to diagnose pests and weeds using a smartphone application and provide information on effective pesticides to farmers. Also, we are developing and examining so-called biopesticides that do not leave a residue on crops.

Business Overview

Agrochemicals

Our agrochemical business started in the 1910s when our predecessors Nippon Seimi Seizo and Kanto Soda began manufacturing and selling insecticides and fungicides. Starting with TARGA® (herbicide for grassy weeds) launched in 1984, we have continued to manufacture and sell products developed in-house such as SIRIUS® (herbicide for paddy rice), SANMITE® (insecticide/acaricide) and PERMIT® (herbicide for paddy rice and corn), which have steadily improved profitability.

Afterwards, we experienced hard times as a result of in-house development delays and intensifying competition with competitors. However, since the launch of LEIMAY® (fungicide) in 2008, we have returned to introducing products developed in-house and started sale of GRACIA® (general purpose pesticide) in 2018. In addition, we are actively pursuing the acquisition of other companies' agents and have enhanced our agricultural chemical product portfolio by taking over the global product Quintec® (fungicide) in 2019 and Japanese and Korean operations for the versatile DITHANE® (fungicide) in 2020.

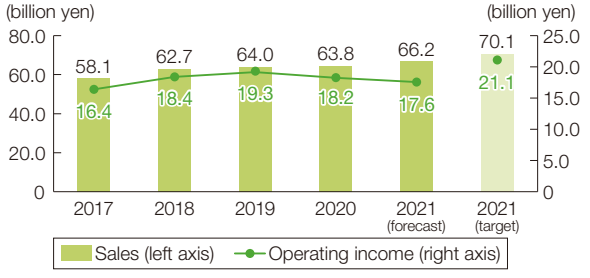
Veterinary Pharmaceuticals

Through our development of agricultural pesticides, we have discovered compounds that are not only effective for use on agricultural crop pests, but also on fleas and ticks that are parasitic in dogs and cats, and have continued to examine these compounds as veterinary pharmaceuticals. In 2008, we entered a licensing agreement with Intervet Inc. Development of veterinary pharmaceuticals using Fluralaner, a compound invented by us, as an active ingredient has advanced.

Since launched in Europe and the United States under the brand name BRAVECTO®* in 2014, veterinary pharmaceuticals containing Fluralaner as an active ingredient are now used in more than 100 countries and are leading the growth of Agricultural Chemicals Division.

* BRAVECTO® is a registered trademark of Intervet International B.V. and Intervet Inc.

Business Results and Outlook



Stage II Business Strategies

Opportunities and Risks

- Continuous expansion of the overseas agrochemicals market
- Labor shortage due to the population decline in Japan
- Intensification of inter-corporate competitions
- Supply shortages of active ingredients
- Growth of the companion animal market

Strengths

- Ability to create distinctive, new agrochemicals from the core technologies of fine organic synthesis and biological evaluation
- Experiences and track records spanning many years from research for new agricultural chemicals to manufacturing and sales
- High level of motivation cultivated through maintaining high profit margins and continuous growth

Main Measures

- Rapidly popularize and promote sale of GRACIA® and take over sales of Quintec® and DITHANE® in various countries
- Strengthen initiatives aimed at large-scale farmers, corporations, and general consumers
- Steadily develop new agrochemicals and create pipeline

Progress of Main Measures

1. GRACIA®

GRACIA®, a pesticide developed in-house, is fast-acting on a wide range of crop pests and has little impact on honeybees which are useful insects. It was released in South Korea in 2018 and went on sale in Japan in 2019. We also expect to release GRACIA® in India in 2021 as it has already become a major product.


GRACIA®

2. ROUNDUP®

ROUND NOZZLE® ULV5, a product that allows for dispersion of ROUNDUP® MAXLOAD in a way that reduces farmer workload, is gaining popularity. We plan to launch the sale of the long awaited boom sprayer nozzle in FY2021.


ROUND NOZZLE® ULV5


ROUNDUP® MAXLOAD (200L)

3. Fluralaner

Veterinary pharmaceuticals for companion animals and livestocks containing Fluralaner as an active ingredient are available in more than 100 countries. In 2020, a spot-on product for dogs and a spot-on compound designed for external and internal parasites found on cats were approved for marketing in Japan and were launched there in January 2021. Along with the declining birthrate and growing proportion of elderly people, the idea that companion animals are like a family to their owners is growing in popularity. We expect that the demand for veterinary pharmaceuticals will increase in the future as people become more aware about companion animal health.


BRAVECTO® tablets for cats

Efforts Started After Stage II Initiation

In order to enhance our overseas product portfolio, we have acquired Quintec® (active ingredient: quinoxyfen) from Corteva Inc. This product is a fungicide that is effective in prevention of powdery mildew and is currently used mainly in vineyards in the US.

In addition, as in-house developed products, following the development of a fungicide (development code NC-241) and a herbicide for paddy rice flooding treatment (development code NC-653), we also started to develop a herbicide for application on stems and leaves of paddy rice (development code NC-656). Moreover, we have established a joint venture (Nissan Bharat Rasayan PVT. LTD.) in India for the purpose of manufacturing the active ingredients in agrochemicals. From Stage II, by having this joint venture's manufacturing plant together with the Onoda Plant, we can respond to growing demand for our agrochemicals. We expect it will contribute to the growth of our agrochemicals business by a robust active production and supply system that is cost-competitive.

Provision of Products for Helping to Enrich People's Lives

Exzolt®*1

As for products that use Fluralaner, our original active ingredient for veterinary pharmaceuticals, in addition to BRAVECTO®, which is designed for external parasites found on companion animals, Exzolt®, a veterinary pharmaceutical effective on chicken mites, was approved for marketing in Europe in 2017. The product was later approved for marketing in Japan in April 2021. This is a revolutionary product that can be administered in water supply systems for chickens, unlike the conventional method of exterminating chicken mites which has been inefficient and inadequate. Chicken mites not only reduce the spawning efficiency of chickens but are also problematic to poultry farmers since they are also parasitic on them. Exzolt® is able to very effectively eliminate these mites. In Europe, it is recognized as an effective drug from the aspect of animal welfare*2 and is thought to be useful in relieving insomnia, reducing stress, and increasing egg-laying rates in chickens.

*1 Exzolt® is a registered trademark of Intervet International B.V. and Intervet Inc., a subsidiary of Merck & Co., Inc.

*2 On January 28, 2021, MSD Animal Health announced an update to the Summary of Product Characteristics (SPC) for Exzolt® from the European Medicines Agency's Committee for Medicinal Products for Veterinary Use.

Pharmaceuticals

By focusing on drug discovery and manufacture of active pharmaceutical ingredients, we are striving to develop better pharmaceuticals through a unique business model that does not have a sales department, licensing products which we have developed to pharmaceutical companies.

ISHIWATA Norihisa
Head of Pharmaceuticals Division

Social Issues and Needs

In Japan, a country with the declining birthrate and growing proportion of elderly people, medical services and pharmaceuticals are becoming more important than ever. Lifestyle-related diseases are increasing due to changes in lifestyles. So awareness for increasing expectancies for healthy life is growing. As a solution, safer and more effective medicines, such as personalized medicine and preventive medicine, are desired.

Business Vision

We entered the pharmaceutical business in 1982 and launched EPATEC®, an external preparation with ketoprofen as its main ingredient, as our first pharmaceutical product. Since mastering the pharmaceutical business from manufacturing to sale, we have continued challenges in the R&D of innovative new drugs by making full use of our strategically developed chemical compound library, our cutting-edge evaluation functions, and our fine organic synthesis technologies.

Business Overview

In-house Drug Discovery

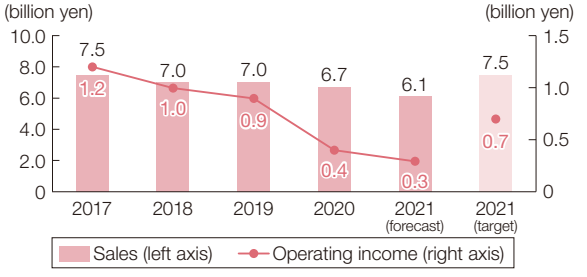
The development of the anti-hypertension agent efonidipine hydrochloride marked our start in the drug discovery business. At the time of its development, drug development by major Japanese pharmaceutical companies was focused on antibiotics. We focused on drugs for hypertension and hyperlipidemia, paving the way for success. It was launched in 1994 in Japan, which is distributed by Zeria Pharmaceutical and Shionogi as LANDEL® in Japan and by Green Cross as FINTE® in South Korea.

In 2003, LIVALO®, anti-cholesterol drug with pitavastatin calcium we developed as another one of our focus point, was launched by Kowa Pharmaceutical (current Kowa Company). Currently LIVALO® is sold in 28 countries around the world. After its substance patent for Japan expired in August 2013, due to the decline in market share by generic drugs and the impact of drug price revisions, the domestic conditions continue to be harsh. The creation of new drugs is an urgent issue for us.

Finetech®

We are developing a contracting solution proposal business that provides total support to customers in line with their needs for their development of active pharmaceutical ingredients (API). We engage in the contracted development of manufacturing process in the stages from pre-clinical to commercial production, as well as manufacture of API and intermediates in compliance with Good Manufacturing Practice (GMP). Furthermore, we provide related services including quality designs, stability testing, impurity and metabolite sample synthesis, and creation of materials regarding drug master file application (CMC: Chemistry, Manufacturing, and Controls compliant). Recently, we are expanding supply business of APIs of generic drugs that responds to the need for highly active drug substances that require fine organic synthesis and containment. In addition to our wide variety of asymmetric synthesis technologies, oxidation reaction technology using organic molecular catalysts, and prostaglandin derivative synthesis through a proprietary two-component coupling method, we also have an abundant amount of experience manufacturing in-house drugs and agrochemicals, and our strengths include multi-step synthesis and heterocyclic compound synthesis.

Business Results and Outlook



Stage II Business Strategies

Opportunities and Risks

- Revitalization of research for discovery of APIs for medium-molecule drugs
- Increasing demand for generic drugs
- Intensification of inter-corporate competitions

Strengths

- Fine organic synthesis technology
- Good Manufacturing Practice (GMP) compliant high-level containment technology
- Chemistry, Manufacturing, and Controls (CMC) support for APIs
- Cutting-edge evaluation functions

Main Measures

- Create and advance candidate drugs
- Expand our contracted manufacturing business and improve profitability

Progress of Main Measures

1. Strengthening Initiatives for Creating Nucleic Acid Technology and Nucleic Acid Drug Discovery

Nucleic acid drugs are attracting attention in their main roles as next-generation pharmaceuticals. In 2018, we began joint research with Luxna Biotech for nucleic acid drug discovery, investing in the company in February 2020. In June 2020, we were licensed a novel modified nucleic acid, 2'-MCE, from Tokyo Institute of Technology and are using it for our own nucleic acid sequence designs.

2. Approaches to Drug Discovery Using Computational Science

With recent advances in supercomputers, the speed of computational processing has become much faster. Therefore, it is becoming possible to design small molecule drug candidates for target molecules with high precision. In July 2019, we started joint research with Veritas In Silico on new small molecule drug discovery targeting RNA.

3. Establishment of an Efficient Peptide Manufacturing Technology

We invested 900 million yen in 2018 in a third-party allocation of shares of PeptiStar, which is aiming to establish a stable supply system for APIs of constrained peptides. We have developed a novel liquid phase peptide synthesis technology (SYNCSOL™) that enables dramatic cost reduction.

4. Continuous Launch of Highly Bioactive Generic Drugs

The demand for eldecalcitol, a drug for treatment of osteoporosis, is growing because the number of patients with osteoporosis is expected to increase due to population aging. Based on the production results of maxacalcitol, a highly active vitamin D3 drug, in FY2020 we started the sale of eldecalcitol, which requires high-quality control because of the susceptibility to decomposition and impurities caused by oxygen, moisture, and heat in the air. We will continue to develop a stable supply system and nurture it as a source of growth.

Efforts Started After Stage II Initiation

In addition to developing a therapeutic agent for thrombocytopenia (NIP-022) and an anti-arrhythmic agent (NTC-801), we aim to license out at least two chemical compounds in Stage II among several drug candidate agents which are at the late stage of drug discovery. Also, drug discovery researches in early stages are focused on neurological diseases. To raise the probability of success, we will also concentrate research resources to collaborative drug discovery research with Shionogi and other pharmaceutical companies, and nucleic acid drug discovery research with Luxna Biotech.

Pitavastatin calcium, the API of LIVALO®, will serve as an important source for profits during Stage II as usual. As pressure to control prices increases, we aim to maximize value with stable production results and high-quality APIs.

It will take time to acquire results in in-house drug discovery business. Until then, our Finetech business will support our pharmaceutical business. In addition to our business of maxacalcitol, which contributed to Stage I profits, we are getting our business up to speed with the launch of the eldecalcitol as a new generic drug in FY2020. Furthermore, we will start a contracted peptide manufacture in collaboration with PeptiStar, a company in which we have invested, using our overwhelming technological advantages, including liquid phase synthesis. During the final year of Stage II, we will proceed with a full-scale plan to transform Finetech® into a highly profitable business.

Our pharmaceutical business will continue to boldly challenge in-house drug discovery while supporting the backbone by our highly profitable Finetech business.

Provision of Products and Services for Helping to Enrich People's Lives

APIs Manufacturing (In-house drug discovery business and Finetech®)

We manufacture APIs at the Onoda Plant, which is located in Sanyo-Onoda City, Yamaguchi Prefecture. In addition to being GMP compliant, it is regularly inspected by domestic and foreign regulators and customers where we supply APIs, and its level of quality is highly evaluated.

Liquid Phase Peptide Synthesis Technology Platform (SYNCSOL™)

At Chemical Research Laboratories located in Funabashi City, Chiba Prefecture, we are moving forward with preparations for our contracted peptide manufacturing business in which we utilize our proprietary liquid phase method technology. Due to their nature, biological activity of peptides is demonstrated at microscopic levels. Therefore, we are conducting research and development in a special experimental environment in which peptides are physically contained.

Nucleic Acid Drug Technology Platform

We are preparing to provide a technology platform based on basic drug discovery research using a unique nucleic acid chemical structure developed by Nissan Chemical and nucleic acid chemical element technology developed by Luxna Biotech. Furthermore, we are also engaged in research and development of highly safe and more effective nucleic acid drugs.

Luxna Biotech

Planning and Development Division

By combining our core technologies with new materials and technologies, we are striving to create new products and businesses with high added value that meet the needs of society. The Planning and Development Division was newly established in FY2020 to further accelerate development.

SUZUKI Hitoshi
Director, Managing Executive Officer
Head of Planning and Development Division

Social Issues and Needs

Economic development and technological innovation have enriched people's lives and made them more convenient materially. However, there are various challenges for a sustainable society, such as the declining birthrate, growing proportion of elderly people, and progressing climate change issues. We are making various efforts to create new businesses in order to contribute to a society which boasts health and longevity, an advanced information society, and an environmentally sustainable society.

Business Vision

As a future-creating enterprise, we aim to realize a sustainable society by taking on the challenge of exploring the limitless possibilities of chemistry and creating high value-added products in response to customer "trust."

Business Overview

Life Sciences Materials

We are developing life sciences related materials in anticipation of entering the cosmetics market and the expansion of the regenerative medicine market.

In the cosmetics field, NANOFIBERGEL® was adopted in skin care products of cosmetics manufacturers in 2020 and 2021 consecutively. We have also developed ORGABEADS®, which reproduces a beautiful, transparent skin tone, and are introducing it to customers.

In the field of regenerative medicine, in addition to FCeM®FP and FCeM®Cellhesion®, which are cell culture substrates, we are promoting the development of prevelex®, a product that controls protein and cell adhesion. In the development of the FCeM® series, we are developing researching mass production methods for making them mainstream of cell culture substrates for mass production of undifferentiated iPS cells. Furthermore, in the field of mesenchymal stem cell manufacturing, we are developing Cellhesion® as a scaffold to manufacture inexpensively undifferentiated cells with high migration performance and enable autologous and allogeneic transplantation. We are also developing the prevelex® series of biomaterial adhesion inhibitors for use in the fields of regenerative medicine, genetic medicine, and antibody drugs in the pharmaceutical field, where modalities are becoming increasingly diverse.

Information & Communication Materials

We are working on the development of new materials that support cutting-edge devices required to realize Society 5.0.

We are promoting market development for materials including μLED-related materials attracting attention as next-generation displays with high brightness and high reliability, wafer-level package-related materials and power semiconductor-related materials that are next-generation semiconductor technologies which break down the barriers associated with miniaturization, and optical interconnect materials that support high-speed, large-capacity data communications.

Environmental-Friendly Materials

We are committed to the development of products that contribute to zero emission initiatives and lead to the popularization of bioplastics.

For lithium-ion batteries (LIB) which serve as key components of electric vehicles, we have developed FairCurrent®, an undercoat material designed for quick charging and extending life of batteries, and are aiming for its early commercialization. We are proceeding with the development of ECOPROMOTE®, a resin additive for increasing the crystallization rate in the molding process and improving the molding cycle and heat resistance in order to solve issues related to polylactic acid (PLA), which is expected to be widely used as a bioplastic.

New Material Planning and Research Management

Through venture capital based investment and other means, we are working to discover high-quality start-up companies and new development themes. We are working at the revitalization of development themes by introducing new materials in each field and accelerating commercialization by making licensing agreements with start-up companies, investing in them, and through mergers and acquisitions.

We are also working to strengthen our R&D capabilities by encouraging the training of researchers and the proper allocation of resources and by creating systems for the timely decision-making and creation of themes by the Theme Council.

Stage II Business Strategies

Opportunities and Risks

- Expansion of the regenerative medicine market
- Growth of the beauty & health market
- Increasing demand for technological development aimed at the realization of a low-carbon society
- Development delays and late arrival of expected new fields

Strengths

- Ability to promote collaborative-based product creation with customers
- Thin film coating based interface control technology
- Fusion of functional material design and biological evaluation

Main Measures

- Acceleration of development by allocating resources to important themes
- Improvement of contact with customers and strengthening of solution proposals
- Achievement of standardization of our materials through participation in national projects

Progress of Main Measures

1. NANOFIBERGEL®

In addition to promoting the penetration of active ingredients such as vitamins A and C derivatives, NANOFIBERGEL® has been confirmed to have an anti-pollution effect that inhibits the adhesion of PM2.5 and pollen, and has been adopted in a skincare product by a major cosmetics manufacturer. In April 2021, the product was also adopted for use in SUGI Pharmacy's private brand Prieclat Cream W. In the future, we will promote development by expanding the number of different types of items to use it in.

2. FCeM®Cellhesion®

It has been newly discovered that mesenchymal stem cells derived from elderly persons can also be cultured, and studies on autologous transplantation for these cells for the elderly have begun.

3. prevelex®

In recognition of its high safety and coating performance in applying to microstructures, culture vessels coated with prevelex® CC1 will be used in clinical research for iPS cell-derived cardiomyocyte spheroid transplantation.

Spheroid cells generated using Elplasia™ coated with prevelex® CC1: DU145 (human prostate cancer cell line)

4. FairCurrent®

In tandem with providing samples for use in lithium-ion batteries (LIB) for electric vehicles, we are also considering application of the product in next-generation batteries.

Provision of Products for Helping to Enrich People's Lives

prevelex® CC1

Professor Keiichi Fukuda and his colleagues from the Department of Regenerative Medicine and Advanced Cardiac Therapeutics, Graduate School of Medicine, Keio University will begin clinical research in 2021 using allogeneic iPS cell-derived cardiomyocyte spheroids created in culture vessels coated with prevelex® CC1, one of the products in the prevelex® lineup for preventing cell adhesion. Currently, cardiovascular disease is the second leading cause of death after cancer, and many people die every year from acute myocardial infarction and heart failure. We expect that prevelex® will contribute to the realization of regenerative medicine for patients with severe heart failure.