

Bio CDMO Div. & Life Sciences Business Div. Business Briefing

December 15, 2022

FUJIFILM Holdings Corporation

Forward-looking statements, such as those relating to earnings forecasts and other projections contained in this material, are management's current assumptions and beliefs based on currently available information. Such forward-looking statements are subject to a number of risks, uncertainties, and other factors. Accordingly, actual results may differ materially from those projected due to various factors.

**NEVER
STOP**

FUJIFILM
Value from Innovation

1

Life Sciences Business Group

Takatoshi Ishikawa

FUJIFILM Corporation

Director, Senior Executive Vice President, CLSO

General Manager, Life Sciences Strategy Headquarters

2

Bio CDMO Division

Takatoshi Ishikawa

FUJIFILM Corporation

Director, Senior Executive Vice President, CLSO

General Manager, Bio CDMO Division

3

Life Sciences Business Division

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FUJIFILM Corporation

Corporate Vice President,

General Manager, Life Sciences Business Division



1 | Life Sciences Business Group

1-1 | Life Sciences Business Group : Organization

- “Healthcare” segment has two business groups ; “Medical Systems” and “Life Sciences”.
- “Life Sciences” business group to strengthen and prioritize Bio CDMO and drug development support businesses.

➔ **Become a leader within the life science industry, by offering value of end-to-end solutions as a company strongly supporting the creation of cutting-edge medicine.**

Healthcare

Medical Systems

Medical Systems Business Div.

Life Sciences

Life Sciences
Strategy
Headquarters

LS-CVC

Bio CDMO Div.

Life Sciences Business Div.
(Cell / Cell Culture Media / Reagent)

Pharmaceutical Products Div.

Consumer Healthcare Business Div.
(Cosmetics /Supplements)

FUJIFILM Diosynth Biotechnologies (FDB) |   

FUJIFILM Toyama Chemical (FFTC) | 

FUJIFILM Cellular Dynamics (FCDI) | 

FUJIFILM Irvine Scientific (FISI) |   

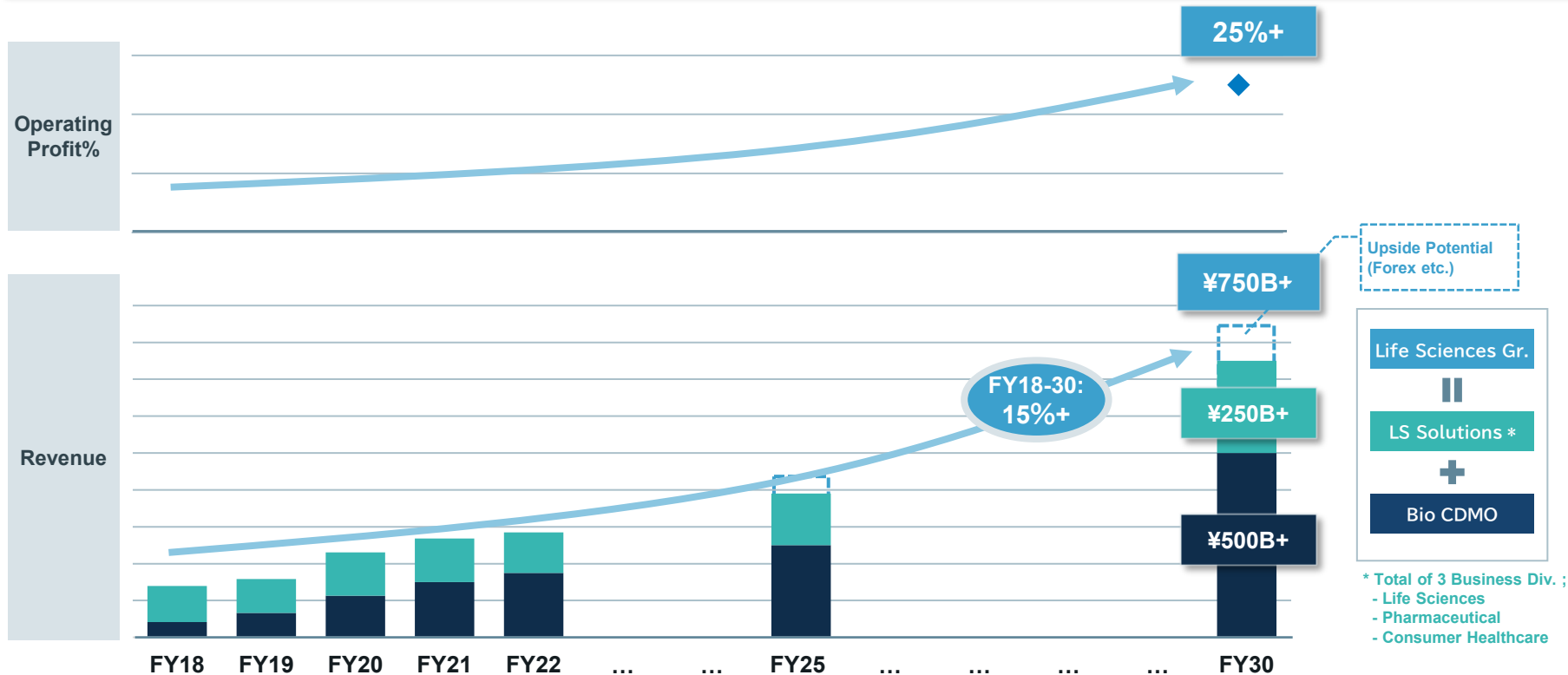
FUJIFILM Wako Pure Chemical (FFWK) | 

Shenandoah Biotechnology | 

*Group Companies | Site

1-2 | Life Sciences Business Group : Financial Target toward FY30

Toward FY30, Life Sciences Business Group will achieve strong business growth;
 i) Revenue : ¥750B+, ii) FY18-30 CAGR : 15%+, iii) Operating Profit Margin: 25%+.



1-3 | Life Sciences Business Group : LS-CVC (Life Sciences Corporate Venture Capital)

- In Feb. 2022, launched LS-CVC.
- In Dec. 2022, invested in PhenoVista Biosciences, a leading CRO of providing the imaging-based assay services.

Goals and Objectives

- Access cutting-edge and innovative biotechnologies and know-how outside of Fujifilm group.
- Through strategic alliance with early-stage companies / biotech startups,
① create synergy, ② enhance current businesses and expand product/service portfolio, ③ enter new business.
- Accelerate business overall growth of Life Sciences Business Group overall.

Target

- **Bioprocess technologies for novel biopharmaceutical** : Cell and gene therapy, mRNA, Novel antibodies
- **Innovative cell technologies** : Editing, Analysis
- **Innovative biomanufacturing technologies**



2 | Bio CDMO Division

- 1. Overview of Bio CDMO Business**
2. Outlook of Bio CDMO Business
3. Technological Advantage
4. Environmental Approach
5. Wrap-up

1-1 | Bio CDMO Market Trend

In addition to conventional modalities such as antibodies, technological developments within next gen biopharmaceuticals further increase the demand for CDMOs

The growth of the Bio CDMO drug substance market further accelerates. Recent topics:

1) Accelerated development of cell and gene therapies: CAGR to increase to 29%

No. of drugs approved and under development continues to increase and advancements in development is expected to lead to further market expansion beyond 2025

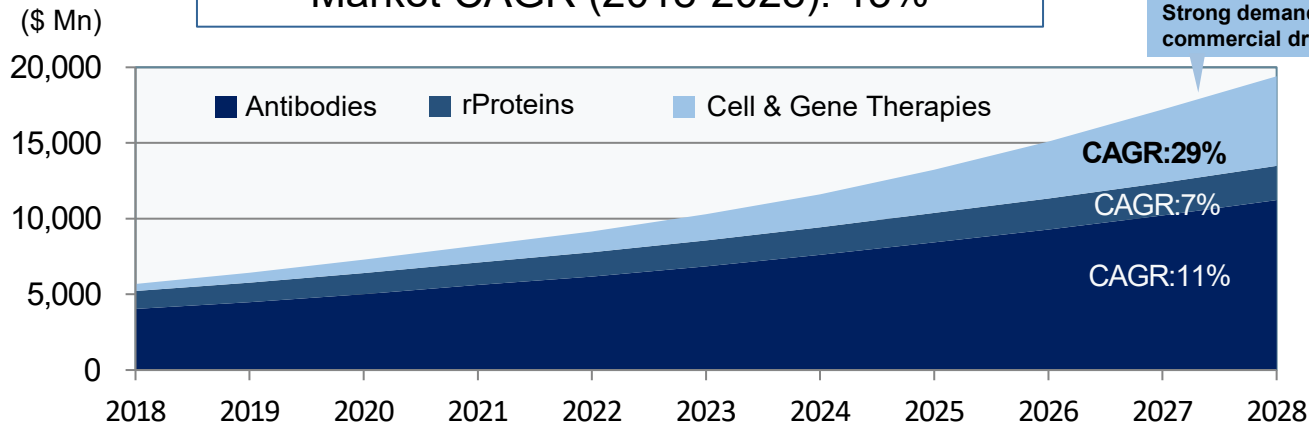
2) Increase in demand for next gen biopharmaceuticals: The antibody segment is expected to maintain a high CAGR of 11%.

In addition to steady growth of conventional antibodies, next gen antibody drugs with high therapeutic effect such as ADCs* and bispecifics contribute to the growth

*ADC: Antibody-Drug Conjugate

**Bio drug substance
CDMO market*
(excl. vaccines)**

(* in-house research)

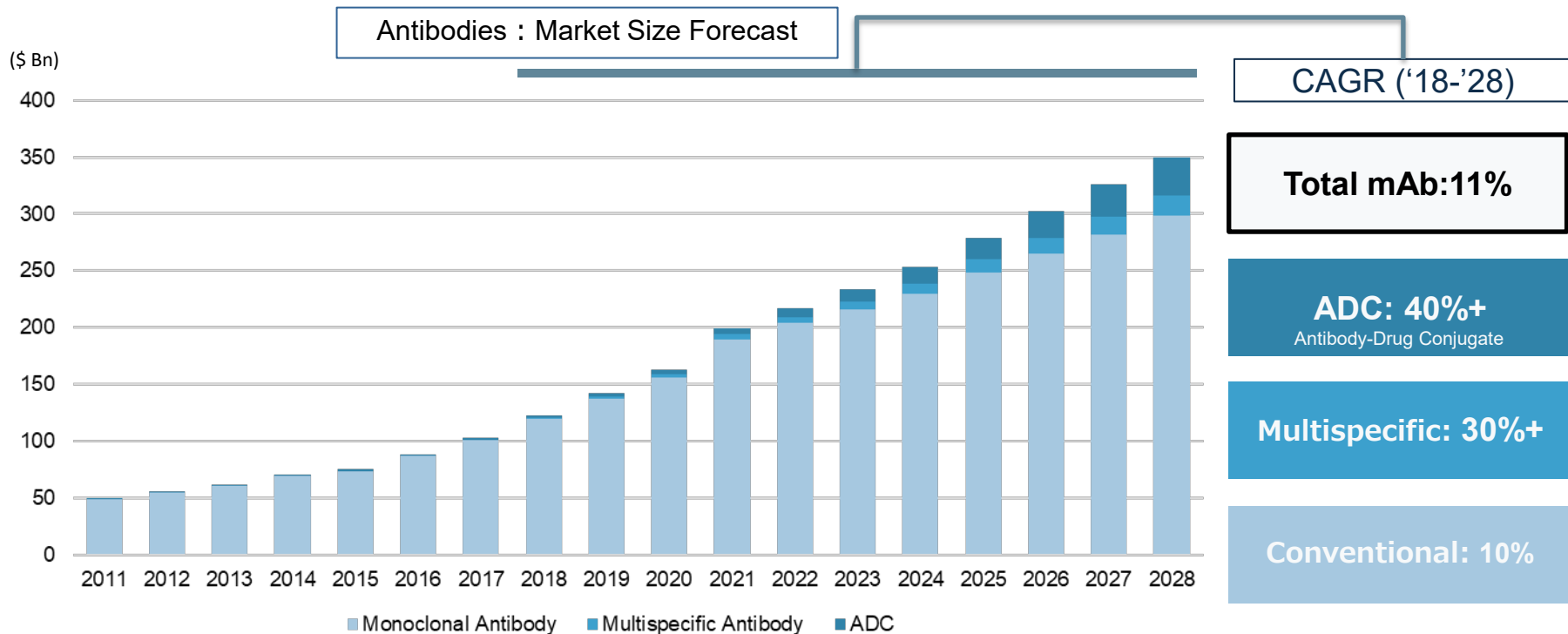


*CAGR 2018-2028 for Biologic Drug Substance CDMO Market: Fujifilm internal analysis

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1-2 | Antibody Drug Global Market Trend

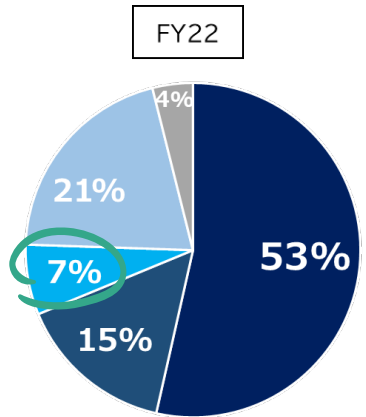
The market for antibody drugs is being driven by next gen antibody drugs such as ADCs and bispecifics and the current outlook is for an annual demand growth of more than 10%



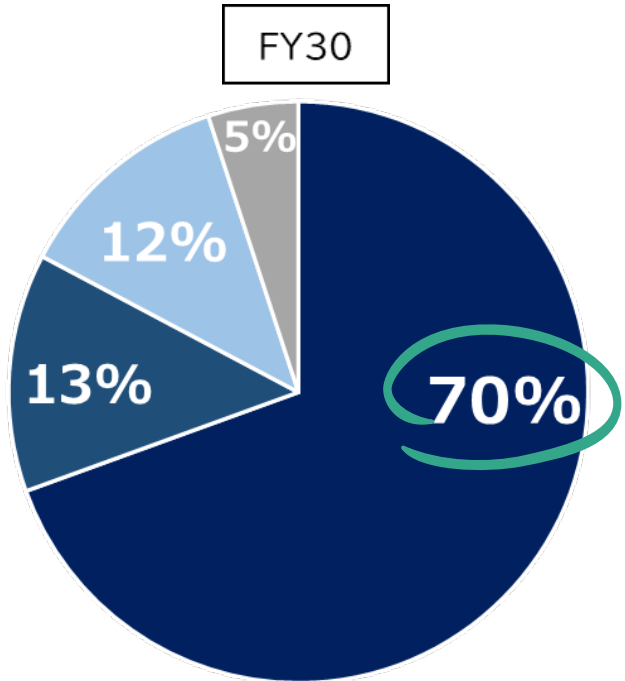
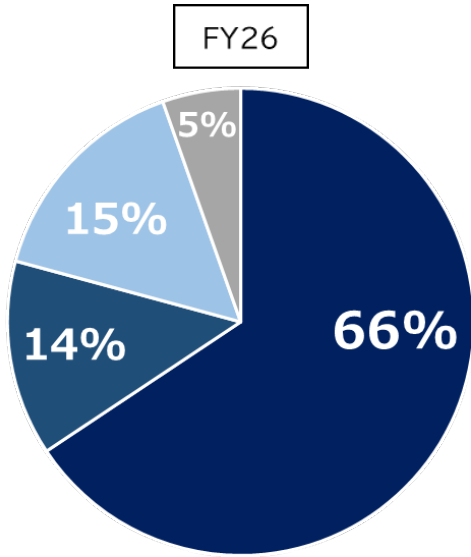
Source: Evaluate Pharma, Downloaded on Jun 11th.

1-3 | Fujifilm's CDMO Business: Revenue Ratio (%) by Modality

- Capacity increases from facility investments mean the ratio of antibodies will increase.
- Since vaccine demand is uncertain it has not been included in the future business plan.











Revenue Forecast: ¥175B+



Revenue target: ¥500B+

Offering end-to-end solutions from small-to-large scale bulk drug substance production to formulation and packaging

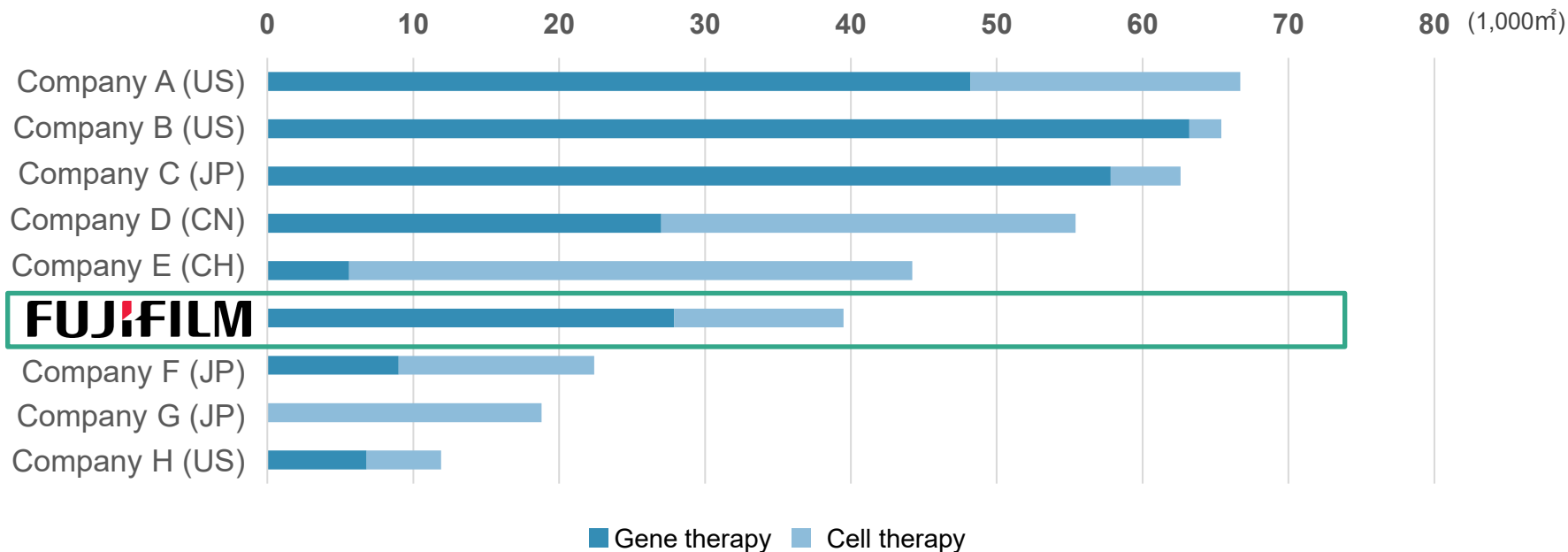
As of Dec,2022 (w/o Small molecules)	North America				Europe			Asia
	RTP NC, US	College Station TX, US	Thousand Oaks CA, US	Boston MA, US	Holly Springs NC, US	Billingham UK	Hillerød Denmark	Toyama Japan
(Services since...)	 (2011)	 (2014)	 (2022)	 (2022)	 (TBO 2025)	 (2011)	 (2019)	 (TBO 2026)
Antibodies	●	●			●	●	●	●
Recombinant proteins	●					●		
Cell/Gene therapies		●	●	●		●		
Vaccines	●	●				●		●
Formulation		●	●		●		●	●
Assembly, Labeling & Packaging					●		●	●



1-5 | CDMO Business Expansion: Cell Therapy CDMO Full-Blown Market Entry

Made a full-blown entry into the cell therapy CDMO business in April 2022 through the acquisition of the cell therapy manufacturing site (currently Fujifilm Diosynth Biotechnologies California) of Atara Biotherapeutics, inc. located in California, US

Manufacturing floor space for cell and gene therapy

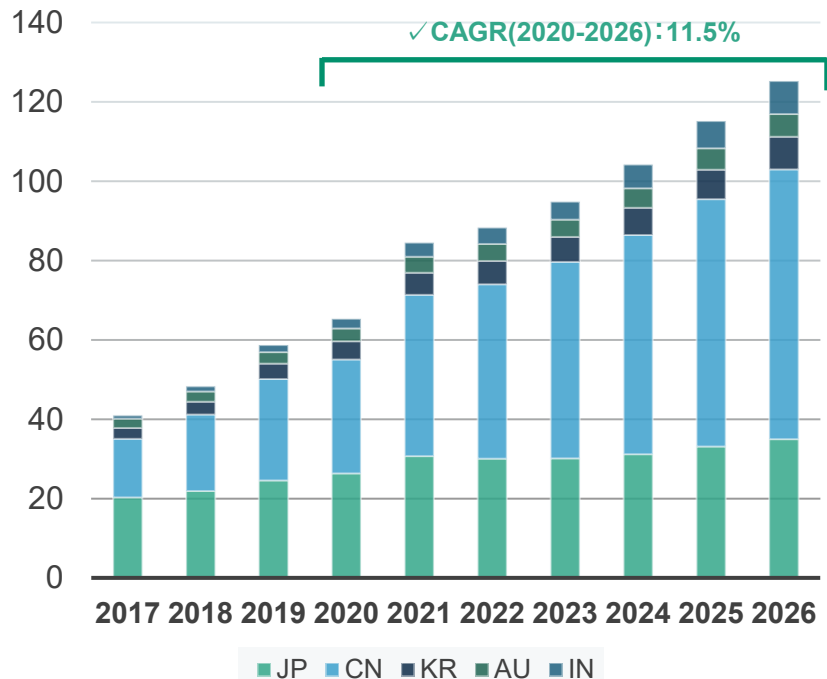


※Calculated floor space based on public information from each company on operational mfg. facilities (and partly from conjecture)
Abbreviations of country names indicate the location of company headquarters.

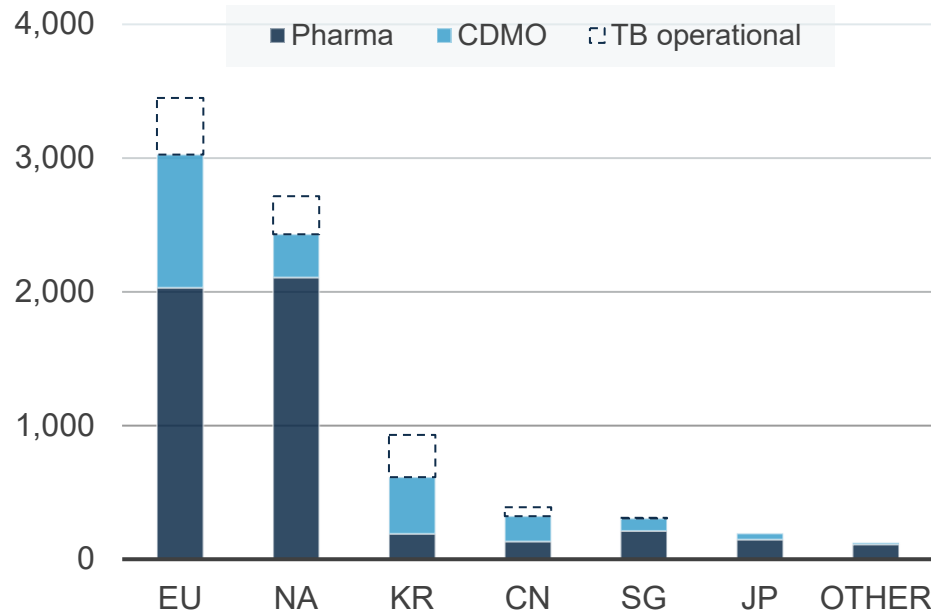
1-6 | CDMO Business Expansion: APAC Biopharma Market vs. Manufacturing Capacity

The APAC biopharmaceutical market is expected to expand. However, Japan is lagging behind other major APAC countries in terms of biomanufacturing capacity and there are calls for expansion.

Biopharma market of major APAC countries (\$ Bn)



Biomanufacturing capacity of major regions & countries (Units: kL)

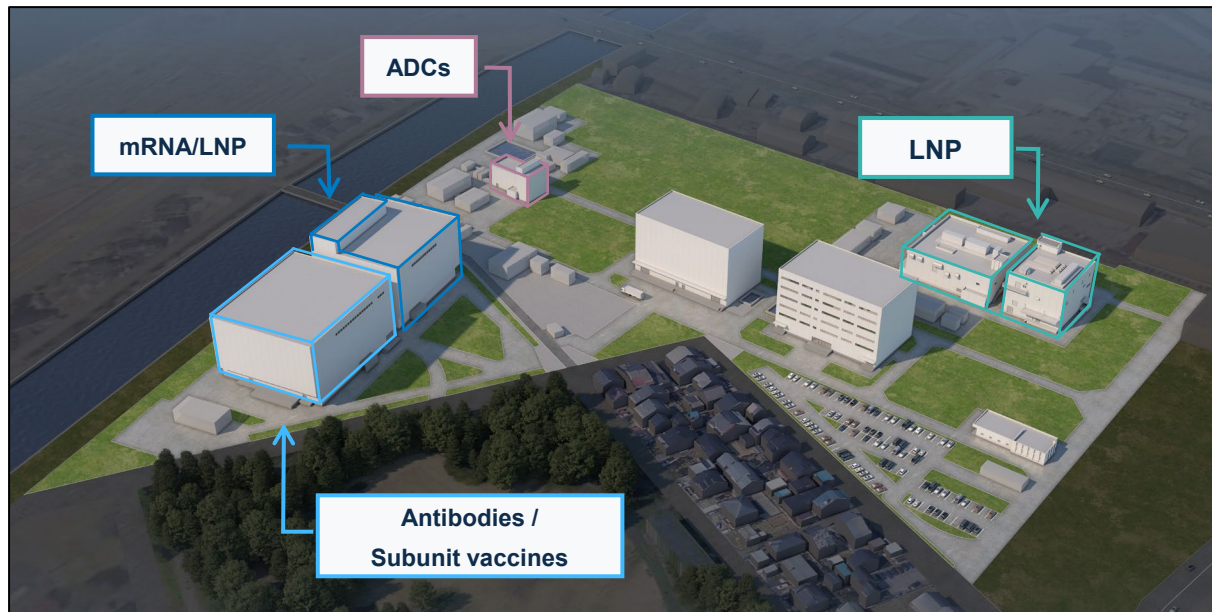


※In-house calculation based on public info as of Dec 2022

1-7 | CDMO Business Expansion: Establishing a Bio CDMO site for Japan & Asia

- Promote a bio CDMO “local production, local consumption model” to respond to the increase in market size and demand in Japan & the APAC region
- Build a bio CDMO site within Fujifilm Toyama Chemical’s 2nd factory
- Wide variety of modalities within new areas such as ADC and mRNA in addition to LNP and antibodies
- Chosen for a subsidy from the Japanese government under the premise of dual use in the event of a pandemic

FFTC Toyama 2nd Factory Upon completion (conceptual drawing)

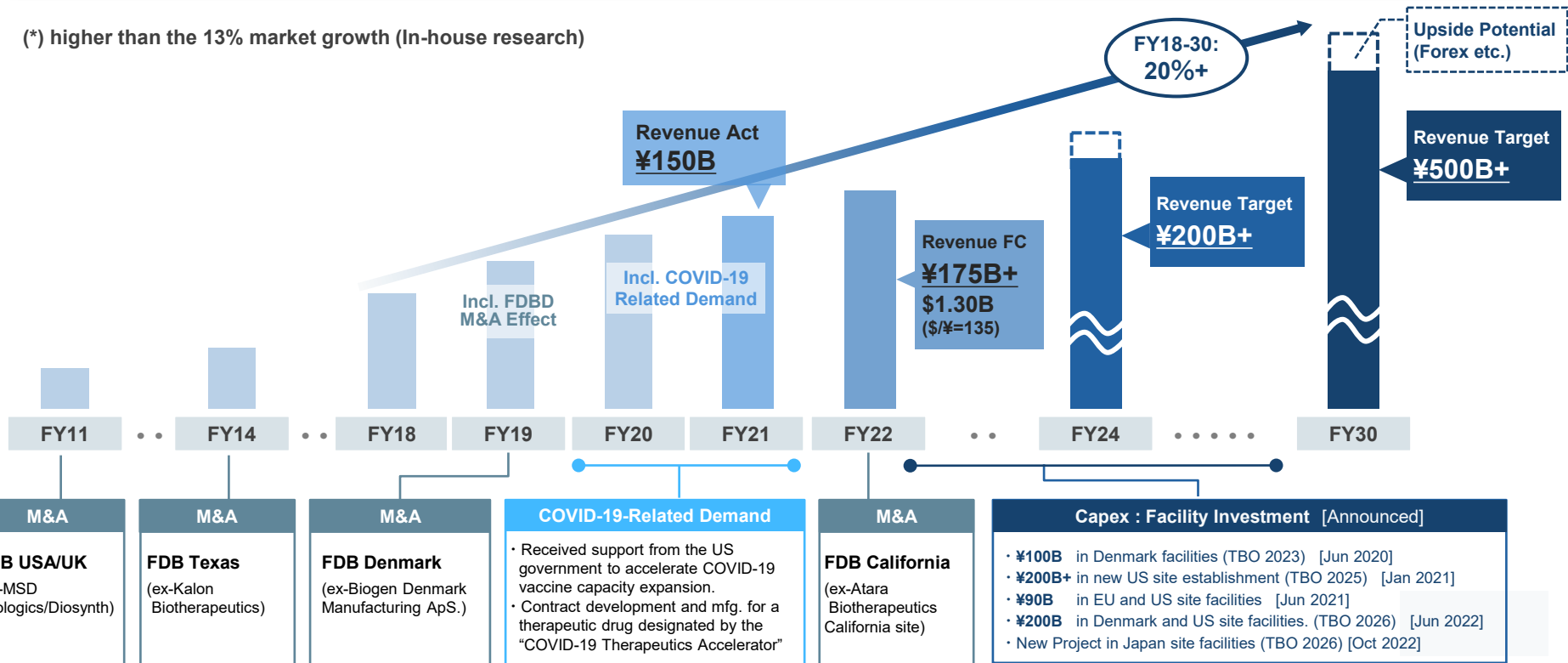


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2-1 | Revenue: CAGR exceeding that of the Market

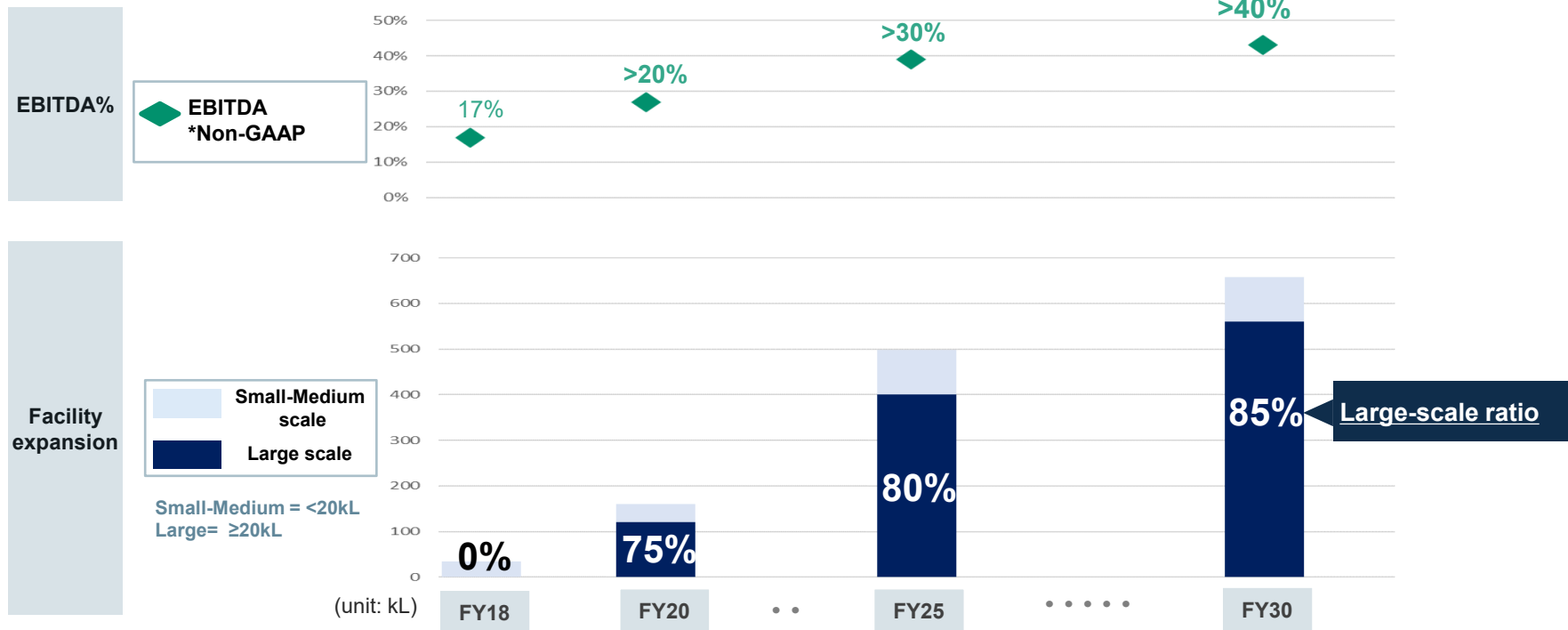
The Bio-CDMO Division will expand business through facility investments and M&A, and expects revenue growth of i) ¥200B+ in FY24 and ¥500B+ in FY30, ii) FY18-30 CAGR 20%+ (*)

(*) higher than the 13% market growth (In-house research)



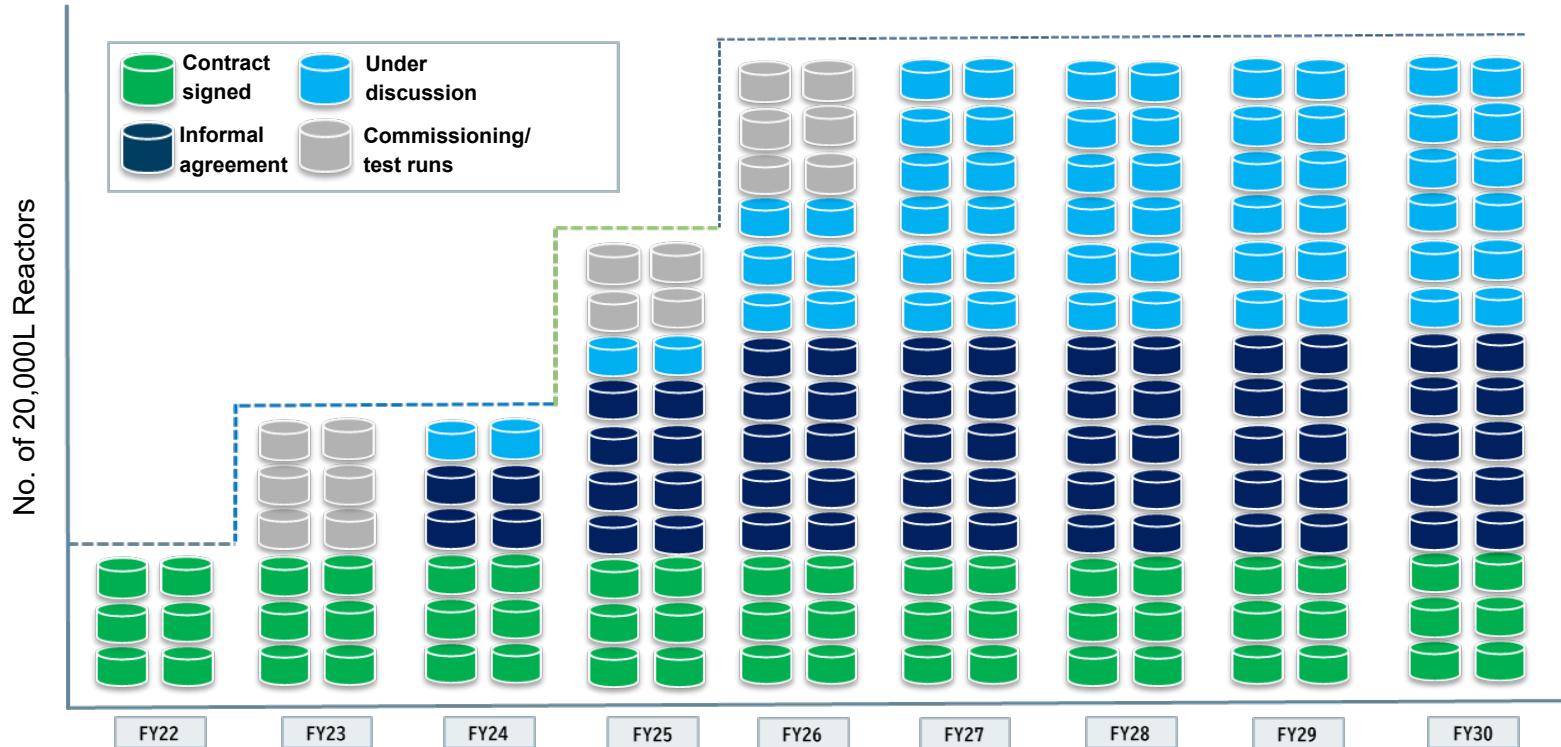
2-2 | Facility Investments: Manufacturing Capacity Expansion Plan

Increase ratio of high profit margin large scale facility through large scale investments in US and EU sites, and aim for EBITDA of over 40% in FY30

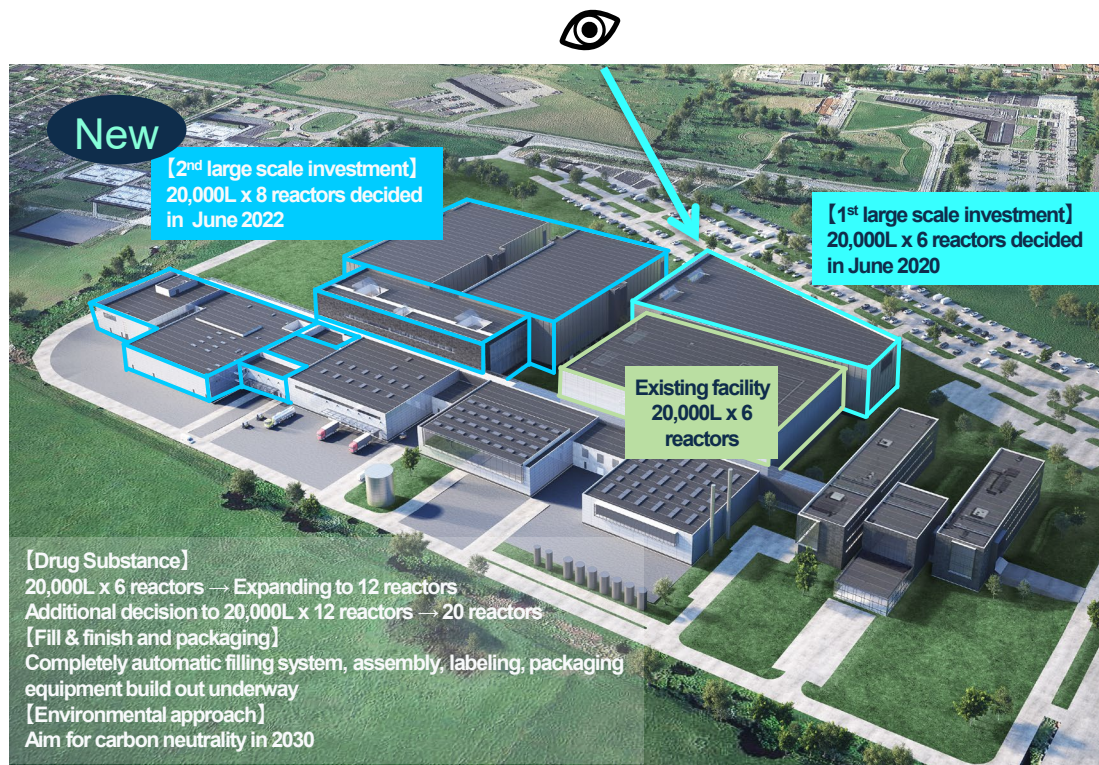


2-3 | Facility Investment: Capacity Expansion and Commercial Activity

Carrying out commercial negotiations at a steady pace aimed at the operation start of large-scale facilities.
Will ensure that market demand is captured to generate business growth



Denmark site additional expansion decided and began construction Sep 2022.
Set to become the largest pharma/CDMO manufacturing site in the EU (25,000m² floor space)



Steady progress on 1st investment
(Picture taken on October 2022)

2-5 | North Carolina, US: New Site Construction (Jan 2021 announcement)

Currently constructing a new site with 20,000L x 8 bioreactors, fill & finish and packaging in North Carolina, US. The site is set to become the largest bio CDMO manufacturing site in North America.

- 20kl Bio reactors

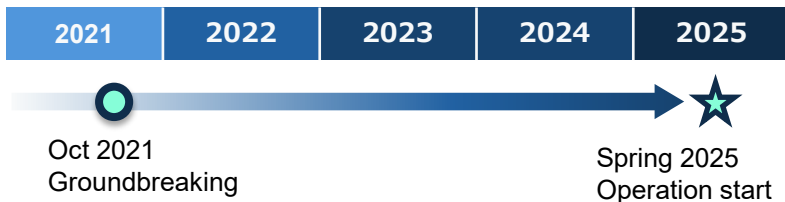
8 Under construction → Maximum **32** Can be expanded

- All-Automated fill & finish system
- Assembly, labelling, packaging

*New NC, US Site :

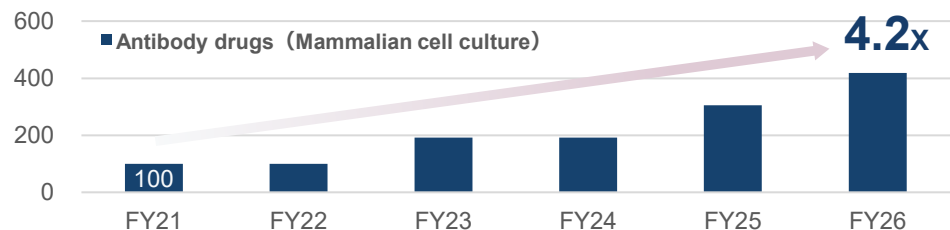
- Site area 610km² (x85 soccer fields) ➔ largest in North America
- Plan to use 100% electricity from renewable sources
- **Aim for carbon neutrality in 2030**

Timeline



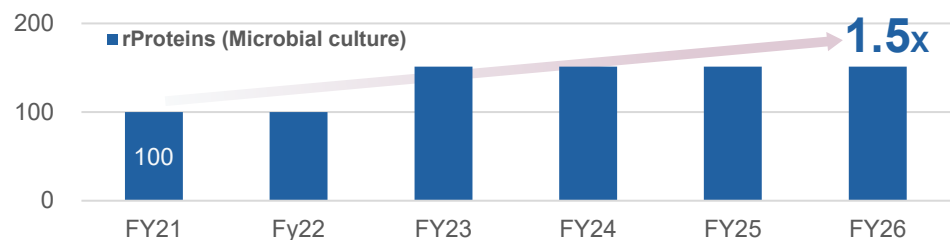
2-6 | Manufacturing Capacity Expansion Plan

Large scale investments for each modality to achieve ¥500B revenue by FY2023



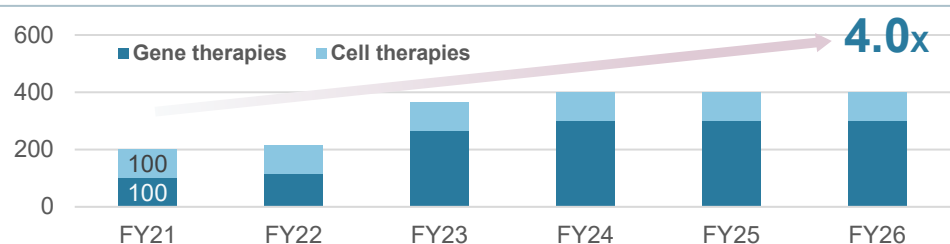
■ Antibody drug (mammalian culture):

- Facility expansion in the EU and US underway
- Strengthening both continuous and conventional batch manufacturing capacity



■ rProtein (microbial culture)

- Continue investments in line with market demand



■ Gene therapy:

- Expand capacity faster than market growth rate
- Establish high productivity manufacturing technology and solve current issues (complex manufacturing process, hard to mass produce, high cost)

■ Cell therapy:

- Focus on allogeneic cells and aim to establish high productivity manufacturing technology

* FY21 annual production capacity =100,
Only based on publicly disclosed information

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3-1 | Comparison of Productivity Across Modalities

Industry top-level productivity for each modality

			(In-house research)	
			Fujifilm	Competitors
Antibody drug (Mammalian culture)	Productivity	mAb	>10g/L	3~8g/L
		BiAb* ¹	~5g/L	1~2g/L
		New Fc fusion Protein	1-2g/L (*pool) several cases	1g/L (*pool)
	Cell line development (Process development)		10 weeks (34 weeks)	12~18 weeks (40~48 weeks)
rProtein (Microbial culture)	Productivity	>15g/L	>15g/L	
	Cell line development	4 weeks	6~8 weeks	
Gene therapy	Productivity	3 x past results ⇒ 100 x^{*2} (Conventional: 1.0×10 ¹¹ vg/mL)	-	

*1 BiAb: bispecific antibodies

*2 May 2023, TB announced in
The American Society of Gene & Cell Therapy

3-2 | Next Generation Antibodies

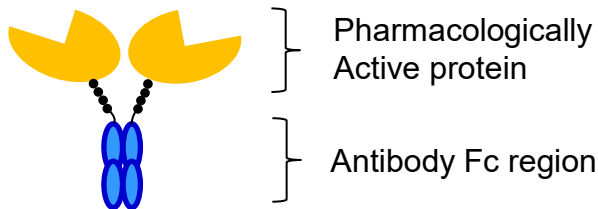
Adapted our proprietary production platform (ApolloX) to Fc fusion proteins, one of the next gen categories of antibodies, and obtained data demonstrating higher productivity than our competitors for several model molecules. Will continue to approach the next gen market.

What is Fc fusion proteins ?

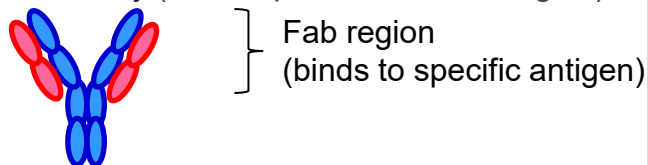
- Fc fusion proteins

Artificial protein made by fusing Fc region of an antibody and a pharmacologically active protein (molecular size 50-150kDa)

⇒ Longer half-life than non-fusion proteins

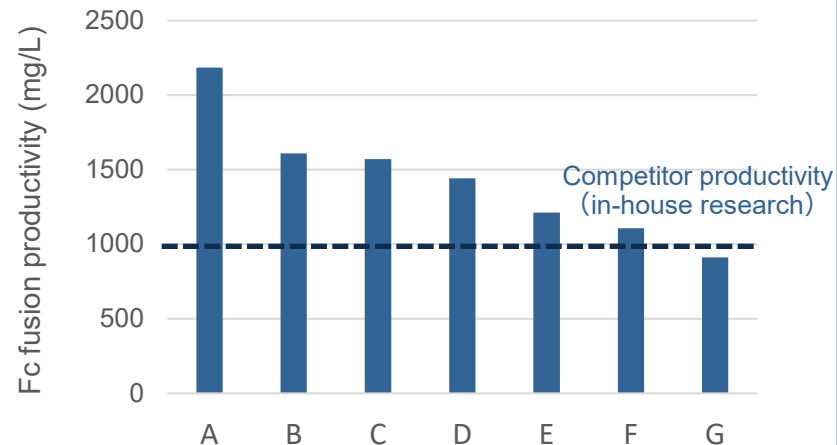


- Normal antibody (Made up of Fc and Fab region)



Fc fusion protein productivity track record

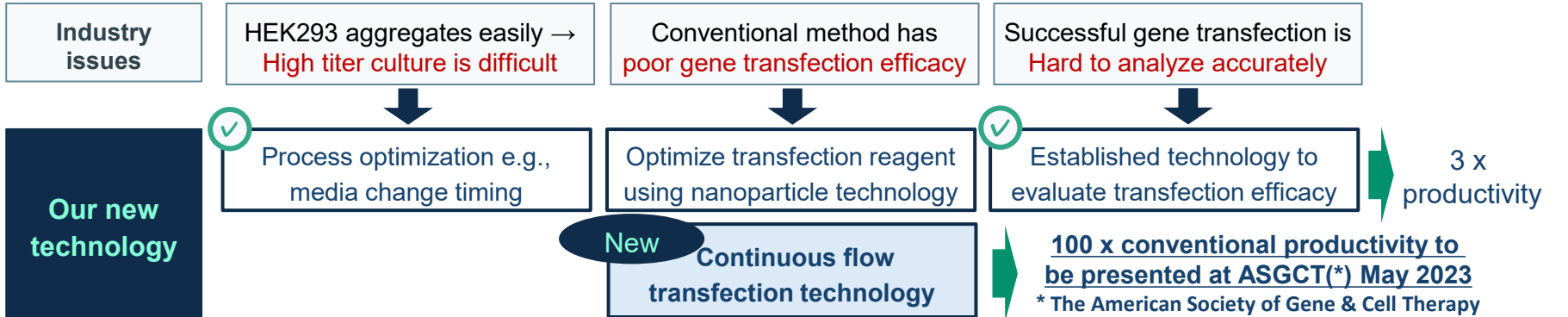
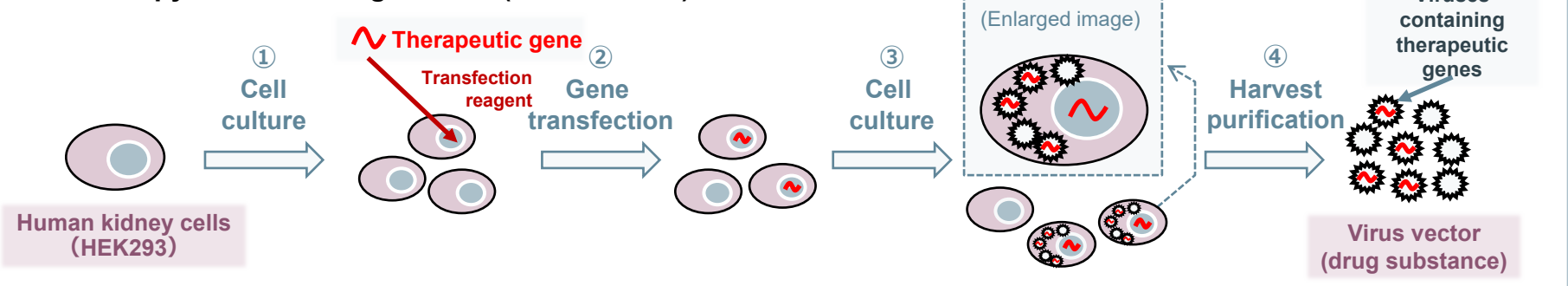
- Have verified the productivity of ApolloX using 7 different types of Fc fusion proteins
- Were able to confirm productivity equal or higher than competitors for all types (in-house research).



3-3 | High Productivity Technology Development for Gene Therapy

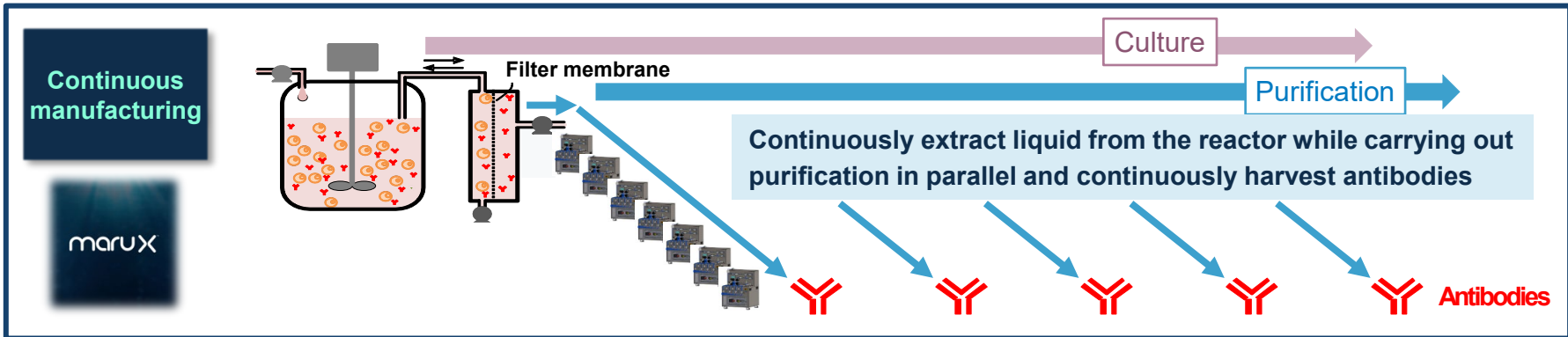
Realized 3 x productivity through process technology, nanoparticle control technology, AI analysis and developing fundamental AAV high productivity technology using continuous flow type gene transfection, which enables drug substance productivity of 100 x conventional methods*

Gene therapy manufacturing method (conventional)



3-4-1 | Industry-First Culture to Purification Continuous Manufacturing System

World's first "integrated culture to purification 500L scale facility" for continuous manufacturing
 GMP manufacturing facilities under construction in the UK and US



【Continuous culture reactor】



500L reactor

【Automatic continuous purification device: Symphon X】



Purification device
(7 units connected)

3-4-2 | Comparison of Continuous Manufacturing Systems

Industry leader with integrated culture and purification for commercial scale (500L) high titer culture. Carrying out scale-up development for 2,000L scale (output equivalent to 20,000L batch manufacturing).

Comparison of continuous manufacturing across different companies

*No available information found for Samsung Biologics

		CDMO · Equipment Company				Pharma companies				
		FUJIFILM	Lonza	WuXi Biologics Global Solution Provider	ThermoFisher SCIENTIFIC	AstraZeneca	Biogen	AMGEN	MERCK	sanofi
Continuous culture	Cell titer	120M cells/ml	Started R&D for small scale	40~100M cells/ml	120M cells/ml	90M cells/ml ※	120M cells/ml	80M cells/ml ※	Undisclosed	120M cells/ml
	Scale	500L ⇒2,000L Under development		150L	500L	500L※ (3000L under development)	500L※ (2000L under development)	Implemented cGMP equipment	500L (3000L Under development)	500L (no mention of scale up)
Continuous purification		Proprietary equipment enables full integration ⇒2,000L scale (already applied)	—	Only partly continuous, some steps are done in batches	—	—	Only partly continuous, some steps are done in batches	Only partly continuous, some steps are done in batches	—	Only partly continuous, some steps are done in batches

※ Based on info disclosed in 「Integrated Continuous Biomanufacturing V」(held in the EU Oct 2022) etc. © FUJIFILM Holdings Corporation 28

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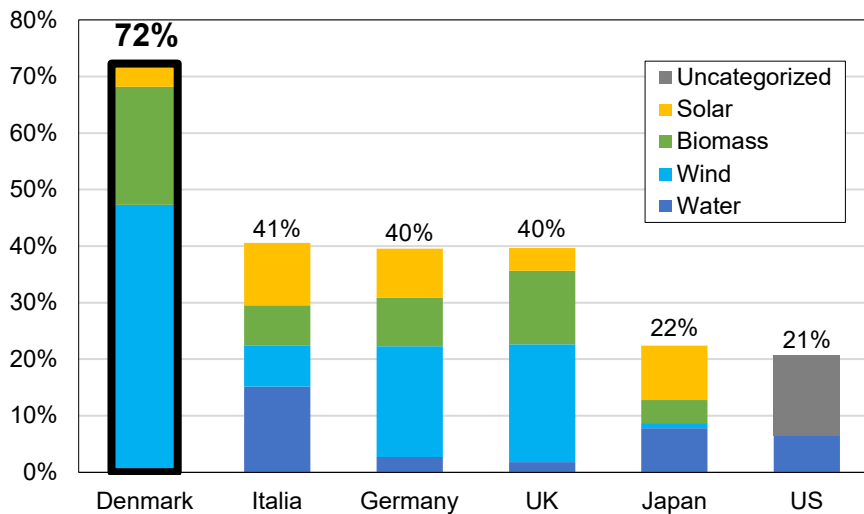
4-1 | Environmental Approach

Promoting “Reduction of CO₂ emissions” and ”Reduction of water consumption” to achieve SVP2030.

- Denmark: Promote switch to electricity derived power boiler energy and recycling wastewater into cooling water.
 - * Denmark has high affinity with our policy in that it is taking a proactive approach to the environment and its ratio of renewable energy is over 70%.
- US (North Carolina): Include **100% renewable energy derived from electricity** in large scale facility investment.

Ratio* of renewable energy for electricity generation in 2021

*Renewable energy: Water, wind, biomass, solar, geothermal



Source : ISEP, EIA

1) Reduction of CO₂ emissions



- Switching from gas to electricity powered boiler to reduce CO₂ emissions (Denmark 2nd facility investment)
- Plan to use electricity from 100% renewable energy (US large scale investment)

2) Reduction of water consumption



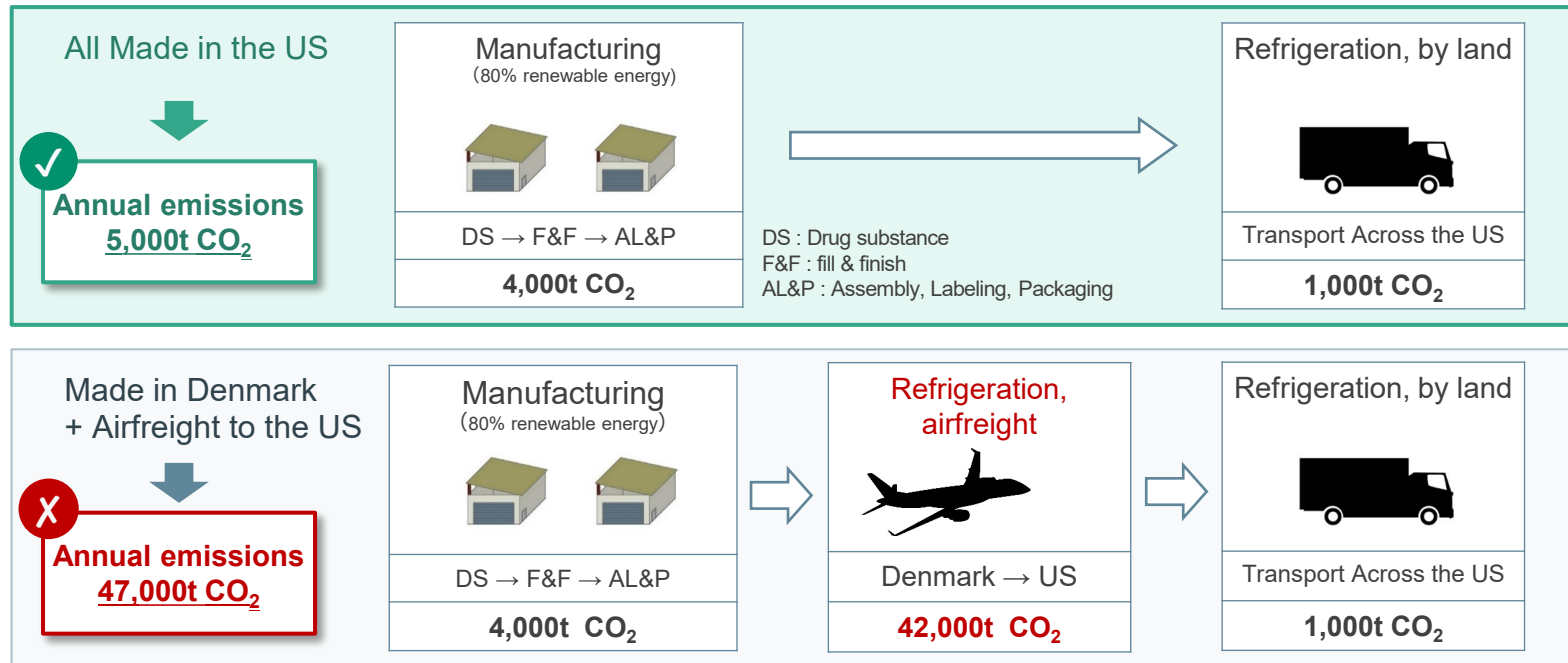
By recycling waste water (drainage etc.) into cooling water

4-2 | CO₂ emissions from shipment of Biopharmaceuticals

Reduce the environmental burden of the pharmaceutical supply chain by promoting “local production for local consumption”.

CO₂ emissions from supplying products to the US (in-house simulation*)

(* Premise : Comparison of CO₂ emission for the same amount of the same drug manufactured for the US until reaching the patients



➔ Significant amount of CO₂ emissions when manufacturing products for the US within the EU due to the need for Refrigeration and airfreight

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- 1 | Strengthen offering for various modalities**
→ Strengthen especially cutting-edge modalities (e.g. ADCs, advanced vaccine, cell and gene therapy)
- 2 | Pursue highest level of productivity for each modality**
→ Strive to become the industry leader not only within antibody drugs and recombinant protein drugs, but also cell and gene therapy
- 3 | Offer services globally incl. APAC**
→ Expand into the APAC market from the new Japan site in addition to the existing EU and US sites
- 4 | Reinforce the “End-to-End Service” offering**
→ Strengthen end-to-end solutions at each site, including formulation and packaging
- 5 | Environmental awareness**
→ Promote “local production for local consumption model” at US site and use of renewable energy to reduce environmental burden



2 | Life Sciences Business Division

- 1. Overview /Outlook of Life Sciences Business**
2. Cell Therapy Process Development & Manufacturing Service
3. Drug Discovery & Manufacturing Support
 - 1_ iPS Cell : Drug discovery R&D support business
 - 2_ Cell culture media business
4. Wrap-up

1-1 | Business Area of Life Science Business Division

Handling R&D and production of innovative drugs and offering solutions in the field of cell therapy to contribute to addressing unmet medical needs

Cell Therapy Process Development & Manufacturing Service

- We will create synergy, with **a focus on FCDI's* iPS Cell**, that makes use of FUJIFILM group-wide unique engineering technologies, resources, and facilities.
*FCDI:FUJIFILM Cellular Dynamics, Inc.
- Utilizing synergy as a platform, we will **promote** in alliance with partners **efficient R&D and promote business developing and manufacturing cell therapy products.**

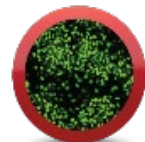


GMP facility : i-FACT
(Madison, Wisconsin, US)

i-FACT
Innovation Facility for
Advanced Cell Therapy

Drug Discovery & Manufacturing Support

- Supplying **cells** (e.g. human iPS Cell for drug discovery), **cell culture media, cytokine, reagents and related products** to contribute to **discovery research and production of new innovative drugs.** **COVID-19 vaccines**
- Cell culture media has grown rapidly due to increased demand for use in the manufacturing biopharmaceutical.



iPS Cell



Cell culture media



Reagents

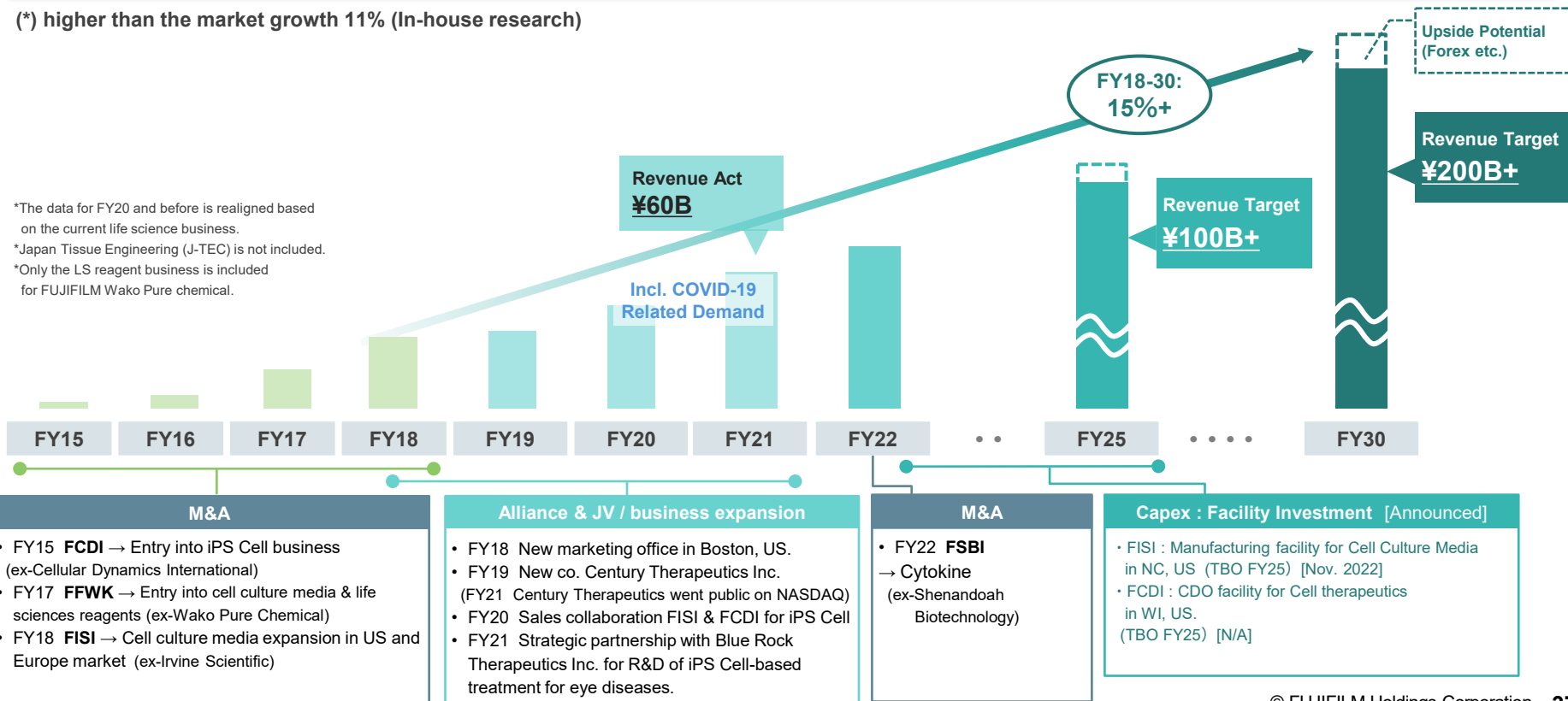


Cytokine

1-2 | Revenue : CAGR exceeding that of the Market

Life Sciences Div. will expand business through facility investments and M&As, and expect revenue growth : i) ¥100B+ in FY25 and ¥200B+ in FY30, ii) FY18-30 CAGR 15%+ (*)

(*) higher than the market growth 11% (In-house research)

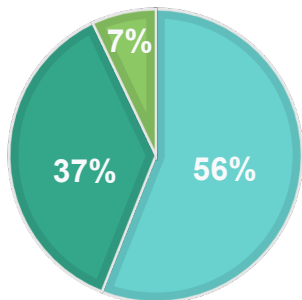


1-3 | Revenue Ratio (%) by Business Unit

The cell culture media business will grow due to high demand for antibody drugs. In addition, we will expand drug discovery support and CDMO businesses, with leveraging iPS cell

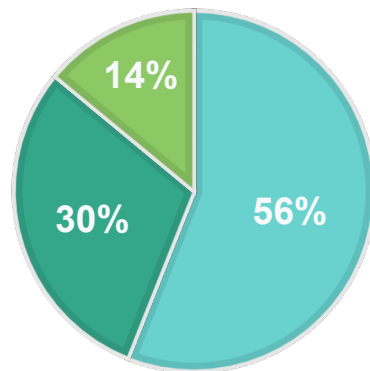
FY21

- Cell culture media
- Drug Discovery (iPSCell&Reagents)
- iPSC CDMO



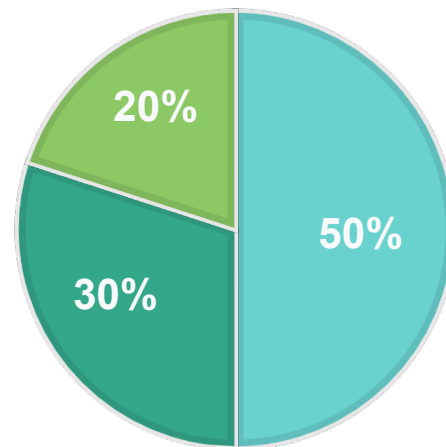
Revenue Act : ¥60B+

FY25



Revenue Target : ¥100B+

FY30



Revenue Target : ¥200B+

1-4 | Cell Culture Media : New Facility Investment

FUJIFILM Irvine Scientific (FISI) Invests \$188 million in a second manufacturing facility in the US. to supply products to customers on the East Coast

Upon completion (conceptual drawing)



FISI purchased 259,000m² land including a further room for expansion, in the Research Triangle Park(RTP) in NC state of US.

- ① **Reduce transit time and cost** from NC site beyond that from CA site, and ensure business continuity.
- ② Ensure a steady supply of cell culture media for **biologics, cell and gene therapies, and other key medicines** that are essential for human health. Customized cell culture media appropriately meeting customer needs can be provided.
- ③ Realize **more efficient production** with improved workflow.
- ④ RTP in NC state is a leading life sciences cluster. This location makes easier to secure **biotechnology resources** required for manufacturing operations.

Fujifilm Cellular Dynamics (FCDI) decided to establish a new GMP facility to expand development and production capacity

New Facility (Madison, WI, US)



(48,000m² includes further room for expansion)



• HQ Office



• Production facility for DR cell products
• Quality Control(QC) Div.



• Production facility for clinical trial products
• Warehouse
• Logistic Div.

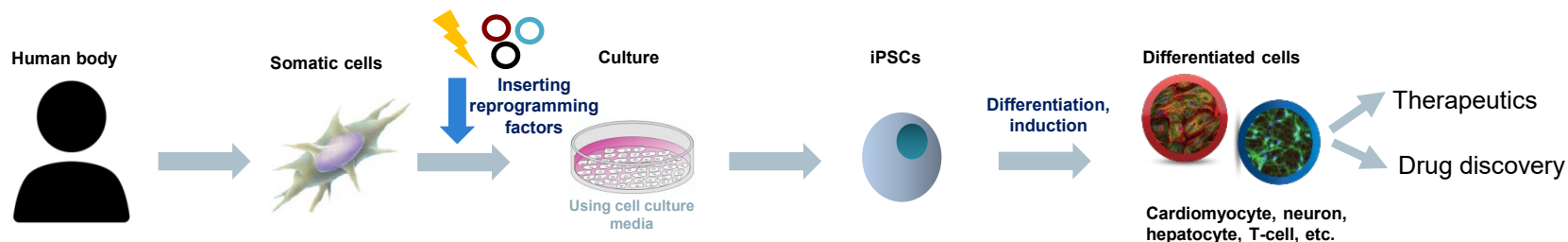
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2-1 | iPS Cell : Potentiality

iPS cell have self-propagating ability and pluripotency, which can be used for various types of therapies.

iPS cell (iPS=induced pluripotent stem)

iPS cells are produced by introducing a small number of genes known as reprogramming factors into human skin tissue and blood-derived somatic cells to enable differentiation into various tissues and organ cells as well as enable almost indefinite propagation.



	Autologous cells		Allogeneic cells (donor's cells)	
		Somatic stem cells	Somatic cells	Pluripotent stem cells
Definition	Patient's cells	Derived cells in the body that are able to differentiate into new cells to repair and regenerate tissue	Derived cells that are terminally differentiated and part of the body's tissue and organs	Cells having self-propagating ability and pluripotency
Example		Stem cells derived from bone marrow, MSC, etc.	T-cells, skin cells, blood cells, etc.	iPS cells (made from somatic cells/genes)
Mass production	-	Limited	Limited	Possible (High proliferation ability)
Production cost	High	Middle	Middle	Low cost through mass production

By using our proprietary technology for mass production, iPS cells can be stably supplied at a lower cost. iPS cells will be a key material in the next generation of therapeutic modalities and drug discovery support.

1) Cell Therapy

Challenges

Stable Supply and Stable Quality

1. **Shortage** of cell donors for rare disease
2. **Unstable cell quality** due to individual difference

Solutions

Modality using iPS cells

1. **Stable supply** of iPS cells because of their self-proliferation ability.
2. **Stable cell quality** as they are derived from the same cell line.

2) New drug development support:

Challenges

Improving efficiency and **Reducing cost** of new drug development

1. **No new drug evaluation method** due to complicated disease mechanisms.
2. In some cases, animal tests are OK, but clinical tests are not because of the **difference between humans and animals**.

Solutions

New drug screening with iPS cells

1. **Disease analysis with iPS cells** derived from patients with intractable diseases.
2. Toxicity/drug efficiency/safety tests using **iPS cell-derived disease model before clinical trial**.

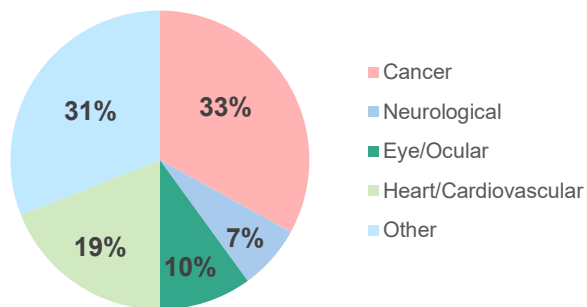
Number of clinical trials involving iPS cells: Approximately 100 (7% of total cell therapies)
Increasing trend of allogenic cells, CY20-CY30:CAGR15%+

iPS Cell derived cell therapy products – clinical trial

Area			 	Other
Number	51	18	24	5

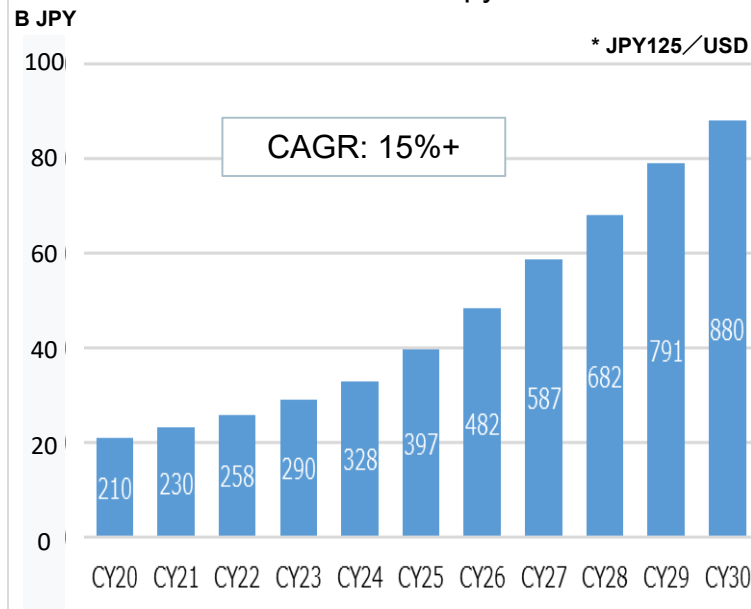
Target disease of iPS Cell derived cell therapy clinical trials

FUJIFILM covers major disease with partners



Source: Locust Walk; iPSC Market Overview, Sep. 30th, 2021

Forecast :iPS cell therapy CDMO market



Based source : Cell Therapy Manufacturing Market (3rd Edition),
2020-2030 (Roots Analysis)

※Estimated ratio :10% iPSC out of Cell therapy

Establish recurring revenue business enabling sustainable growth through a combination of grant of iPS cell-related IP licenses and process development & manufacturing services

1. Investment into cell therapeutic firms

Grant of IP license for iPS Cell related

- Strategic alliance
- Contract development and manufacturing
- Reprogramming
- Differentiation

Expansion of target diseases

Establishment of technologies involved

Business expansion through CDMO service

2. Cell Therapy Development

- Promote cell therapy development through alliances with partners

Recurring revenue from up-front, milestones, and royalties from licensees

3. Providing Cell Lines




- Providing materials for R&D
- Developing new customers.

Increase customer satisfaction with support for their R&D


Acquisition of future CDMO clients

2-5 | iPS Cell Therapy : CDMO business update and GMP facility expansion

1. CDMO business from investee firms

Indication	Partner	Update
Cancer Immunotherapy	 CENTURY THERAPEUTICS	Century Therapeutics received IND clearance from the FDA . FCDI is contracted with Century for manufacturing and clinical supply.
<ul style="list-style-type: none"> GvHD Knee osteoarthritis 	 cynata therapeutics	NDA approved by FDA (Using FCDI iPS Cell line) CMO potential customer: Clinical supply and commercial manufacturing
New Parkinson's disease	 Ryne Bio	In Aug. 2022 FCDI licensed program of a next-generation Parkinson's treatment derived from iPS cells to Ryne Biotechnology Inc, the licensee and manufacturing partner of FCDI. FCDI Contracted CDMO services with Ryne to manufacture dopaminergic progenitor cells.

2. Cell therapy development

Indication	Partner	Update
<ul style="list-style-type: none"> Retinitis pigmentosa Age-related macular degeneration 	 BlueRock THERAPEUTICS	Autologous cell derived iPS cell therapy PJT Under development

3. Providing iPS cell lines

Licensing out for several pharmaceutical companies aiming future CDMO business

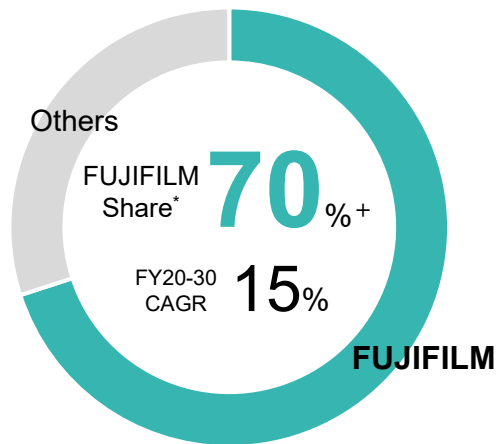
Increasing CDMO business

Facility expansion planned in 2025 and beyond to prepare for future demand increase.

1. Overview /Outlook of Life Sciences Business
2. Cell Therapy Process Development & Manufacturing Service
- 3. Drug Discovery & Manufacturing Support**
 - 1_ iPS Cell : Drug discovery R&D support business**
 - 2_ Cell culture media business**
4. Wrap-up

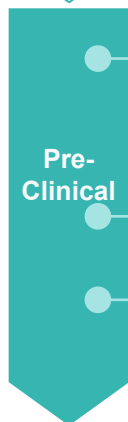
Over 400 Customers: Top 10 big pharma in Japan, Europe, US, etc.

*Share against the demand for iPS Cell derived cells purchased from 3rd party (Our research)



[Drug Discovery Process]

Basic Research



Clinical Trial

Medicinal effect test | Pharmacological test

1. Microglia (Launched in Jan, 2019)

Good reputation as a **pharmacological test tool** (FY22 1st half: YoY+76%)

Safety - Pharmacokinetic test

Safety - Toxicity test

2. Cardiomyocyte on new cell line (Launched in Sep, 2020)

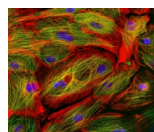
Good reputation as a **cardiotoxicity test tool**

3. LS - CVC

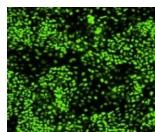
The 1st case (PhenoVista)

Optimize drug discovery process by combining with cell image analyzing technology

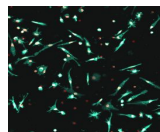
iPS cell-derived cell products



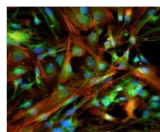
Cardiomyocyte



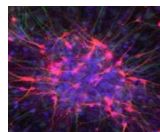
Myocardial progenitor cells



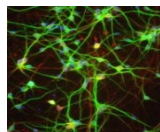
Microglia



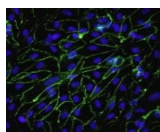
Astrocytes



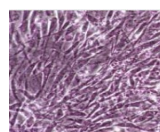
DopaNeurons



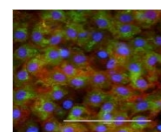
GABANeurons



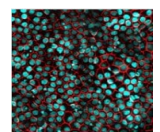
Endothelial cells



MSC



Liver cells



Retinal cells

3-1-2 | iPS Cell Products : Microglia

What is Microglia?

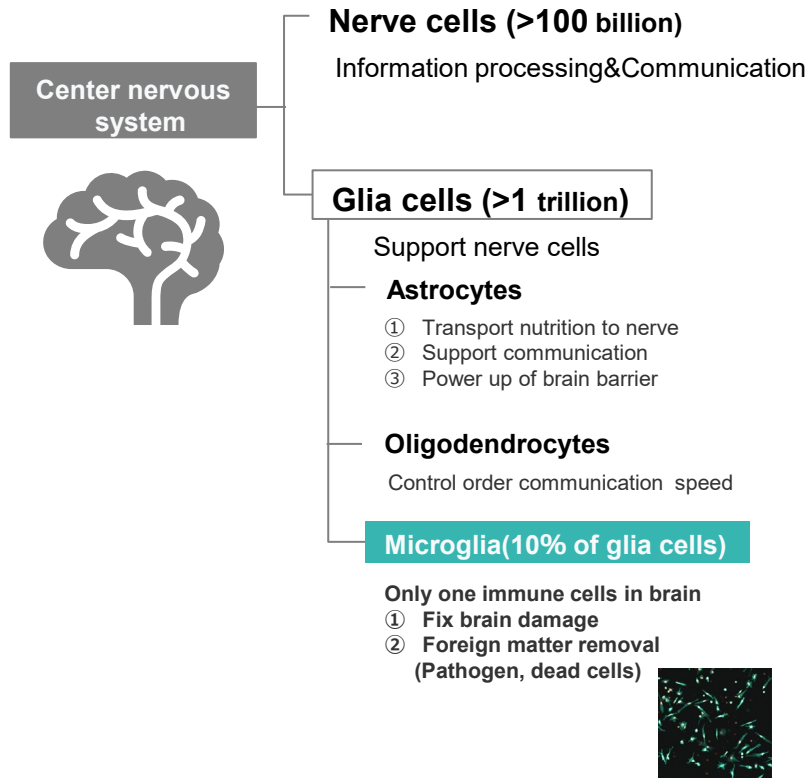
- Microglia are a type of glial cells located throughout the brain.
It's the only cell in the brain that has a very critical function for a normal brain's working immune system defending the body against infection.
- Although the mechanism has yet to be fully elucidated, it is known to be involved in the development of neurological disorders, such as Alzheimer's dementia and Parkinson's disease for which radical therapies have yet to be established.

[Challenge of new drug discovery for neurological diseases]

The success rate has been low due to **difficulty of obtaining appropriate preclinical evaluation tests for effectiveness/toxicity.**



- Launched iPS cell-derived human **microglia** in January 2019.
- Utilization of microglia constructs a new evaluation method that recreates an environment similar to the human central nervous system. It is expected to contribute to **enhancing trial effectiveness as well as speed up and reduce cost of new drug R&D.**

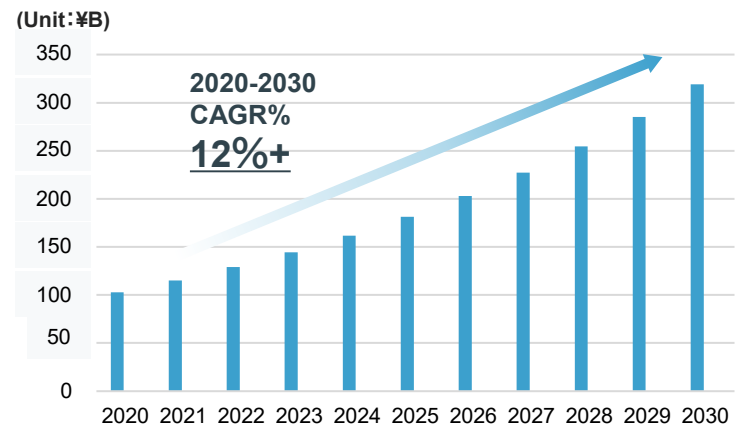


Bioproduction media Fujifilm is focusing on is the growing market with CAGR +12%. Fujifilm will be a market leader for BP Media holding >30% market share with ¥100B sales by 2030.

BP Media : Global Market Outlook

- Total demand of serum-free culture media* for bioproduction (BP), a focus area for Fujifilm, is expected to grow at the rate of CAGR+12%.

*Serum-free culture media:
Serum-free culture media is formulated to mitigate risks from the use of undefined and highly-variable serum products. For this reason, serum-free culture media are widely used for commercial production for biomedicine."

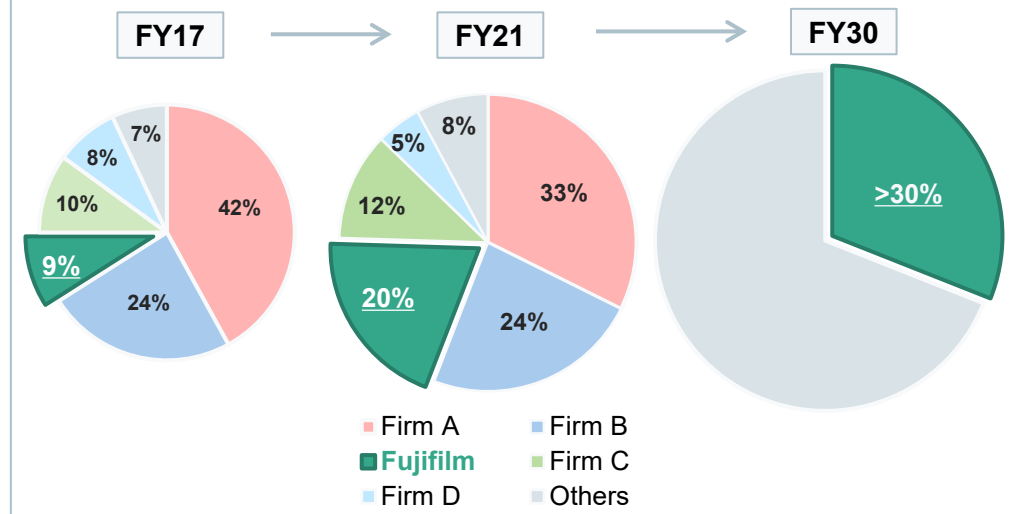


Source: Market Research Report(Nov,2020)
By MarketsandMarkets Research Private Ltd

BP Media : Market Share Outlook

(In-house research)

- Following the acquisition of FIS I in 2018, Fujifilm has doubled its market share and increased sales by 4 times (over CAGR+50%).
- **The goal is to hit ¥100B in revenue by FY2030.**



Coordinating departments to provide powerful customer support to trade with 15 out of the world's top 20 pharmaceutical companies

R&D

- More than 50 years of cell culture media **expertise** and an advanced media portfolio.
- **Ability to provide solutions** by conducting quick testing at FCDI·FDB and optimizing through “cells / cell culture media / culture processes”.
- Applying **the state-of-the-art technology** in powder and liquid process, developed **through the photo film business**.

Manufacturing

- Using **GMP-compliant manufacturing facilities** to produce high-quality cell culture media.
- **Products-supply from a global production framework** consisting of sites in Japan, EU and US.
- Using advanced analysis technology, etc. for **Quality Control & Quality Assurance**.



Sales & Operation

- Deploying **an enhanced product line-up** including cell culture media for broad-based applications, buffers, sterile water for injection, and **cytokines** .
- Robust global sales networks, combined with **sales teams with outstanding expertise**.
- **We built up new customized service center in China where the market is growing very rapidly**.

Handling processes from development to manufacturing and quality assurance swiftly to supply high-quality products in a timely fashion

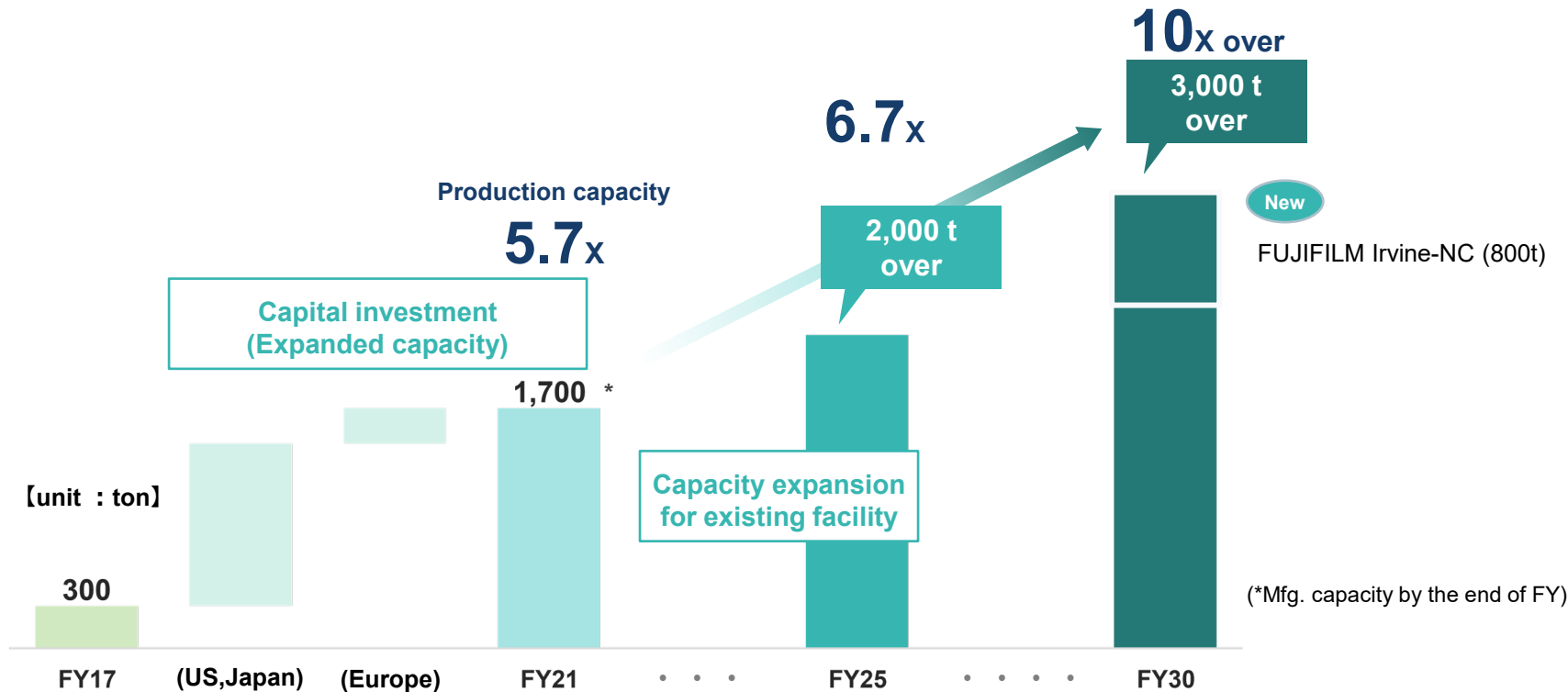
Identifying customer needs accurately and providing it to R&D as feedback

Manufacturing & Customized service center

As of Dec,2022	North America New		Europe	China New	Japan	
(Services since...)	Santa Ana CA, US  ① (2018)	RTP NC, US  ② (2025)	Tirburg Netherlands  ③ (2021)	New District Suzhou  ④ (2022)	Saitama  ⑤ (2018)	Aichi  ⑥ (2017)
Main market	West coast US.	East coast US	Europe	—	Japan & Korea	Japan & Korea
Factory : Powder (Maximum Capacity)	● (1,200t / FY23)	● (800t / FY30)	● (320t / FY23)	—	● (90t / FY23)	● (100t / FY24)
Factory : Liquid (Maximum Capacity)	● (1,200kL / FY23)	● (3,300kL / FY30)	● (470kL / FY23)	—	—	● (720kL / FY23)
Customized Service	●	—	—	●	●	—



Continuous capital investment in US, Europe and Japan
 Tenfold capacity expansion by 2030 over 2017 level (FISI acquisition)



High quality “cytokines” joined to our product portfolio
→ Power up of our comprehensive proposal to meet wide customers needs

Feature

- 300 high quality protein
- Animal free products lineup
- cGMP level QC system
- Human resorces with unique knowhow

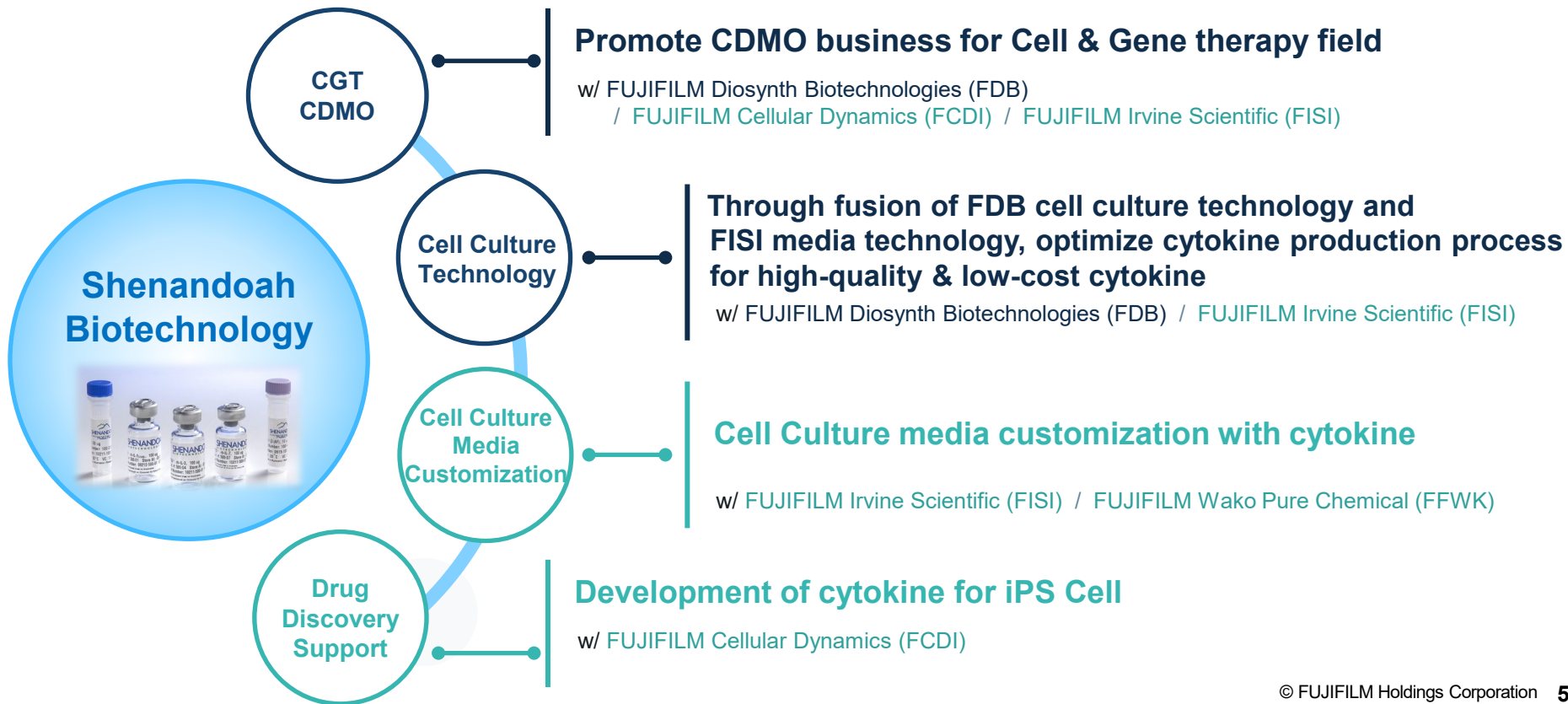
Effect

Among FUJIFILM group companies,

- 1) Synergy creation by fusing with existing technologies and products for new product & service proposals ⇒ Next page
- 2) Power up of comprehensive proposal and sales revenue increase by utilizing current product sales channels



Cytokine of Shenandoah Biotechnology enable Life Sciences Business Group to create synergy



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 - 2_ Cell culture media business
4. **Wrap-up**

1 | Strengthen drug discovery & manufacturing support

→ Provide pharma companies and academia with “solutions combining cells, cell culture media, cytokines and reagents” by leveraging expanded utilization of drug discovery screening and pharmacological testing with human iPS cells.

2 | Significant growth of cell culture media business

→ Expand global footprint in US. (**incl. new FISI NC factory**), Japan and Europe through continuous Capex.
→ Aim to be market leader in serum-free culture media for bioproduction (BP) holding **30% share by FY30** by developing customized cell culture media to meet customers' diverse needs.

3 | Expand cell therapy PD & Mfg service business

→ Establish recurring revenue business model, enabling achievement of sustainable growth by granting IP licenses for iPS cell and related technology as well as process development & manufacturing services utilizing **GMP facilities** (i-FACT).”

4 | Environmental awareness

→ Localization of production with 3 sites (US, Japan and Europe) and use renewable energy to reduce environmental footprint.

FUJIFILM
Value from Innovation



Appendix

- 1 | Life Sciences Business Group
- 2 | Bio CDMO Division
- 3 | Life Sciences Business Division

Appendix 1-1 | Life Sciences Business Group : Global Footprint



① FDB USA
FUJIFILM Diosynth
Biotechnologies U.S.A.

② FDB Texas
FUJIFILM Diosynth
Biotechnologies Texas

③ FDB California New
FUJIFILM Diosynth
Biotechnologies California

④ FDB Boston New
FUJIFILM Diosynth
Biotechnologies Boston

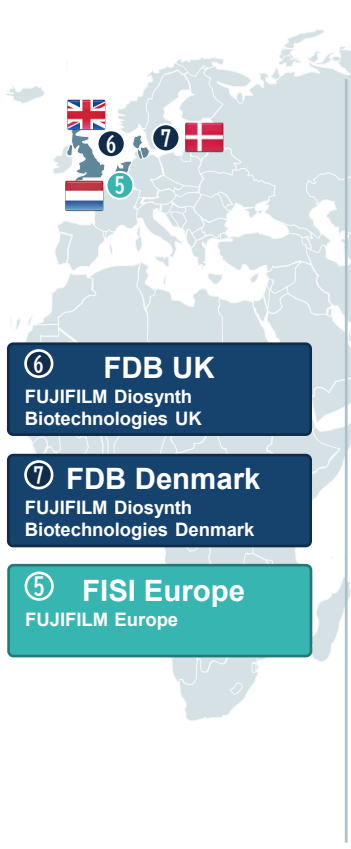
⑤ FDB NC
FUJIFILM Diosynth
Biotechnologies North Carolina

① FISI CA
FUJIFILM Irvine Scientific
California

② FISI NC New
FUJIFILM Irvine Scientific
North Carolina

③ FCDI
FUJIFILM Cellular Dynamics

④ FSBI New
Shenandoah Biotechnology



⑥ FDB UK
FUJIFILM Diosynth
Biotechnologies UK

⑦ FDB Denmark
FUJIFILM Diosynth
Biotechnologies Denmark

⑤ FISI Europe
FUJIFILM Europe

Bio CDMO Div.
Sites

Life Sciences Div.
Sites



**⑥ FISS Innovation and
Collaboration Center** New
FUJIFILM Irvine Scientific
Suzhou

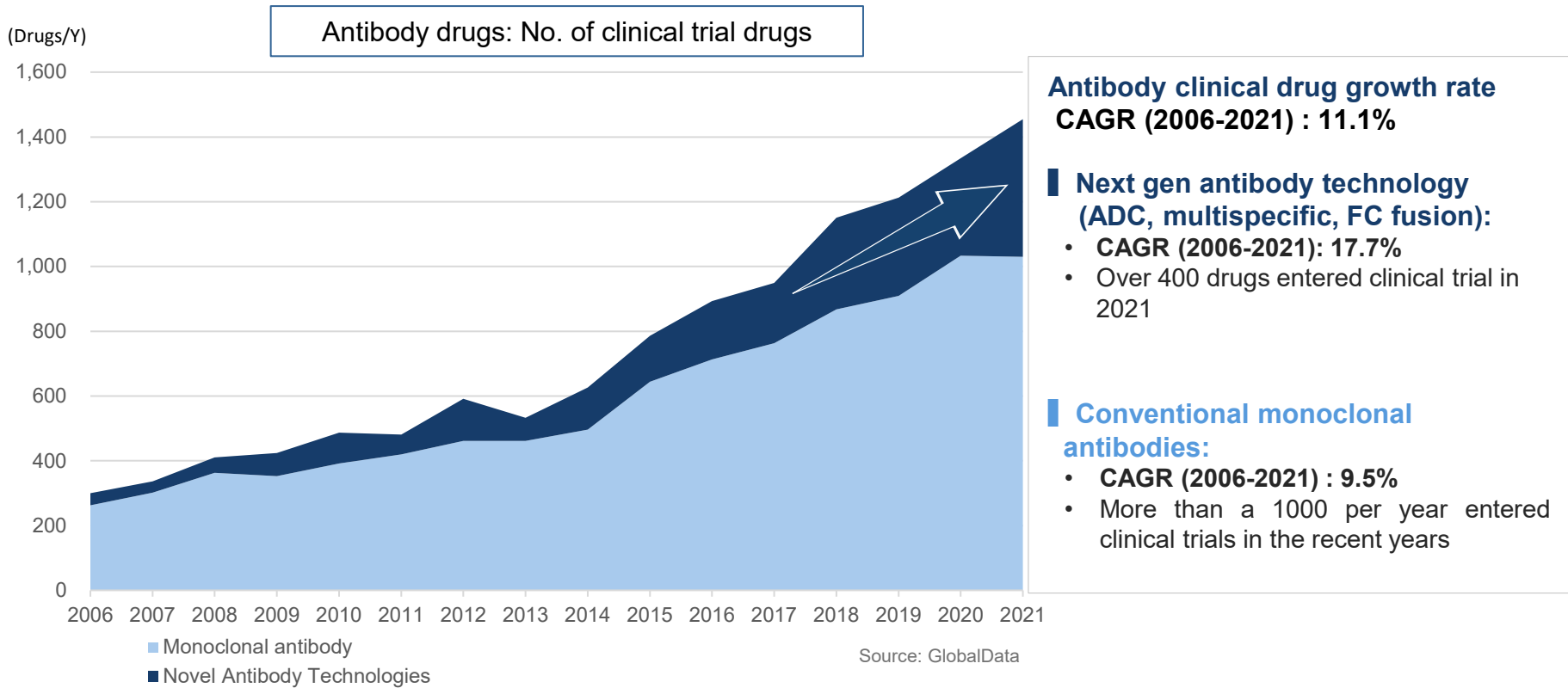
⑧ FFTC Toyama New
FUJIFILM Toyama Chemical

⑦ FFWK Saitama
FUJIFILM Wako Pure Chemical

⑧ FFWK Aichi
FUJIFILM Wako Pure Chemical

Appendix 2-1 | Global Trend for Antibody Clinical Trials

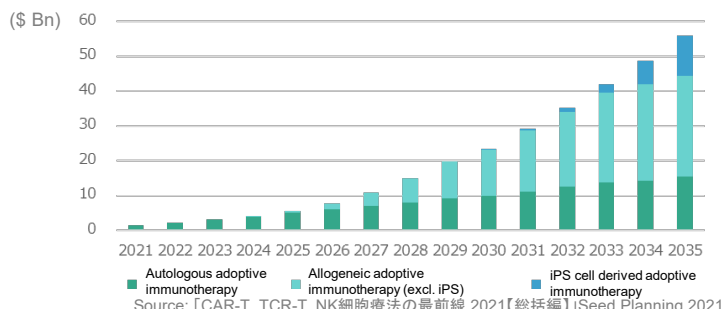
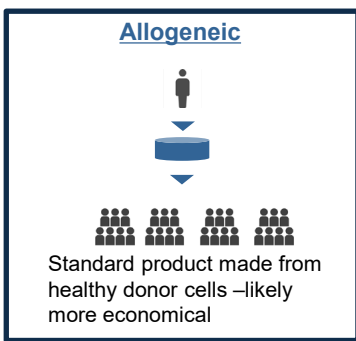
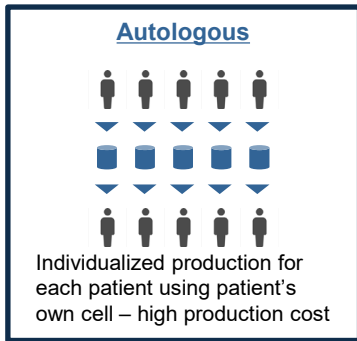
As for development, the number drugs for which clinical trials being carried out is also increasing due to next gen antibody drugs such as ADCs and bispecifics



Appendix 2-2 | Cell Therapy CDMO Full-Blown Market Entry

The site is strong when it comes to development and manufacturing of immune cell therapies (e.g. CAR-T cell therapy), especially allogeneic cell therapies, which are expected to see strong growth going forward.

Allogeneic cell therapy is more economical than autologous, and development is picking up speed in anticipation of future market growth

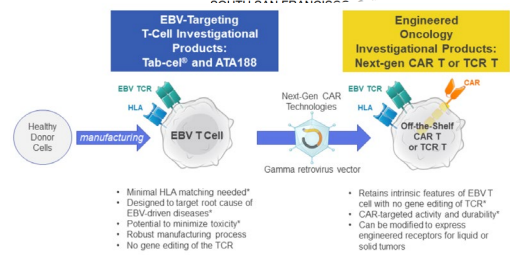


Atara Biotherapeutics is a pioneer within allogeneic immune cell therapy and is expected to receive commercial approval in the EU within 2022

October 14, 2022 ATARA BIO

CHMP Recommends Approval of Atara Biotherapeutics' Ebvallo™ (tabelecleucel) for the Treatment of Epstein-Barr Virus-Positive Post-Transplant Lymphoproliferative Disease

Ebvallo™ on Track to be the First Ever Allogeneic T-Cell Therapy Approved
 Positive Opinion Based on Pivotal Phase 3 ALLELE Study Demonstrating a Favorable Risk-Benefit Profile
 European Commission Approval Expected 2022



[Characteristic of Atara's product]
 Give EBV (Epstein-Barr virus) specificity to allogeneic T cells from a donor. Developing technology unique to allogeneic cell therapy such as immune evasion and develops CAR-T

※Source : Atara Biotherapeutics HP, viewed on Dec 12th, 2022

Fujifilm will push for market expansion of allogeneic cell therapies through continued development and manufacturing for our costumers

Appendix 2-3 | Fujifilm's Continuous Manufacturing System

Set to begin GMP operation from 2023 and are currently having discussions with several clients

	Features of Fujifilm's Continuous Manufacturing	Batch Production
Quality	<ul style="list-style-type: none"> • Ability to achieve high purity compared to batch production • Enables manufacturing of unstable antibodies that are difficult to produce with batch production. 	<ul style="list-style-type: none"> • Unstable antibodies are hard to manufacture
Production capacity	<ul style="list-style-type: none"> • By adjusting the production time small to large scale lots can be made at the same facility 	<ul style="list-style-type: none"> • Different facilities needed for different lot sizes
Facility investment Mfg. cost	<ul style="list-style-type: none"> • Takes up 25-75% less space compared to batch production • Facility investment amount is likewise reduced by 25-75% • 25% reduction in manufacturing costs(In-house research) 	<ul style="list-style-type: none"> • Need to invest in bio reactors depending on the amount to be manufactured
Technology	<ul style="list-style-type: none"> • Systems for automatic titer control and continuous monitoring of culture conditions are necessary (development complete) • The automatic continuous manufacturing device also needs an automatic control system (development complete) 	-
Culture media	<ul style="list-style-type: none"> • Media optimized for continuous manufacturing is necessary and Fujifilm has developed a high-quality media for this purpose. 	-

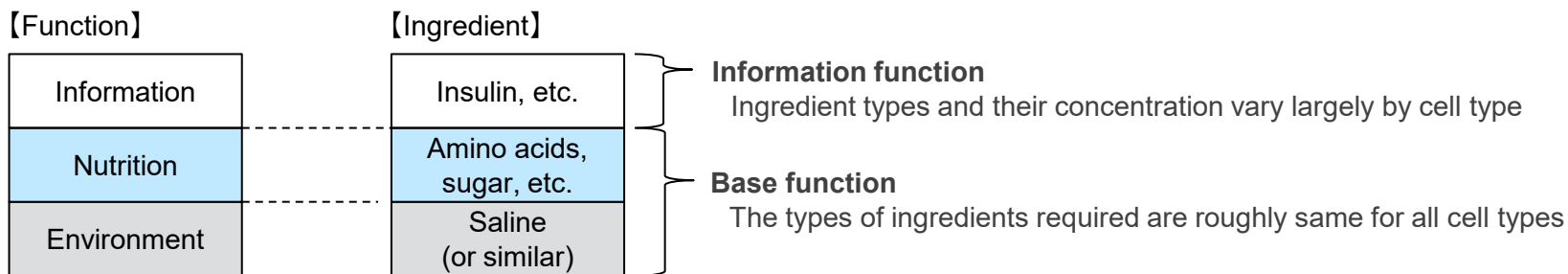
(*Automatic continuous purification device and monitoring technology can also be used for batch production.)

Appendix 3-1 | What are Cell Culture Media?

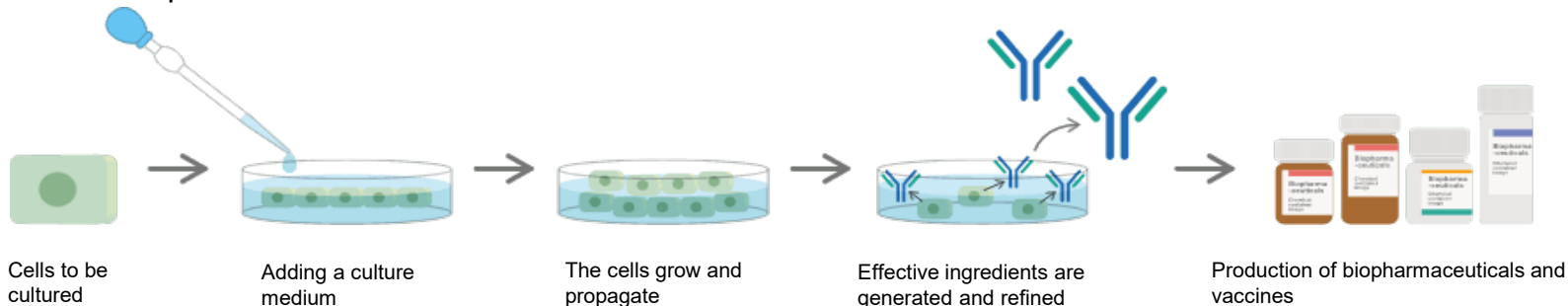
■ What are Cell culture media?

Cell culture media are important materials, essential for facilitating cell growth and production of end objects generated from cells. It has the function of providing “environment, nutrients and information” to cells.

Just as people have personal preferences, cells and cell products have individual preference in optimum composition of culture media.



Cell culture process



Appendix 3-2 | What are Cytokines?

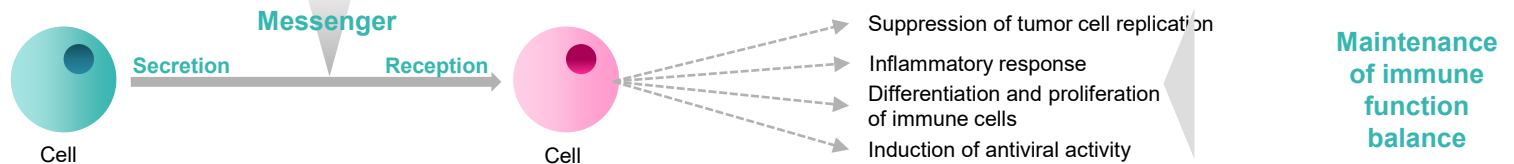
■ Cytokines are:

- A category of proteins produced and secreted by certain cells of the immune system (cells that are present inside white blood cells and protect the body from infection by pathogens) in response to an invasive pathogen.
- **Cytokines are the mechanism by which cells “talk” to each other. They activate and control immune system cells, and play an important role in balancing immune function.**

■ Types and functions of cytokines

- It is not just immune system cells that produce cytokines. They are also secreted from hundreds of types of cells. Even today, more types of cytokines are being discovered.
- Progress is being made on developing drugs that target cytokines with the hope they will be effective in controlling tumors and other proliferative diseases as well as suppressing rejection when transplants are performed.

	Types (main categories)	Function
1	Interleukins	Mainly secreted by leukocytes, interleukins modulate growth, differentiation, activation, death, etc. of immune cells.
2	Chemokines	Chemokines play a control function guiding leukocytes to sites of inflammation (chemotaxis).
3	Interferons	Interferons are secreted in response to the presence of a virus or tumor cells and suppress viral and tumor cell replication.
4	Growth factors	Growth factors stimulate the proliferation of specific cells other than hemocytes.
5	Hematopoietic factors (colony-stimulating factors)	Hematopoietic factors promote differentiation and proliferation of immune cells and hemocytes (erythrocytes, leukocytes and thrombocytes)
6	Tumor necrosis factors	Tumor necrosis factors induce necrosis and apoptosis in tumor cells. They also involved in inflammatory response.



■ Examples of the use of cytokines

Cytokines are often used as a culture medium additive mainly when culturing cells.

- Stem cell culture: Maintain undifferentiated stem cells and promote differentiation into specific cells
- Field of cell therapy: Used for cell proliferation and to activate t-cells

A person is running away from the camera on a dirt path that winds through a dry, grassy landscape. In the background, there are mountains under a clear blue sky. The sun is low on the horizon to the right, creating a bright glow and lens flare effects. The overall mood is one of perseverance and achievement.

NEVER STOP

Achieving Continual Growth: "NEVER STOP"