COMPANY RESEARCH AND ANALYSIS REPORT

Carna Biosciences, Inc.

4572

TSE JASDAQ Growth

3-Jul.-2020

FISCO Ltd. Analyst
Yuzuru Sato

FISCO Ltd.
http://www.fisco.co.jp

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https://www.carnabio.com/english/

Index

*This is an English translation of a report issued on May 28, 2020.

Summary

Starting clinical trials of drug candidates developed in-house from 2020, high expectations for progress on development of the program out-licensed to Gilead

Carna Biosciences, Inc. <4572> (hereafter, also “the Company”) is a bio-venture company that conducts drug discovery and development and drug discovery support businesses focused on the functions of kinase, which are intracellular signaling substances. In its Drug Discovery and Development business, it is developing kinase inhibitors, mainly for diseases with high unmet medical needs such as cancers and autoimmune diseases. In May 2016, it licensed-out the CDC7 kinase inhibitor, a cancer drug candidate, to North American bio-venture capital company Sierra Oncology, Inc. (hereafter, Sierra) and concluded a global licensing agreement with it. Following this, in June 2019, the Company concluded a licensing agreement with Gilead Sciences Inc. (“Gilead”) regarding the small molecule compound program in immuno-oncology.

1. Overview of the FY12/19 results

In the FY12/19 consolidated results, net sales increased 325.0% year on year (YoY) to ¥3,207mn, and the operating income was ¥977mn (versus an operating loss of ¥1,144mn in the previous fiscal year). The increase in both net sales and operating income was due to the fact that Company concluded a licensing agreement with Gilead regarding the drug discovery program in immuno-oncology and received a US$20mn (¥2,128mn) upfront payment as well as the fact that net sales in the Drug Discovery Support business increased significantly by 53.2% YoY to ¥1,079mn as a result of strong sales to the U.S. and China. In the agreement with Gilead, the Company will receive potential milestone payments of up to US$450mn depending on the future progress of development, as well as royalties on future net sales if the drugs developed through this program are commercialized. In terms of the progress on the drug discovery pipeline, in December 2019 the Company filed a CTA (Clinical Trial Application) in the Netherlands for AS-0871, a BTK inhibitor that targets autoimmune diseases, in order to initiate a Phase 1 clinical trial. The Company plans to initiate the clinical trial in the first half of 2020.

2. Outlook for the FY12/20 results

The outlook for FY12/20 is for net sales to decline 67.7% YoY to ¥1,036mn from net sales in the Drug Discovery Support business alone, and for an operating loss of ¥1,779mn. R&D expenses are expected to increase from ¥1,281mn in the previous fiscal period to ¥2,040mn, largely due to AS-0871 clinical trial costs and preclinical trial expenses for AS-1763, a BTK inhibitor targeting blood cancer. The Company plans to file a CTA (Clinical Trial Application) for AS-1763 in Europe during 2020, and move ahead to clinical trials after receiving approval.

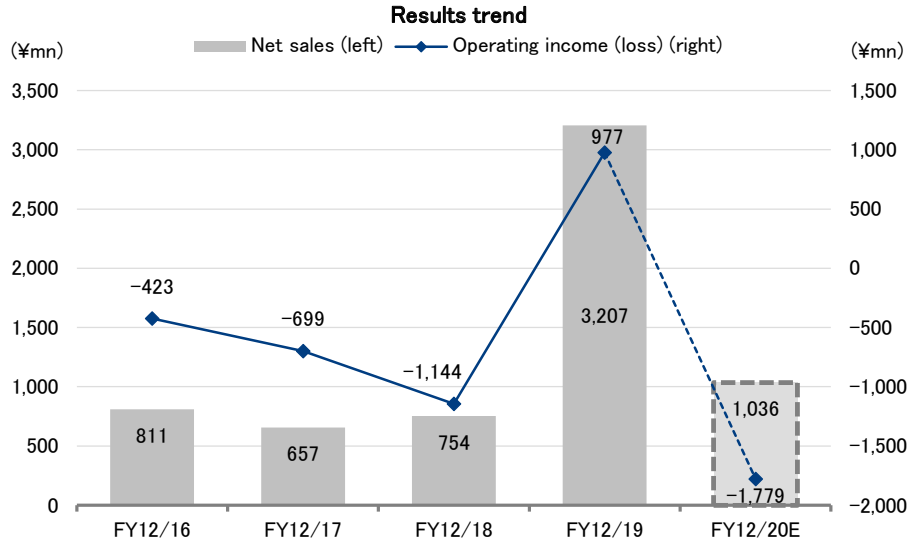
3. Drug Discovery Vision 2030

The Company has established the “Drug Discovery Vision 2030” as a medium-term strategy. By around 2025, the Company will look to have made progress on clinical trials for blockbuster candidates AS-0871 and AS-1763, and stabilize management by licensing-out these drugs once Proof of Concept (POC)* in humans has been attained and receiving milestone payments. From 2026 onward, the Company will aim to drive sustainable profit growth by receiving milestone payments on multiple out-licensed programs, as well as royalties on sales from the commercialized products. In the near term, the Company will need to raise funds given the fact that the investment stage is ongoing. The Company has been issuing subscription rights to shares to raise funds. In addition, it is considering a different means through capital increases via third-party allotment as an option, which will also create stable shareholders.

* The confirmation of safety and efficacy of a new drug candidate substance in humans.

Key Points

- Will initiate Phase 1 clinical trial of BTK inhibitor AS-0871, which targets autoimmune diseases, from 2020
- Net sales increased significantly in FY12/19 due to the licensing agreement signed with Gilead, while operating income was positive for the first time in four years
- Seeks to drive sustainable profits by maximizing the value of its pipeline by conducting clinical trials in-house and by receiving milestone and royalty payments from multiple out-licensed programs



Source: Prepared by FISCO from the Company's financial results

Company profile

Conducts the Drug Discovery and Development business and the Drug Discovery Support business focused on the functions of kinase

1. Company history

The Company was established in Kobe, Hyogo Prefecture, in April 2003, by way of spin-off of the pharmaceutical research facility of Dutch pharmaceutical major Organon's Japanese entity Nippon Organon K.K., and it aimed to develop a drug discovery support business and a drug discovery and development business specializing in kinase.

It established its corporate headquarters and laboratory in October 2003 in the Kobe International Business Center (KIBC) in Kobe City. In 2004, it set up a laboratory for animal testing in the Kobe Business Support Center for Biomedical Research Activities and commenced animal testing. In March 2008, it listed its shares on the JASDAQ NEO (currently JASDAQ Growth) exchange, and the following month, it established a sales subsidiary, CarnaBio USA, Inc., as its first overseas base. Since 2010, it has focused in earnest on drug-discovery research, and in June 2015, in a first for the Company, it concluded a licensing agreement for a pipeline compound with Janssen Biotech, one of US-based Johnson & Johnson's pharmaceutical divisions, but in August 2016, this agreement was ended for strategic reasons at Janssen Biotech. Furthermore, in May 2016, it concluded a worldwide exclusive licensing agreement with US-based Sierra for the CDC7 kinase inhibitor developed by the Company. In June 2019, the Company concluded a licensing agreement with Gilead (U.S.) concerning the drug discovery program in new immuno-oncology that the Company had been researching and developing.

As an overseas business development, the Company opened the research facility CarnaBio C-Lab within the incubation laboratory of J&J Innovation in South San Francisco in the United States in February 2016. It conducted fundamental research aiming to develop new drug discovery technologies, while incorporating cutting-edge technologies and information. As it had achieved a certain level of results*, this facility was closed at the end of January 2019. But in February of the same year, an office was opened in South San Francisco City toward advancing clinical development.

* It succeeded in developing a screening system able to discover BRAF inhibitors with few side effects, and the research results were published in the international scientific journal Scientific Reports (January 24, 2019).

History

Date	Major event
April 2003	Established in Kobe, Hyogo Prefecture, with the spin-off of Nippon Organon K.K., aimed at developing a drug discovery support business and a drug discovery and development business specializing in kinase
October 2003	Commenced operations in the Kobe International Business Center
August 2004	Established a new facility at the Kobe Business Support Center for Biomedical Research Activities and commenced animal testing
October 2005	Established a new chemical testing facility at the Kobe Healthcare Industry Development Center
March 2008	Listed on the JASDAQ NEO exchange (currently JASDAQ Growth)
April 2008	Established CarnaBio USA, Inc., in the U.S.
December 2008	Integrated its headquarters and research facility, shifting to the Kobe Business Support Center for Biomedical Research Activities
October 2013	Made ProbeX K.K. a fully-owned subsidiary by way of simplified share swap
June 2015	Concluded an exclusive global licensing agreement with Janssen Biotech of the U.S. for BTK inhibitors created by the Company (Agreement ended in August 2016)
February 2016	Opened CarnaBio C-Lab as its U.S. research facility
May 2016	Concluded a global, exclusive licensing agreement with U.S. Sierra Oncology, Inc. for its CDC7 kinase inhibitor
March 2018	Concluded an agreement with Sumitomo Dainippon Pharma for joint research to discover new kinase inhibitors for psychiatry and neurology disease, and for their subsequent development and commercialization.
February 2019	Opened an office in South San Francisco, the United States, for clinical development
June 2019	Concluded a licensing agreement with U.S.-based Gilead Sciences, Inc. regarding the drug discovery program in immuno-oncology for which the Company has been advancing R&D

Source: Prepared by FISCO from the Company materials

Kinase inhibitors can be developed as orally available small molecule drugs with fewer side effects

2. The characteristics of kinase inhibitors

While on the one hand anti cancer drugs in use up to the present time are effective treatments, on the other hand they have serious side effects that place a considerable mental and physical burden on the patient. In contrast, molecular targeted drugs*, of which kinase inhibitors are a leading example, selectively inhibit the functions of the specific molecules that are functioning abnormally within the body, so they have the advantage that their therapeutic effects are high but they have fewer side effects compared to conventional treatments. The first time a kinase inhibitor was approved for manufacturing and marketing was in 2001, when the FDA in the United States approved Imatinib (trade name: Gleevec, manufacturer and distributor: Novartis International AG <NVS>) as a treatment for chronic myelogenous leukemia. Subsequently also, more than 30 types (as of December 31, 2018) of kinase inhibitor have been approved as treatments for various cancers, while in 2012, Tofacitinib (trade name: Xeljanz, manufacturer and distributor: Pfizer Inc. <PFE>) was approved as a rheumatoid arthritis therapeutic agent. In such ways, therapeutic areas they are indicated for are expanding, and as one of the representative molecular targeted therapeutic agents, currently R&D is being actively conducted into them around the world, including in major pharmaceutical companies, bio-ventures, and research facilities.

* Drugs with therapeutic effects from inhibiting the functions of specific molecules that cause a disease.

Among them, Ibrutinib (trade name: Imbruvica, manufacturer and distributor: Janssen Pharmaceuticals Inc.), which was approved for the first time in 2013 as a BTK inhibitor, has a high therapeutic effect for blood cancer. With sales of US$4.4bn in 2018, and sales expected to be US$9.5bn in 2024, it is growing to become a blockbuster. In 2017, Acalabrutinib (trade name: CALQUENCE, manufacturer and distributor: Astra Zeneca <AZN>) was approved for sale in the U.S., and sales in 2018 totaled US$62mn. M&A activity has also been picking up recently. In January 2019, U.S.-based Loxo Oncology, which develops BTK inhibitors, was acquired by U.S.-based Eli Lilly <LLY> for approximately US$8bn, while in December 2019, U.S.-based ArQule <ARQL> was acquired by U.S.-based Merck <MRK> for US$2.7bn. The Company is currently developing its second BTK inhibitor.

In the field of molecular targeted drugs, other than into kinase inhibitors (small molecule compounds) R&D is also being actively conducted into antibody drugs (high molecule compounds). While antibody drugs have high efficacy, they require large-scale cell culture facilities to produce them and have extremely high drug prices. Because they are injections, they require treatment at a hospital, and the burden on patients is relatively large. In contrast, kinase inhibitor drugs are small molecule compounds, and apart from being able to keep medication costs low by allowing mass production through chemosynthesis, their characteristics include that because they are orally available, they may be prescribed for home use, so the patient does not have to visit the hospital and the physical burden placed on them is light.

Its strengths are its expertise in screening and profiling, and its high quality kinase production technologies

3. The drug discovery research process

In the drug discovery research process for kinase inhibitors, first, the specific target kinase for the disease in question on which drug discovery research will be undertaken is determined. Then there is selection from a screening process for hit compounds that function to inhibit this specific kinase function. Then several types of compounds that are likely drug candidates are selected from amongst the hit compounds and, based on this, similar compounds are further synthesized to optimize the molecular structure to realize enhanced selectivity and reduced side effects of the kinase. For example, if the target kinase A's functioning is the cause of the disease, a compound that inhibits only A is important to develop a drug with fewer side effects. This is because if a different kind of kinase is inhibited, other normal functions will not work and these changes in the body will be manifested as side effects. The testing to determine which kinase functions that a developed compound inhibits and which it does not is called "profiling." After this sort of research process is completed, drug candidate compounds to proceed to the preclinical trials are identified from the compounds that have been optimized.

In the research process for a series of kinase inhibitor drugs, what is important is the evaluation system for drugs used in screening and profiling (called "assays"). This is because if the quality of the kinase used in the assays, the precision of the measuring system, or the ability to reproduce results are not high, it will be difficult to select a drug candidate compound, and also the research efficiency will be lowered. The Company's strengths are its expertise in screening, profiling, and also its production technologies for high quality kinase.

As of the end of December 2019, the Company offers 360 varieties of kinases and 442 products, making it a world leader in terms of number of kinases offering. By way of reference, it is said that 518 varieties of kinases exist in human cells and thus the Company covers approximately 70% of them. The functions that most of the remaining 30% perform in the body are not clear, so the product lineup of kinase is practically comprehensive as they cover most kinases that can be drug targets. Competitors that undertake kinase production and screening services include Thermo Fisher Scientific Inc. of the United States and Reaction Biology Corporation of the United States.

Its business model is to conduct drug discovery and development using the income gained from the Drug Discovery Support business and then to achieve major results from licensing-out these programs

4. Business description

As well as the parent company, the Group is comprised of one consolidated subsidiary (CarnaBio USA, Inc.) and has two business segments, the Drug Discovery and Development business and the Drug Discovery Support business. The Company's fundamental technologies consist of its assays kinase expertise, including kinase production technologies, profiling, screening and other technologies required in kinase inhibitor research, and its ability to construct a library of original compounds with kinase inhibitory activity. The Company obtains stable income from the Drug Discovery Support business utilizing its fundamental drug discovery technologies, while conducts the Drug Discovery and Development business with the funds gained. Its business model aims to achieve high growth and returns by licensing out the drug candidates which are developed in the Drug Discovery and Development business.

(1) Drug Discovery and Development business

This business is based on the Company's fundamental drug discovery technologies relating to kinase inhibitors. It can search efficiently for drug candidate compounds by utilizing its technologies for manufacturing high quality kinase and its advanced profiling and screening technologies. In addition, it has a fully-fledged chemical synthesis laboratory in-house and can optimize compounds at any time, which is a factor differentiating it from its competitors. All the drugs in the Company's drug discovery pipeline have been created either independently by the Company or through joint-research with academia or other organizations, and they are highly original. It not only possesses a library of unique compounds with kinase inhibitory activity that it has created up to the present time, it also has the human resources and facilities in place to evaluate in-vitro and in-vivo. Also, in FY12/18, it established the Clinical Development Department in the R&D Headquarters, and started building a team to conduct in-house clinical trials. Currently, the team consists of three people in the head office and two people in newly opened office in the United States, but it intends to increase a little more its human resources with expertise in clinical development.

As the management policy for the Drug Discovery and Development business, the Company is building pipelines for both first-in-class*1 and best-in-class*2 through selection, mainly for diseases with strong unmet medical needs for which a revolutionary treatment method has not yet been established, and a research system with a small number of highly skilled researchers, particularly focusing on cancer and autoimmune diseases as the priority areas. In addition, except for one part of the pipeline, its policy is to conduct development in-house up to the Phase IIa clinical trials and then license-out the programs to pharmaceutical companies after increasing its market value. It also strategically licenses-out one part of the pipeline at an earlier stage, of the preclinical trials stage.

*1 Within the therapeutic agents for a certain condition, it refers to an original pharmaceutical that has new targets and mechanisms of action, and which significantly changes the conventional system of treatment (an innovative new pharmaceutical).
*2 Within the therapeutic agents for a certain condition, it refers to a pharmaceutical, which although it does not have a novel mechanism of action, has a clear advantage over other existing drugs by giving new value to the existing targets and mechanisms of action.

(2) Drug Discovery Support business

This business involves the sale and provision of products and services to pharmaceutical companies, universities and other research facilities to support the drug discovery research they are engaged in, based on the fundamental drug discovery technologies involving kinase it possesses. The products it sells are kinase proteins used in kinase inhibitor drug discovery research and assay kits*, while its services include carrying out screening and profiling of the compounds that form the foundation of drugs produced by pharmaceutical companies and other organizations, developing assay kits from specific requests by customers, and cell-based assay services developed by the Company or the companies it collaborates with. Amidst the advances in kinase inhibitor research, cell-based assay services meet customer needs for evaluation of compounds at a cellular level.

* Assay is the generic term for measurement testing and refers to checking how much a test compound inhibits or does not inhibit a target kinase function (measurement of kinase activity), with the kinase required for testing, the buffering solution, and the other necessary elements being sold as a kit.

Most of the sales in this business segment are from kinase proteins, assay development, and screening and profiling services. The main customers for these services are Ono Pharmaceutical CO., LTD. <4528> in Japan, and for overseas, Gilead in the United States.

Trends in the drug discovery pipeline

Will initiate Phase 1 clinical trial in 2020 for BTK inhibitor AS-0871 which targets autoimmune diseases

1. The BTK inhibitor drug development schedule

Among the Company's drug discovery pipeline, two non-covalent BTK inhibitors (AS-0871 and AS-1763) are attracting attention. Non-covalent refers to a type in which after the molecules of the drug bind to the targeted molecule, such as to BTK, the bonded drug molecules separate over time.

Looking at the current development schedule for AS-0871, which is being developed with an indication for autoimmune diseases (rheumatism, allergies, etc.), the Company filed a CTA in Netherlands in December 2019 (approved in February 2020), and plans to initiate a Phase 1 clinical trial on healthy individuals from the first half of 2020. If there are no problems with safety, the Company will decide the indication and move on to the Phase 2 trial.

Meanwhile, for AS-1763, which is being developed indicated for blood cancer, the plan is to file a CTA (clinical trial application) in Europe before the end of 2020, and initiate clinical trials once approval is received. Since clinical trials of anticancer drugs are underway at many companies, it is expected that it will take time to enroll subjects, so it was changed to a CTA in Europe that is based on the AS-0871 CTA. In March 2020, the Company concluded an agreement with BioNova Pharmaceuticals (China) to grant BioNova the development and commercialization rights for AS-1763 for the greater China territory. If BioNova conducts clinical trials in China, where it is easy to recruit trial volunteers, it should speed up the development of AS-1763.

2. Pipeline Status

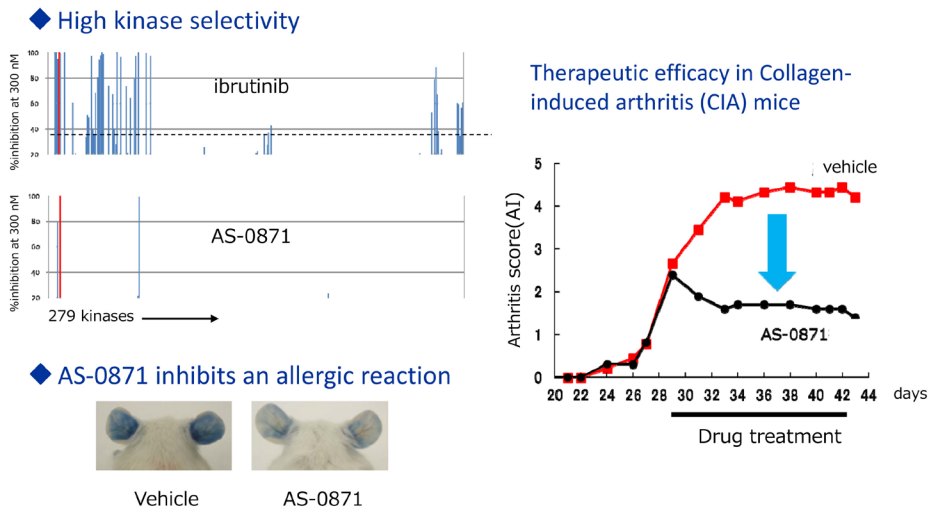
(1) AS-0871: BTK Inhibitor (Targeted disease: Autoimmune diseases)

The Company is developing AS-0871 for autoimmune diseases (including rheumatism, allergies, etc.). Its characteristics include that it is non-covalent, has high kinase selectivity, and a low risk of side effects. It has demonstrated excellent therapeutic effects for arthritis in a mouse model, and it has been confirmed that it is also effective in a model for systemic lupus erythematosus*, which has been designated as an intractable disease.

* It is a disease that produces various autoantibodies due to some cause, and as a result, causes systemic inflammatory organ damage. It is considered to be the most intractable disease among the autoimmune diseases.

Looking at the kinase selectivity profile published by the Company, AS-0871 has only two types of kinase that it inhibits other than BTK, and therefore the risk of side effects is expected to be low. Also, in the results of the test using the arthritic mouse model, the arthritis score remained high even after the administration to the vehicle group, but the score decreased in the group administered AS-0871 to less than half that of the vehicle group.

The high safety and efficacy of AS-0871



Source: From the Company's results briefing materials

Currently, Bristol-Myers Squibb <BMY> 's BMS-986142 (Phase 2 clinical trial completed) and Roche/Genentech's Fenebrutinib (GDC-0853) (Phase 2 clinical trial completed), are competing as non-covalent BTK inhibitors currently under development targeting autoimmune diseases. Of these, Fenebrutinib had strong clinical trial results, so the Company will look to compete with it in the future.

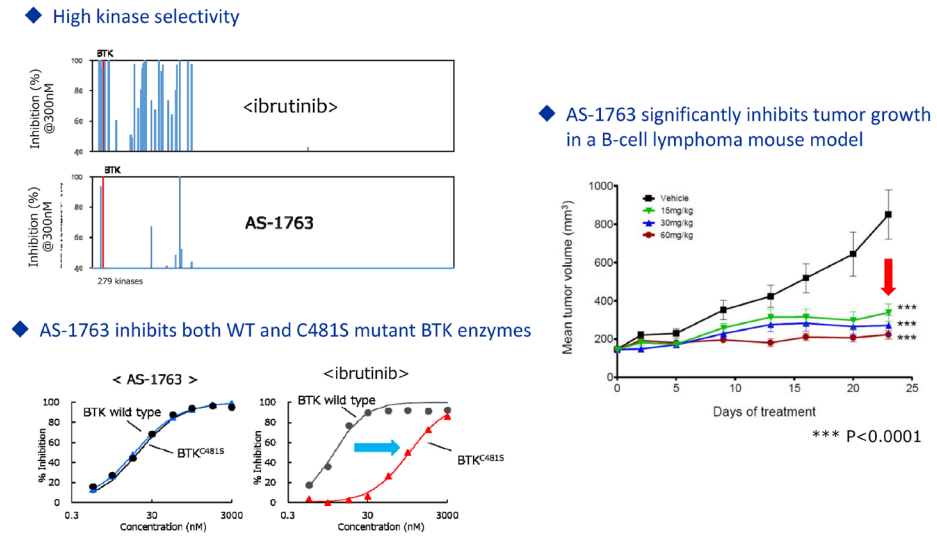
There are several types of therapeutic agents for rheumatism on the market, such as HUMRIA, which is an antibody pharmaceutical, and Tofacitinib (JAK inhibitor, manufacturer and distributor: Pfizer) which is a small molecule therapeutic agent. As the drug prices of antibody pharmaceuticals are high and it is necessary for the patient to go to the hospital once or twice a month to have the drug administered by injection, the problem is that significant economic and physical burdens are placed on the patient. Also, because Tofacitinib has high efficacy but also strong side effects, it is currently only used for patients for which antibody pharmaceuticals are not effective. Therefore, there is the need for the development of a safe, inexpensive small molecule therapeutic agent that has small side effects. The global market for therapeutic agents for rheumatism and other autoimmune diseases is on a scale of around ¥6tn, and development competition is fierce, but if the development of AS-0871 is a success, we think there is a solid chance it could grow to become a blockbuster.

(2) AS-1763: BTK Inhibitor (Indication: Blood cancer)

AS-1763 is being developed for blood cancer. Its characteristics include that it is non-covalent, it has high kinase selectivity so there is a low risk of side effects, it has shown strong inhibitory activity against Ibrutinib-resistant BTK (C481S-mutant BTK), strong anti-tumor effects have been confirmed in a lymphoma model, it shows effect in a cancer immunity model, and the indication can be extended to autoimmune diseases.

As a blood cancer therapeutic agent, Ibrutinib is already on the market as a BTK inhibitor, but it has been reported that continued administration of Ibrutinib leads to mutations in BTK's C481, resulting in Ibrutinib-resistant BTK (C481S-mutant BTK), thereby reducing the therapeutic effect. When Ibrutinib-resistance occurs, the inhibitory effects weaken, which is believed to result in a proliferation of blood cancer cells. AS-1763, which is being developed by the Company, is non-covalent and it has been confirmed through in-vitro research that it has strong inhibitory effects against both the wild-type and the C481-mutant BTK. In terms of kinase selectivity, it affects much fewer types of kinase than Ibrutinib, so the risk of side effects is assumed to be low. It was also found to have a tumor proliferation inhibitory effect. For example, when cells of lymphoma (OCI-Ly10 cells), which is one type of human blood cancer, were transplanted into mice, the sizes of the tumors in the group to which AS-1763 was not administered were about 5 times larger after 23 days, whereas they were only around twice as big in the group to which AS-1763 was administered.

Excellent safety and efficacy of AS-1763



Source: From the Company's results briefing materials

Non-covalent BTK inhibitors being developed to target cancer include U.S.-based Sunesis Pharmaceuticals' <SNSS> vecabrutinib (SNS-062) (Phase 1b/2 clinical trial in progress), ARQ531 (Phase 2 clinical trial in progress) from ArQule (acquired by Merck), and LOXO-305 from Loxo Oncology (acquired by Eli Lilly). Of these, the Company recognizes both ARQ531 and LOXO-305 (Phase 1b/2 clinical trial in progress) as competitors. Trial data is available for ARQ531. The drug efficacy has been excellent, but on the other hand it appears that the kinase selectivity is weak and side effects are strong, thus AS-1763 (which has high kinase selectivity) is seen as being superior.

Trends in the development pipeline

Blood cancer therapeutic agents include Rituximab (trade name: Rituxan, developer: Biogen Inc.), which is an antibody pharmaceutical that had sales on the scale of approximately US$6.4bn in 2018, and Ibrutinib, which is a BTK inhibitor that had sales on the scale of approximately US$4.4bn. As AS-1763 has strong inhibitory effects even against Ibrutinib-resistant BTK, if its development is successful, it may become a blockbuster. However, the progress on development is slightly delayed compared to competing non-covalent BTK inhibitors, and quickly entering clinical trials would be desirable. In March 2020, the Company concluded an agreement with BioNova Pharmaceuticals to grant BioNova the development and commercialization rights for AS-1763 in the greater China territory. If BioNova conducts clinical trials in China, where it is easy to recruit a relatively large number of trial volunteers, the Company will be able to gather and use more clinical trial data, and might be able to accelerate the development of AS-1763.

Drug Discovery Pipeline Status

Compound	Target Kinase	Indication	Drug discovery research	Preclinical trials	Clinical trials	Development partner
SAR-141 (AS-141)	CDC7/ASK	Cancer			IND filed	Sierra Oncology
Small Molecule	Kinase	Immuno-Oncology				Gilead
Small Molecule	Kinase	Psychiatry & neurology				Sumitomo Dainippon Pharma
AS-0871	BTK	Autoimmune Diseases			CTA filed	In-house development (BioNova in China only)
AS-1763	BTK	Blood Cancer				In-house development
		Immuno-Oncology				
Small Molecule	Wnt-signal	Cancer				In-house development
		Immuno-Oncology				
	TGFβ signaling	Blood Cancer				In-house development
		Immuno-Oncology				
	Kinase	Autoimmune Diseases				In-house development
	N/A	Malaria				In-house development
	CDK1	Cancer				In-house development
	STING	Autoimmune Diseases				In-house development

Source: Prepared by FISCO from the Company's results briefing material

Results trends

Net sales increased significantly in FY12/19 due to the licensing agreement concluded with Gilead, while operating income was positive for the first time in four years

1. Overview of the FY12/19 results

In the FY12/19 consolidated results, net sales increased 325.0% YoY to ¥3,207mn, the operating income was ¥977mn (compared to a loss of ¥1,144mn in the previous fiscal year), the ordinary income was ¥957mn (a loss of ¥1,159mn), and the profit attributable to owners of parent was ¥828mn (a loss of ¥1,210mn). The increases in net sales were due to the fact that, in the Drug Discovery and Development business, the Company concluded a licensing agreement with Gilead in June 2019 and booked a ¥2,128mn upfront payment, as well as the fact that net sales in the Drug Discovery Support business increased significantly by 53.2% YoY to ¥1,079mn as a result of strong sales to the U.S. and China. R&D expenses increased ¥141mn YoY due to progress on pre-clinical trials for AS-0871 and AS-1763, but the upfront payment on the agreement resulted in positive operating income for the first time in four years.

FY12/19 consolidated results

(¥mn)

	FY12/18 results	FY12/19			Remarks
		Results	YoY change	YoY change	
Net sales	754	3,207	2,452	325.0%	Booked ¥2,128mn upfront payment on license agreement with Gilead
Gross profit	503	2,999	2,495	495.2%	
SG&A expenses	1,648	2,022	373	22.7%	
(R&D expenses)	1,140	1,281	141	12.4%	Increase in pre-clinical trial expenses
Operating income (loss)	-1,144	977	2,122	-	
Ordinary income (loss)	-1,159	957	2,116	-	
Profit (loss) attributable to owners of parent	-1,210	828	2,038	-	
Exchange rate (¥/US$)	110.45	109.30		-	

Source: Prepared by FISCO from the Company's financial results and results briefing materials

(1) Drug Discovery and Development business

Net sales in the Drug Discovery and Development business were ¥2,128mn (¥50mn in the previous fiscal year), and operating income was ¥577mn (operating loss of ¥1,261mn in the previous fiscal year). In June 2019, the Company concluded an exclusive worldwide licensing agreement with Gilead (U.S.) for the development and commercialization of the drug discovery program for next-generation immuno-oncology that the Company had been researching on its own, and received an upfront payment of ¥2,128mn. Going forward, the Company can receive up to a maximum of US$¥450mn depending on the progress of R&D on this program, as well as royalties depending on sales.

In addition to the licensing agreement, in order to support the development of the program, the drug discovery basic technology for lipid kinase inhibitors developed by the Company will be exclusively provided to Gilead for a certain period of time for a fee.

Meanwhile, the start of the Phase 1 clinical trial for the CDC7 kinase inhibitor* SRA141 (a cancer treatment drug candidate) licensed out to Sierra (U.S.) is behind schedule, due to the fact that Sierra is concentrating resources on the Phase 3 clinical trial for a different development candidate drug, and the Company has announced that it will consider a variety of strategic options. The Company will receive a US$4mn milestone payment if the Phase 1 clinical trial starts, but given the current situation it is difficult to forecast the milestone payment for the time being. The agreement with Sierra stipulates that the Company will receive up to US$270mn in milestone income depending on the progress made on development, as well as royalty payments depending on sales.

> * The mechanism of the CDC7 kinase inhibitor is that in the chromosome cycle, such as DNA replication, which is important in cell division, by inhibiting the CDC7 kinase that is deeply involved in its regulation, it destabilizes the genome in cancer cells and kills these cells. Since normally functioning cells are not affected, the risk of side effects is thought to be low.

Elsewhere, the Company has been steadily advancing its intellectual property strategy. In FY12/19, the Company registered a patent for its BTK inhibitor in China, registered a patent for a Wnt-Signal inhibitor in Japan, registered a patent for a CDC7 kinase inhibitor in Japan and South Korea, and registered a patent for a new anti-malaria drug in the U.S.

(2) Drug Discovery Support business

In the Drug Discovery Support business, net sales increased 53.2% YoY to ¥1,079mn, and surpassed the ¥1,000mn mark for the first time ever, while operating income increased 241.0% YoY to ¥400mn, increasing for the first time in four years. The increase in operating income was due to strong sales to the U.S. and China.

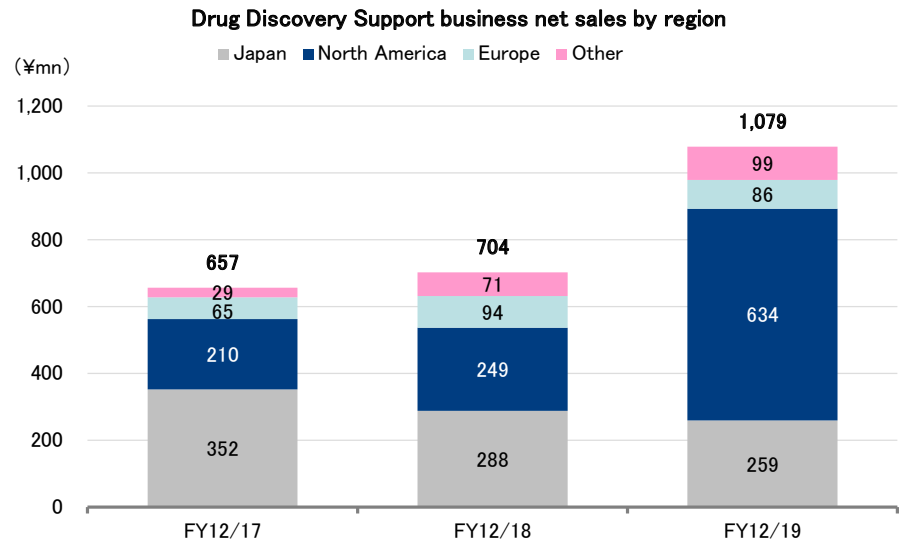
Looking at the breakdown of net sales, sales to Japan decreased 10.2% to ¥259mn, and sales to Europe declined 8.3% to ¥86mn, but sales to North America soared 154.0% to ¥634mn, partially due to large orders from Gilead (assay development, etc.), while sales to China were strong and sales to other regions grew 38.3% to ¥99mn, for double-digit growth. Sales in Japan were impacted by the ongoing narrowing of R&D budgets, centered on main customer Ono Pharmaceutical. Still, signs of a recovery are beginning to emerge, as net sales in the fiscal second half increased 13.7% YoY. In terms of the U.S., in addition to Gilead, sales of profiling services to bio-ventures were strong, indicating robust appetite for development of kinase inhibitors.

As a new service, the Company started a cell-based assay service from December 2018. The scale is still small, but sales were higher than forecast. This service uses the NanoBRETTM technology* of Promega Corporation, which is a leading company for research reagents using light-emission technologies. The number of measurable kinase started from 47 types, and currently more than 100 types can be measured.

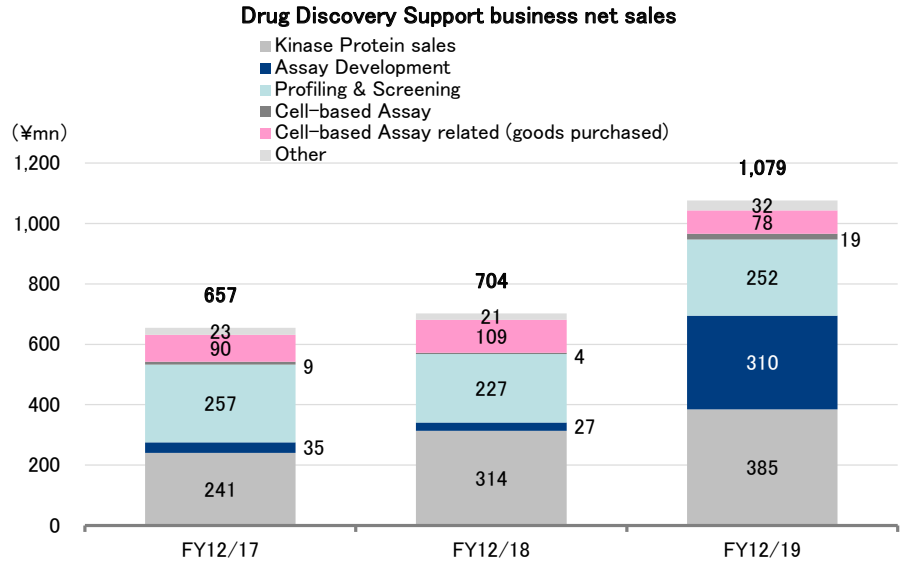
> * NanoBRETTM technology can easily measure various indicators, such as how the compound acts on the targeted kinase, or the kinase's selectivity and affinity, and is able to efficiently evaluate compounds.

In addition, the Company newly added 18 kinase proteins to the lineup, while two kinase targets including lipid kinases were newly added to the profiling panel, thereby expanding the service lineup.

Results trends



Source: Prepared by FISCO from the Company's results briefing material



Source: Prepared by FISCO from the Company's results briefing material

For FY12/20, expecting weak sales in the Drug Discovery and Development business, and forecasting an increase in R&D expenses

2. Outlook for FY12/20 consolidated results

For the consolidated results for FY 12/20, the forecasts are for net sales to decrease 67.7% YoY to ¥1,036mn, operating loss of ¥1,779mn (compared to an income of ¥977mn in FY12/19), ordinary loss of ¥1,794mn (an income of ¥957mn), and loss attributable to owners of parent of ¥1,822mn (an income of ¥828mn).

Looking at the breakdown of net sales, strong sales are not expected in the Drug Discovery and Development business, while net sales in the Drug Discovery Support business, net sales are forecast to decrease 4.0% YoY to ¥1,036mn due to the recoil decline following the large orders received in FY12/19. The Company is expecting R&D expenses to increase 59.1% YoY to ¥2,040mn due to the progress on the preclinical trials and clinical trials for BTK inhibitor drugs. In addition, while three development researchers in Japan and two in the U.S. are already in place, the Company intends to strengthen its development structure by using the opportunity to recruit talented human resources.

Outlook for FY12/20 consolidated results

(¥mn)

	FY12/19 results	FY12/20			Remarks
		Target	YoY change	YoY change	
Net sales	3,207	1,036	-2,171	-67.7%	
Drug Discovery Support business	1,079	1,036	-43	-4.0%	Forecast considering the fact that multiple large orders were received in 2019
Drug Discovery and Development business	2,128	-	-2,128	-	Booked upfront payment from Gilead in 2019
Operating income (loss)	977	-1,779	-2,757	-	
Drug Discovery Support business	400	375	-24	-6.2%	
Drug Discovery and Development business	577	-2,155	-2,732	-	Increase in R&D expenses
Ordinary income (loss)	957	-1,794	-2,752	-	
Profit (loss) attributable to owners of parent	828	-1,822	-2,650	-	
R&D expenses	1,281	2,040	758	59.1%	Clinical trial expenses for AS-0871 and preclinical trial expenses for AS-1763
Capital investment	42	54	12	28.6%	New/upgraded R&D equipment and information system equipment
Exchange rate (¥/US$)	109.30	105.00			

Source: Prepared by FISCO from the Company's results briefing material

(1) Outlook for the Drug Discovery and Development business

In the Drug Discovery and Development business, the Company plans to start AS-0871 Phase 1 clinical trial in Europe in the first half of 2020, and to file a CTA in Europe in 2020 for AS-1763. The Company is also seeking to bring its first development candidate drug to the preclinical trial stage. As a result, the Company expects R&D expenses to increase ¥748mn YoY to ¥1,935mn, and forecasts an operating loss of ¥2,155mn.

(2) Outlook for the Drug Discovery Support business

In the Drug Discovery Support business, the Company plans to focus on expanding its market share in North America, as well as on shoring up the business in Japan, where sales continue to stagnate, as well as on expanding sales in China. For North America, the Company expects sales to decline by ¥43million YoY. Although sales related to the exclusive provision of the Company's drug discovery basic technology to Gilead are included in this, this forecast is based on the Company's expectation that it will not receive large orders like those received from multiple customers in the previous year. In addition, the Company is assuming an exchange rate is ¥105/US$, so net sales could be higher if the yen is weaker than that.

The Company's forecasts for net sales of each main product are relatively conservative. Specifically, the Company expects sales of kinase proteins to decrease ¥45mn YoY, assay development sales to increase ¥28mn, profiling and screening sales to decline ¥22mn, and cell-based assay-related sales to move roughly sideways. Based on the effect from launching new kinase proteins and the high level of inquiries about cell-based assay services using NanoBRETTM technology, net sales will likely exceed the Company's forecast as long as the yen does not strengthen against foreign currencies.

With the objective of developing new products and services, as well as enhancing the quality of existing products and services, the Company is expecting R&D expenses to increase ¥10mn YoY to ¥104mn. The Company is also expecting operating income to decline 6.2% YoY to ¥375mn.

Net sales in the Drug Discovery Support business

(¥mn)

	FY12/17	FY12/18	FY12/19	FY12/20 E	Change
By region					
Japan	352	288	259	246	-13
North America	210	249	634	591	-43
Europe	65	94	86	77	-9
Other	29	71	99	120	21
Total net sales	657	704	1,079	1,036	-43
By product					
Kinase Proteins	241	314	385	340	-45
Assay Development	35	27	310	338	28
Profiling & Screening	257	227	252	230	-22
Cell-based Assay	9	4	19	19	0
Cell-based Assay (goods purchased)	90	109	78	84	6
Other	23	21	32	24	-8
Total net sales	657	704	1,079	1,036	-43

Source: Prepared by FISCO from the Company's results briefing material

Studying new financing options as the R&D stage continues

3. Financial position and management indicators

Looking at the financial position at the end of FY12/19, total assets were up ¥3,606mn on the end of the previous fiscal year to ¥5,376mn. This was mainly because in current assets, cash and deposits increased ¥3,559mn.

Total liabilities were up ¥640mn versus the end of the previous fiscal year to ¥1,523mn. Accounts payable-other increased by ¥141mn, unearned revenue increased by ¥310mn, income taxes payable rose by ¥101mn, and interest-bearing debt increased by ¥42mn. Net assets increased ¥2,966mn to ¥3,853mn. This was due to the ¥2,131mn increase in capital stock and capital surplus combined due to the issuance of shares through the exercise of subscription rights to shares, as well as the increase in retained earnings due to the recording of ¥828mn in profit attributable to owners of parent.

Looking at the management indicators, in the indicators of stability, the shareholders' equity ratio increased from 49.7% in the previous fiscal year to 71.5%, while the net debt to total assets ratio fell from 38.8% to 13.6%. This was mainly because of the significant increase in cash and deposits due to the upfront payment on the agreement and proceeds from the issuance of shares, along with other factors. However, as clinical trials of drugs developed in-house will continue going forward, R&D expenses of around ¥2bn per year are expected to continue, which would result in approximately ¥2bn per year in cash outflow if there were no upfront payments or milestone income. It is expected that new financing will be needed in a year or two, given the level of cash and deposits at the end of FY12/19. The Company has been raising funds by issuing subscription rights to new shares, but the Company now sees capital increase via third-party allotment to institutional investors and other investors who could become stable shareholders as a new financing option. Although per-share shareholder value would be diluted if a capital increase via third-party allotment was carried out, the negative impact on the supply and demand side would be smaller than in the case of issuing subscription rights to new shares, so the effect on the stock price would be neutral, or possibly even positive, depending on the allottee.

Consolidated balance sheet

(¥mn)

	FY12/16	FY12/17	FY12/18	FY12/19	Change
Current assets	2,492	2,134	1,671	5,274	3,603
(cash and deposits)	2,161	1,856	1,355	4,915	3,559
Non-current assets	73	56	98	101	3
Total assets	2,566	2,190	1,770	5,376	3,606
Total liabilities	826	812	882	1,523	640
(interest-bearing debt)	697	624	686	728	42
Total net assets	1,739	1,377	887	3,853	2,966
Management indicators					
Shareholders' equity ratio	67.6%	62.2%	49.7%	71.5%	+21.8pt
Net debt to total assets	27.2%	28.5%	38.8%	13.6%	-25.2pt

Source: Prepared by FISCO from the Company's financial results

Seeks to drive sustainable profits by maximizing the value of pipeline programs through its own clinical trials and by receiving milestone and royalty payments from multiple pipeline programs

4. Drug Discovery Vision 2030

The company has established the “Drug Discovery Vision 2030.” The period from 2010–2015 was designated as the period for building a system for in-house drug development, while the 2016–2020 period was designated as the period for both establishing a track record with out-licensing multiple pipeline programs and starting in-house clinical trials. As for the future schedule, by 2025 the Company aims to acquire POC* in humans in its own clinical trials, maximize the value of drug candidates, and then license them out. At the same time, the Company will also position this period as a time to stabilize its management with milestone income. The period from 2026 onwards will be a time for the Company to aim to generate sustainable profits through the milestone income of multiple out-licensed programs and the royalty income from the launch of sales of licensed products.

* The confirmation of safety and efficacy of a new drug candidate substance in humans.

Currently, the Company has licensing agreements in place with Sierra, Sumitomo Dainippon Pharma, and Gilead. The milestone revenue that can be received from these three companies for drug candidates is a maximum of ¥86bn (exchange rate = ¥105/US$1). Furthermore, the BTK inhibitors currently being developed (AS-0871 and AS-1763) are blockbuster candidates, and may result in major licensing agreements depending on the results of future clinical trials. Although the research and development stage is still ongoing, there are high hopes for future progress on out-licensed drugs and drugs developed in-house.

Drug Discovery Vision 2030

Started drug discovery research	Demonstrated strong capabilities in drug discovery	Maximize pipeline value	Continue delivering profits
2010–2015	2016–2020	2021–2025	2026–2030
Built in-house research platform	Licensed-out multiple programs	POC in humans obtained for in-house clinical trials	Obtain milestone payments and royalties from multiple pipeline programs
Established drug discovery pipeline	Began in-house clinical trials	Stabilize management by milestone revenue	

Source: Prepared by FISCO from the Company’s financial results

Shareholder returns policy

For the time being is allocating funds to R&D investment

The Company is a drug discovery venture currently in the R&D stage and it continues to have negative retained earnings carried forward, so it does not currently pay a dividend. Going forward, for the time being its policy is to allocate funds as a priority to drug discovery and to investment in R&D into fundamental drug discovery technologies, and thereby to work to strengthen its management foundations and enhance corporate value. In terms of returning profits to shareholders, it will consider paying a dividend at the stage when it becomes possible to do so in the future upon considering its business results and financial condition.

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■ For inquiry, please contact: ■
FISCO Ltd.
5-11-9 Minami Aoyama, Minato-ku, Tokyo, Japan 107-0062
Phone: 03-5774-2443 (Financial information Dept.)
Email: support@fisco.co.jp