Mid-Term Management Plan (FY2015-FY2019)

June 29, 2015
Shin Ashida
Chairman & CEO

“HIYAKU”
-Leap into the Future-

飛躍

2015-19 Medium-Term Management Plan

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1. Our Philosophy and Vision

Our Philosophy

Contributing towards people's healthcare through pharmaceutical products

Under our Philosophy,
we take one step further to contribute to health improvements with regenerative medicine and biotechnologies as a pioneer company engaged in research, development, manufacturing and marketing of treatment options.

Our Vision

R&D oriented specialty pharma with global exposure, built on proprietary biotechnologies and cell therapy and regenerative medicine technologies.

Utilizing advanced biotechnologies to address rare diseases and intractable diseases such as inborn errors of metabolism, as well as and developing and creating regenerative medical products is our important mission.

The spirit of challenge which we have valued since establishment of JCR and the open working environment shape our corporate culture of today. Every employee time-consciously takes on challenges to stay one step ahead of our competitors.

2. Key Concept of Mid-Term Management Plan
(FY2015-FY2019)

Key Concept of Mid-Term Management Plan
(FY2015-FY2019)

Now is the time to leap into the future

Technologies and experiences accumulated to date are beginning to yield results.
JCR is ready to advance toward the next stage.

Our Strengths (Drivers to achieve “HIYAKU”)

- **Proprietary Biotechnologies**
  - at the age of innovation
- **Cell Therapy and Regenerative Medicine Technologies** **-** achievement of our challenges
- **Development Capabilities**
  - full-fledged from research to commercialization
- **Production System**
  - adapted to global standard
- **Business Structure**
  - focused in the target domain
- **Management Structure**
  - capable of speedy decision making
- Proactive team of
  Multi-Talented Human Resources

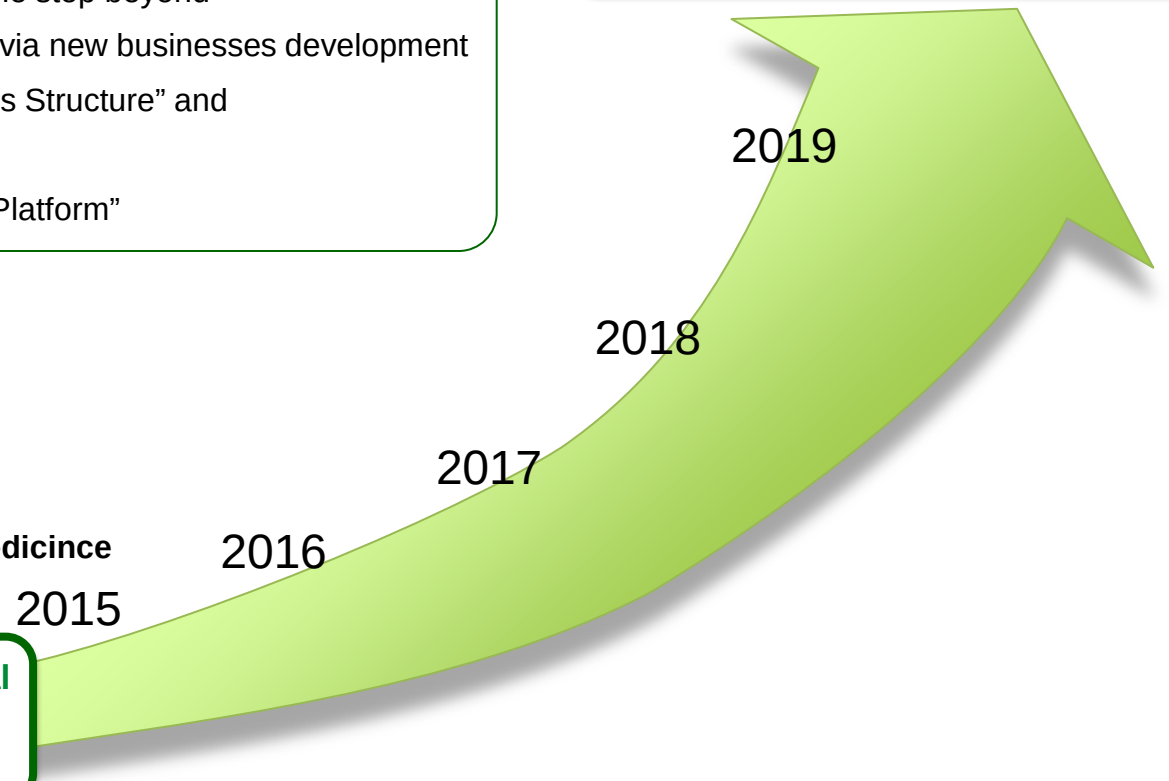
Scenario for Achieving Mid-Term Management Plan

Mid-Term Management Plan (FY2015-FY2019)

Points of Focus to Achieve our Goals

1. Advancing R&D activities one step beyond
2. Reinforcing our capabilities via new businesses development
3. Further enhancing “Business Structure” and “Product Strategy”
4. Reinforcing “Management Platform”

Research oriented specialty pharma with global exposure



Proprietary Biotechnologies
Cell Therapy and Regenerative Medicince Technologies

R&D oriented pharmaceutical company with leading technologies

3. Basic Business Policy & Numerical Goals for Mid-Term Management Plan (FY2015-FY2019)

Sales Goal

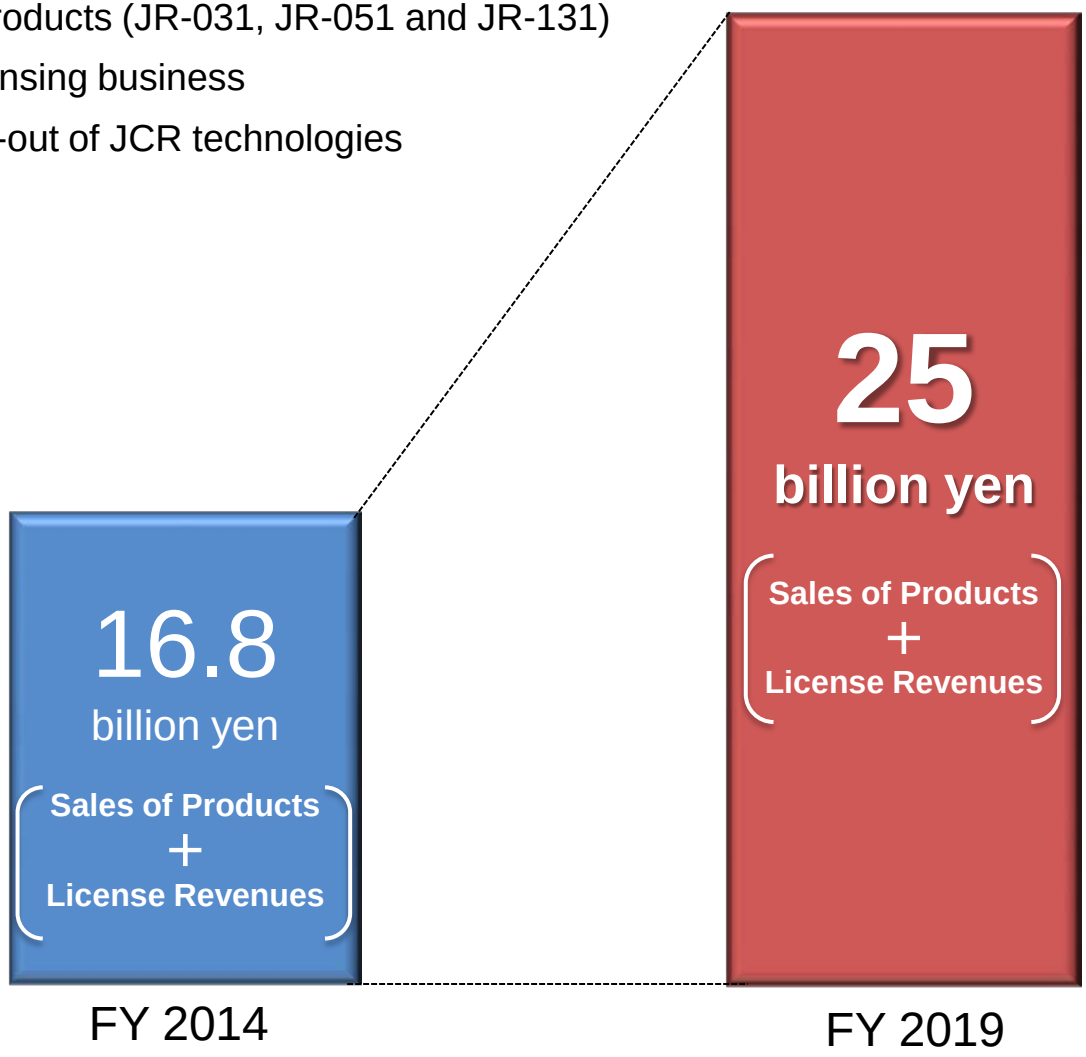
Major Drivers

◎Sales Increase of existing core products

◎Launch of new products (JR-031, JR-051 and JR-131)

◎Expansion of licensing business

including license-out of JCR technologies



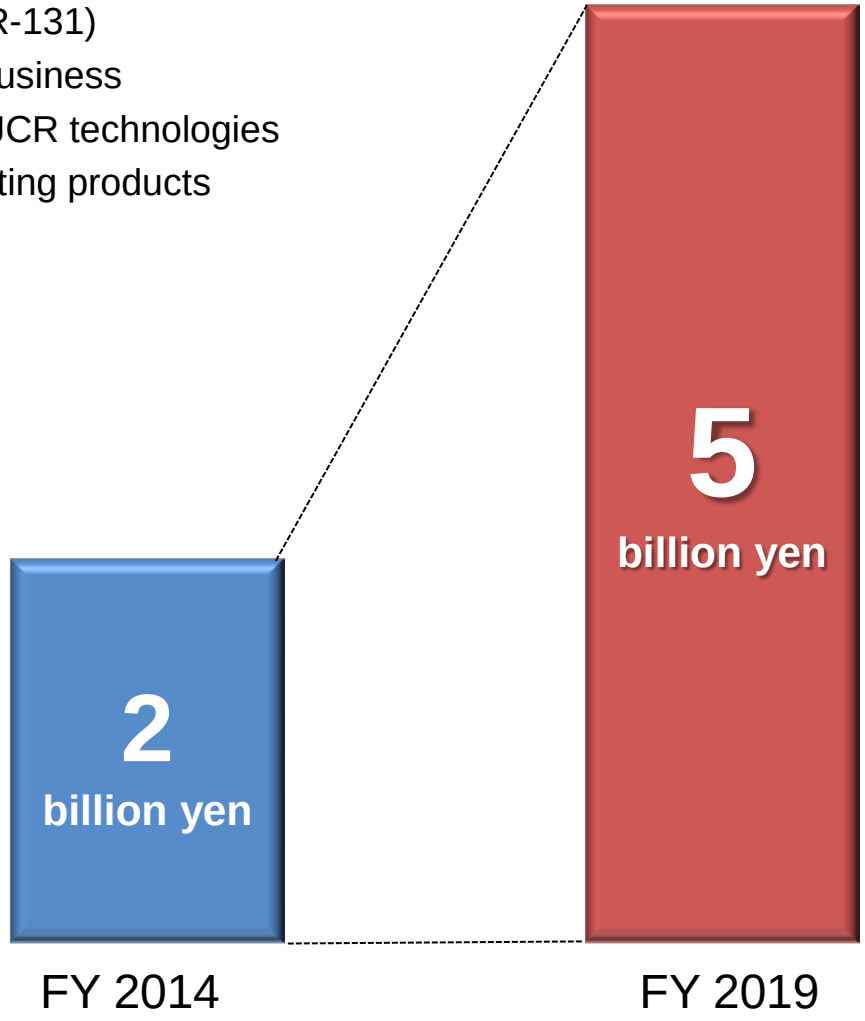
Operating Profit Goal

Major Drivers

◎Launch of new products
(JR-031, JR-051 and JR-131)

◎Expansion of licensing business
including license-out of JCR technologies

◎Reduction in cost of existing products



Goal in Sales and Operating Profit Ratio

20% or more

Policy in R&D Expenditure Ratio (To Sales)

R&D Expenditure Ratio (To Sales) **20%**

It is essential for us to stay ahead of others in our technology development for our further growth and leap into the future. We will secure the necessary financial resource to sustain our R&D activities and we will proactively challenge the technology breakthrough.

Transition of R&D Expenditure Ratio	FY2010	FY2011	FY2012	FY2013	FY2014
	14.0%	14.3%	14.1%	14.0%	19.8%

(note)

R&D Expenditure Ratio before Expenditure born by Co-Developer was deducted	FY2010	FY2011	FY2012	FY2013	FY2014
	14.2%	17.9%	20.3%	17.7%	21.5%

Policy in Dividend Ratio

Dividend Ratio 40%

JCR is committed to a shareholder return through a sustainable dividend policy, and we aim to creating as many JCR supporters as possible.

Furthermore, we will steadily build up our equity capital so as to retain adequate internal reserve for development of innovative biopharmaceuticals and a robust management practice.

Transition of Dividend Ratio	FY2010	FY2011	FY2012	FY2013	FY2014
	41.5%	60.8%	52.1%	41.7%	35.0%

Points of Focus to Achieve our Goal

1. Advancing R&D activities one step beyond

- Push past the limits of research and development with accumulation of technologies and creativity
- Challenge the creation of world's first innovative biopharmaceutical product originating from Japan utilizing our proprietary technologies
- Further development in the cell therapy and regenerative medicine field
- Engagement in new technologies such as gene therapy and iPS cell technology

2. Reinforcing our capabilities via new business development

- Enhancement of alliance and licensing
- Acceleration of licensing-out of JCR proprietary technologies to domestic and overseas companies
- Creation of products through production and quality assurance system of global standard
- Strengthening alliance with partners in view of delivering JCR products to the global market

Points of Focus to Achieve our Goal

3. Further enhancing “Business Structure” and “Product Strategy”

- Enhancement of promotional activity of our core products Growject® and Epoetin Alfa BS Inj. JCR
- Lineup of new biopharmaceuticals in priority disease areas
- Expanding our commercial channels to reach “key hospitals” that match our enriching product portfolio
- Establishing our presence in the cell therapy and regenerative medicine field

4. Reinforcing “Management Platform”

- Strengthening of human resources development for sustainable growth
- Reinforcement of our financial structure through capital ties with multiple alliances and partners
- Fulfilling shareholder return and steady accumulation of our equity capital
- Global financial strategy with the ability to adapt to any changes in the economic environment
- Enhancement of corporate governance

4. Our Technologies and New Business Development

" Accumulation of Technological capabilities" that leads us toward the Stage of "HIYAKU"

Challenge to New Therapies *(See slide # 28)*
- Gene Therapy
- iPS cells

Tissue Targeting Technologies *(See slide # 21)*
- Tissue Targeting Technology
- **J-Brain Cargo**
  - BBB Penetration Technology
  - Targeting other tissues

Technologies for Cell Therapy and Regenerative Medicine *(See slide #s 24, 25)*
- Regenerative Medicine Technology
- Technologies supporting Regenerative Medicine
- First allogeneic regenerative medical product in Japan JR-031

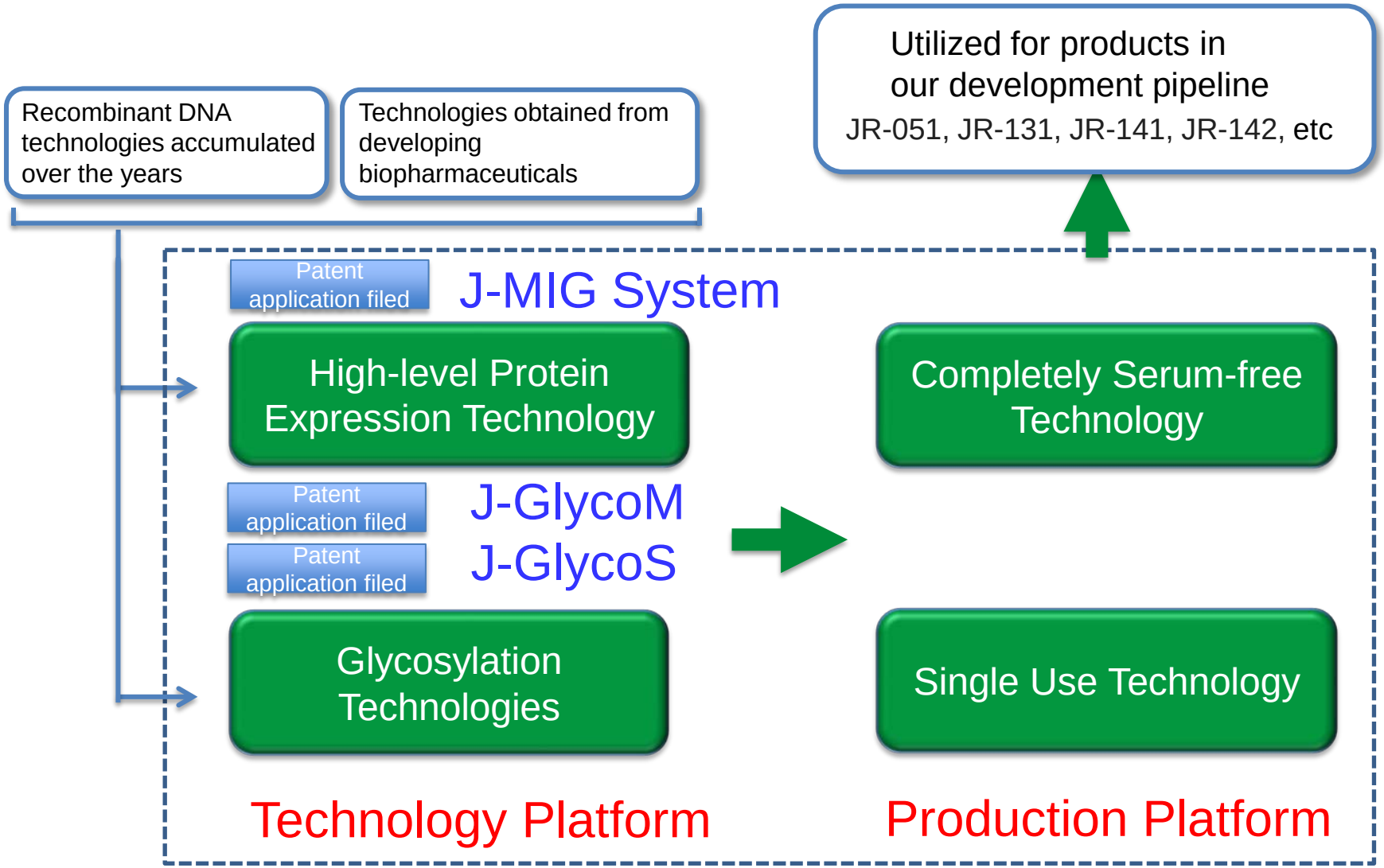
Technologies for Developing Recombinant DNA Products *(See slide #s 18-20)*
- Cell Culture Technology
- Single Use Technology
- Glycosylation Technology — **J-GlycoM**
- Scale up Cultivation Technology — **J-GlycoS**
- Completely Serum-free Technology — **J-MIG System**
- Recombinant DNA Technology
- High-level Protein Expression Technology
- High-level Protein Purification Technology
- Glycosylation Technology
- "Made in Japan" First Biosimilar Erythropoietin BS
- "Made in Japan" hGH Product Growject®
- Human Origin Products (Urokinase and others)

Granted 1st Prize at IBC'S 10th Annual Cell Line Development & Engineering (2014)

- Hunter Syndrome (Lysosomal Storage Disease) — JR-141
- Hunter Syndrome (Lysosomal Storage Disease) — JR-032
- Fabry Disease (Lysosomal Storage Disease) — JR-051
- Renal Anemia — JR-131
- Long-acting hGH — JR-142

Inception 1975～ → Growth → Development → HIYAKU 2015～

Technologies for Developing Recombinant DNA Products



High yield ⇒ Cost down
High quality ⇒ Enhanced safety, differentiation of our products from competitors'
High efficiency ⇒ Multiple product lines at single manufacturing site

Technologies for Developing Recombinant DNA Products

High-level Protein Expression Technology: J-MIG System

On September 8th, 2014
JCR was awarded with the first prize at the IBC's 10th Annual Cell Line Development & Engineering held in the U.S.

We succeeded in the efficient expression of recombinant proteins by preferentially and intensively amplifying target gene transfected into CHO cells.

modified-IRES-GS System

Novel expression vector system created by coupling the target gene and GS gene with drug resistance gene with modified internal ribosome entry site (modified-IRES)

- High drug selection
- Capable of preferentially amplifying GS gene

→ **High-expressing cell lines**

J-MIG System with the utilization of completely serum-free technology and single use bioreactors provides the opportunity of establishing efficient high-expression cell culture system.

Technologies for Developing Recombinant DNA Products

Glycosylation Technologies: J-GlycoM, J-GlycoS

Most biologically active proteins are glycoproteins, composed of amino acids which are partially bound to chains of sugars. Sugar chains play an important role in a wide variety of functions of a living organism.

In our technology portfolio, we apply the following technologies to obtain target sugar chain structure and utilize for the production of recombinant DNA-based drug products.

J-GlycoM:

Technology for expressing glycoproteins of high-mannose-type sugar chains by transfecting insect origin chain trimming enzyme into CHO cells.

J-GlycoS:

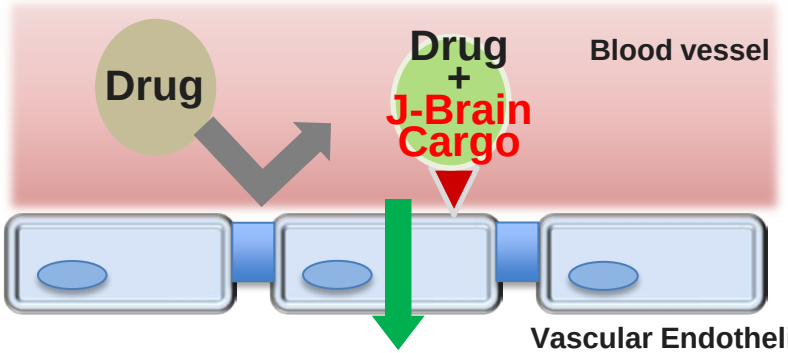
Technology for expressing glycoproteins highly-modified with sialic acids by adding multiple biological substances related to hexosamine biosynthesis sialylation as medium components.

BBB Penetration Technology: J-Brain Cargo

Patent application filed

J-Brain Cargo

Proprietary Blood Brain Barrier Penetration Technology



JR-141

BBB-penetrating recombinant IDS* for Hunter syndrome

Clinical trials to start in FY 2016 est.

Mice study:
Delivery of JR-141 into the brain
in vivo efficacy of JR-141 confirmed

Monkey study:
Delivery of JR-141 into the brain confirmed

*IDS: iduronate-2-sulfatase

To apply J-Brain Cargo to create treatment options for certain lysosomal storage diseases other than Hunter syndrome with central nervous system manifestations.

Farber, Gaucher, GM gangliosidosis, Krabbe, MLD, MPS IH, MPS III, α-mannosidosis, β-mannosidosis, NCL(Batten), etc

Technology licensing-out business

June 17, 2015
Feasibility Agreement concluded with Sumitomo Dainippon Pharma Co., Ltd.
Discussion with several potential partners is ongoing

Product Development Utilizing JCR Proprietary Technologies

Growject® Business

Growject®

New dosage form of liquid formulation
Launch in 2017

JR-142

Long-acting Human Growth Hormone product

Clinical trials in FY 2017 est.

ESA* Business

Epoetin Alpha BS Inj. JCR

JR-131

Darbepoetin alfa Biosimilar

Application for marketing approval in FY 2018 est.

*Erythropoiesis-stimulating agent

J-MIG System

High-level Protein Expression Technology

J-GlycoM

J-GlycoS

Glycosylation Technology

Rare Diseases

JR-051

αGAL-A

Biosimilar (Fabry disease)

Application for marketing approval in FY 2017 est.

J-Brain Cargo

JR-141

Development of BBB-penetrating innovative biopharmaceuticals

Expansion of Production Sites to Further Product Launch

We will promote functional differentiation of our production sites in anticipation of globalization.

Production Center for Investigational New Drugs (tentative name)

Construction to start in Q2 of FY2015

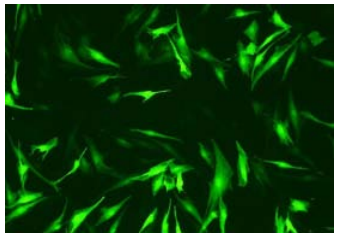
We expect to accelerate development of J-Brain Cargo-utilized products, such as JR-141.

We plan to add a new production site for API (active pharmaceutical ingredients) for the future.

New API Production Site

Technologies for Cell Therapy and Regenerative Medicine

JR-031（mesenchymal stem cells）



First domestic regenerative medical product of allogeneic cells
- Application for marketing approval filed on September 26, 2014
- Approval anticipated in 2015

Japan's large-scale production facility of regenerative medical products

- Production site completed in July, 2014
- State-of-the-art facility

Ultra-low-temperature Logistics System

JCR Pharmaceuticals Co.,Ltd. + Medipal Holdings Corporation

R&D capability **Logistics capability**

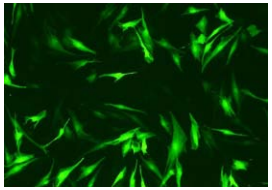
- Storage and delivery at ultra-low-temperature (below −130 degrees Celsius)
- Rapid delivery to accommodate the sudden need/development of target diseases
- Dedicated logistics system installed at Medipal's logistics hubs.

Technologies for Cell Therapy and Regenerative Medicine

Further to recombinant DNA-based drug products, we added Cell Therapy and Regenerative Medicine as a new pillar to our R&D

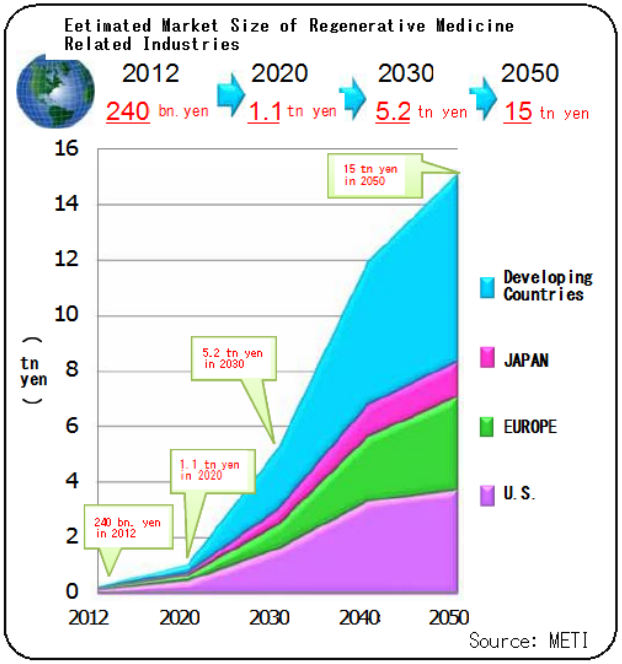
JR-031(mesenchymal stem cells)

First domestic regenerative medical product of allogeneic cells



Application for marketing approval on 26Sep2014

- Orphan Drug designation in Dec2013
- Production site completed in Jul2014
- State-of-art facility



JCR's cell cultivation know-how accumulated over the years

New Business Development of Cell Therapy and Regenerative Medicine

New cell sources & target diseases

(Obtained research contracts from METI)

- **FY 2013** Project of Promoting Industrialization of Regenerative Medicine
- **FY 2014** Project of Developing Evaluation Technology for Industrialization in Regenerative Medicine field

(Obtained research contracts from AMED)

- **FY 2015** Project of Developing Evaluation Technology for Industrialization in Regenerative Medicine field

New Business Development

Reinforcement of Alliance
Strategic Licensing-out

Research oriented Specialty Pharma with global exposure

Japan

Technology Licensing Business

Commercialization/Sales

Proactive business development

Proactive technology licensing-out to Japanese companies

Overseas

Technology Licensing Business

Proactive technology licensing-out to overseas companies

Product Supply

- Globalization of in-house developed products
- Alliance with partners

New Business Development

Partnering

JCR R&D Pipeline

- Rare Diseases (Lysosomal Storage Diseases)
- Therapeutic Enzymes

JCR Proprietary Technologies

- J-Brain Cargo
- J-GlycoS
- J-MIG System
- J-GlycoM

Production & Quality Assurance System of global standard

Outcome of the alliance with GlaxoSmithKline Group

Development Pipeline

As of June 2015

Code	Product Name Indication	Preclinical	Clinical trial	Filed	Marketing Approval	Remarks
JR-041	**Follicle stimulating hormone (rDNA origin)**					Out-licensed to ASKA Pharmaceutical Co., Ltd.
	Infertility		Phase I/II			
JR-051	**α-GAL - A (rDNA origin)**					Enzyme Replacement Therapy (ERT) Co-development with GSK Group
	Fabry disease (LSD)		On going			
JR-032	**IDS (rDNA origin)**					ERT Co-development with GSK Group
	Hunter Syndrome (LSD)		In preparation			
JR-131	**Darbepoetin Alfa (rDNA origin)**					Co-development with Kissei Pharmaceutical Co., Ltd.
	Renal anemia					
JR-101	**GBA (rDNA origin)**					ERT
	Gaucher disease (LSD)					
JR-141	**BBB-Penetrating IDS (rDNA origin)**					ERT J-Brain Cargo* J-MIG System**
	Hunter Syndrome (LSD)					
JR-142	**Long-acting Somatropin (rDNA origin)**					Long-acting human growth hormone product J-MIG System**
	Growth disorder					
JR-031	**Human mesenchymal stem cells (hMSCs)**					Allo-transplantation of hMSCs
	Suppression of graft-versus-host disease (GVHD)			Filed with PMDA		

*JCR's proprietary Blood-Brain Barrier Penetrating Technology **JCR's proprietary High-level Protein Expression System

Challenge to New Technologies

As a “R&D oriented pharmaceutical company focusing on rare and/ or intractable diseases”, we take on challenges in quest of new technologies including gene therapy, iPS cell technology and others.

Gene Therapy

The development of gene therapy is essential for inborn errors of metabolism because enzyme replacement therapy cannot be a permanent cure.
We will engage in the development of gene medicine utilizing our proprietary technologies.

iPS Cell Technology

We are exploring various uses of iPS cells for disease models for efficacy assessment, etc.
We will quest for potential clinical application of iPS cell technology in the future.

5. Glossary

Glossary

Orphan Drugs	Therapeutic products are designated as orphan drug/medical device by Ministry of Health, Labour and Welfare if they meet certain requirements such that their intended use is in less than 50,000 patients, no adequate drug/medical device or therapy exists for substitution, notably high efficacy or safety are expected in comparison with existing drugs/ medical devices, and its medical need is especially high.
Inborn Errors of Metabolism（Lysosomal Storage Diseases）	A collective term of inherited disorders of certain metabolic system causing accumulation of metabolites. They are categorized into disorders of “amino acid metabolism”, “carbohydrate metabolism”, “lipid metabolism”, etc. according to the metabolites involved. Lysosomal Storage Diseases (Hunter syndrome, Fabry disease), referred in our R&D pipeline, are categorized in Inborn Errors of Metabolism. Lysosomal storage diseases cause severe symptoms as a result of accumulation of metabolites due to abnormality of enzyme related to organelles called, “lysosomes” in the cells.
High-level Protein Expression System: J-MIG System	Many proteins have an activity as glycoproteins as they are composed of amino acids to which sugar chains are bound. Being an active ingredient of recombinant drugs, glycoproteins are produced by introducing the target gene into culture cells and expressing them in the cells. The cell line which is most frequently used is CHO cells, derived from the ovary of the Chinese hamster. We succeeded in the development of “Modified-IRES-GS Lineage High-level Protein Expression System” (J-MIG System) which preferentially amplifies the incorporated target gene in order to express glycoproteins efficiently in CHO cells. Our presentation in relation to J-MIG System was granted the first prize at IBC’s 10th Annual Cell Line Development & Engineering, a top-level society in the biopharmaceutical industry field, held on September 8th, 2014 in the U.S.

Glossary

Completely Serum-free Technology	In the production of the biopharmaceuticals, cells in which target proteins are produced are grown in solutions called “media”. This process is called “cultivation”. Usually media containing serum as a nutrient is used, and growing the cells in serum-free media is called “serum-free cultivation”. This technology is free from risks such as infection associated with serum, therefore it contributes significantly to the safety of the products.
Single Use Technology	A technology whereby a disposable plastic bag is used as a bioreactor for cultivation in media. Such single use bioreactor eliminates sterilization and rinsing process in the cultivation step that otherwise are required during production of biopharmaceuticals by a conventional technology.
Tissue targeting Technology	A technology which enables efficient delivery of a drug substance to the target organs and tissues where it is needed. Some lysomosal storage diseases for which we are developing treatment options, result in accumulation of harmful metabolites in the respiratory and cardiac muscles, manifesting fatal symptoms, or in the bone causing malformation of cervical spine and deformation of limbs and back. We are engaged in the development of “Tissue Targeting Technology” which is capable of delivering a therapeutic enzyme to clear metabolites deposited in the tissues such as muscles and bones.
BBB Penetration Technology: “J-Brain Cargo”	BBB is the acronym of “Blood-Brain Barrier”. BBB acts as a barrier to protect important brain neurons from harmful substances. Vascular endothelial cells are lined up so closely to each other forming a tight junction that limits certain substances to pass through the cells. In general, proteins are unable to cross the BBB, and the development of BBB penetration technology via various methods is being attempted. Certain existing therapeutic drugs, including those for the treatment of Hunter syndrome, are challenged by the BBB and are hardly delivered into the brain. At JCR, we strive to make a breakthrough in the current therapy by utilizing our proprietary BBB Penetration Technology, “J-Brain Cargo”.

Glossary

Mesenchymal Stem Cells (MSCs)	Stem cells are cells with the ability to self-renew and differentiate. Various stem cells including embryonic stem cells and iPS cells are well known, but there are others such as mesenchymal stem cells (MSCs) with the ability to differentiate into bone and cartridge of mesodermal origin. Research and development of regenerative medicine for bone and joint disease is pursued utilizing the multipotent ability of MSCs. At JCR, we focus on the immunomodulating property of MSCs and develop MSCs as a treatment for acute Graft-versus-Host Disease (GVHD), a life-threatening side effect associated with hematopoietic stem cell transplantation.
Glycosylation Technology: J-GlysoM, J-GlycoS	It is known that proteins consist of chains of amino acids, and most proteins constituting the body are amino acids partially bound with sugar chains, called “glycoproteins”. Darbepoetin and lysosomal enzymes which JCR are developing are also glycoproteins. When creating biosimlars of such compounds of interest, we need to create a product similar to originator (e.g. Nesp® for JR-131) with an equivalent sugar chain structure. J-GlysoM as well as J-GlycoS are JCR’s technologies adapted to recombinant DNA-based production aimed to obtain glycoproteins with desired sugar chain structure. These technologies were established in the course of our development of biopharmaceuticals over the years. J-GlysoM is a technology for expressing glycoproteins having only high mannose-type sugar chains, whereas GlycoS is a technology for expressing glycoproteins highly-modified with sialic acids in an ingenious cultivation process.

FORWARD-LOOKING STATEMENTS

This document contains forward-looking statements that are subject to known and unknown risks and uncertainties, many of which are outside our control. Forward-looking statements often contain words such as "believe," "estimate," "anticipate," "intend," "plan," "will," "would," "target" and similar references to future periods. All forward-looking statements regarding our plans, outlook, strategy and future business, financial performance and financial condition are based on judgments derived from the information available to us at this time. Factors or events that could cause our actual results to be materially different from those expressed in our forward-looking statements include, but not limited to, a deterioration of economic conditions, a change in the legal or governmental system, a delay in launching a new product, impact on competitors' pricing and product strategies, a decline in marketing capabilities relating to our products, manufacturing difficulties or delays, an infringement of our intellectual property rights , an adverse court decision in a significant lawsuit and regulatory actions.

This document involves information on pharmaceutical products (including those under development). However, it is not intended for advertising or providing medical advice. Furthermore, it is intended to provide information on our company and businesses and not to solicit investment in securities we issue.

Except as required by law, we assume no obligation to update these forward-looking statements publicly or to update the factors that could cause actual results to differ materially, even if new information becomes available in the future.

Thank you for your attention.

– JCR Biotech for a New Tomorrow –