IR Book | Feb. 2025

ST PHARM

Technology Driven Gene Therapy CDMO
From Oligonucleotide to xRNA

Cautionary Statement regarding Forward-looking Statement

This presentation contains forward-looking statements from Dong-A Socio Group (“the Group”) that include, but are not limited to, statements regarding our future financial performance, business strategies, market opportunities, product development, and operational plans. Words such as “anticipate,” “believe,” “estimate,” “expect,” “intend,” “may,” “plan,” “project,” “will,” and similar expressions are intended to identify such forward-looking statements.

These forward-looking statements are based on our current expectations and beliefs concerning future developments and their potential effects on the Group. Such forward-looking statements are inherently subject to risks, uncertainties, and assumptions that could cause actual results to differ materially from those expressed in these forward-looking statements.

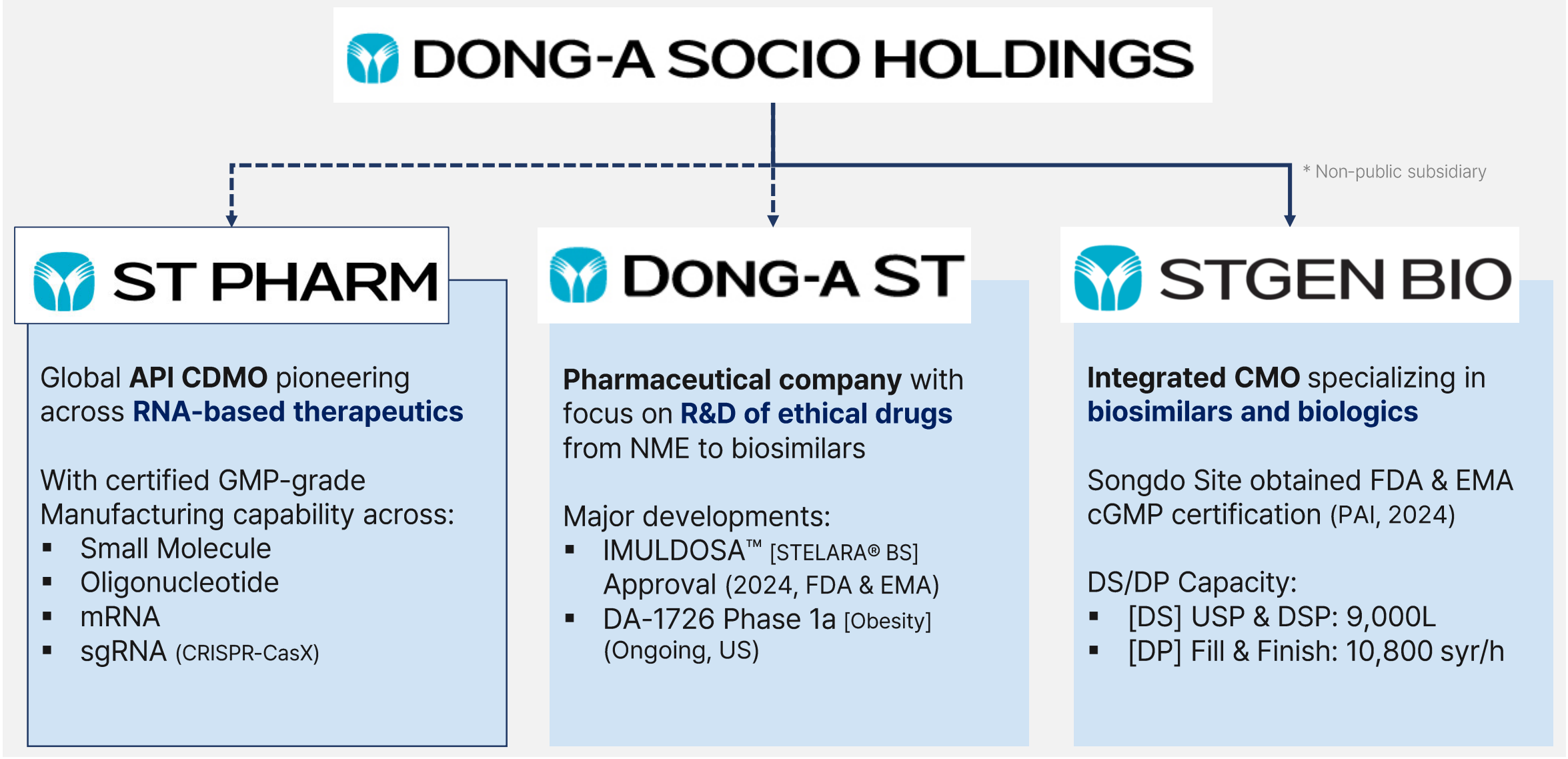
We caution investors not to place undue reliance on any forward-looking statements. These statements speak only as of the date they are made, and we undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise, except as required by law. Additionally, please note that the financial figures and metrics presented in these Investor Relations materials are preliminary and have not yet been audited by an independent auditor. These numbers may be subject to change in future finalized disclosures.

PART 01

Introduction

Overview

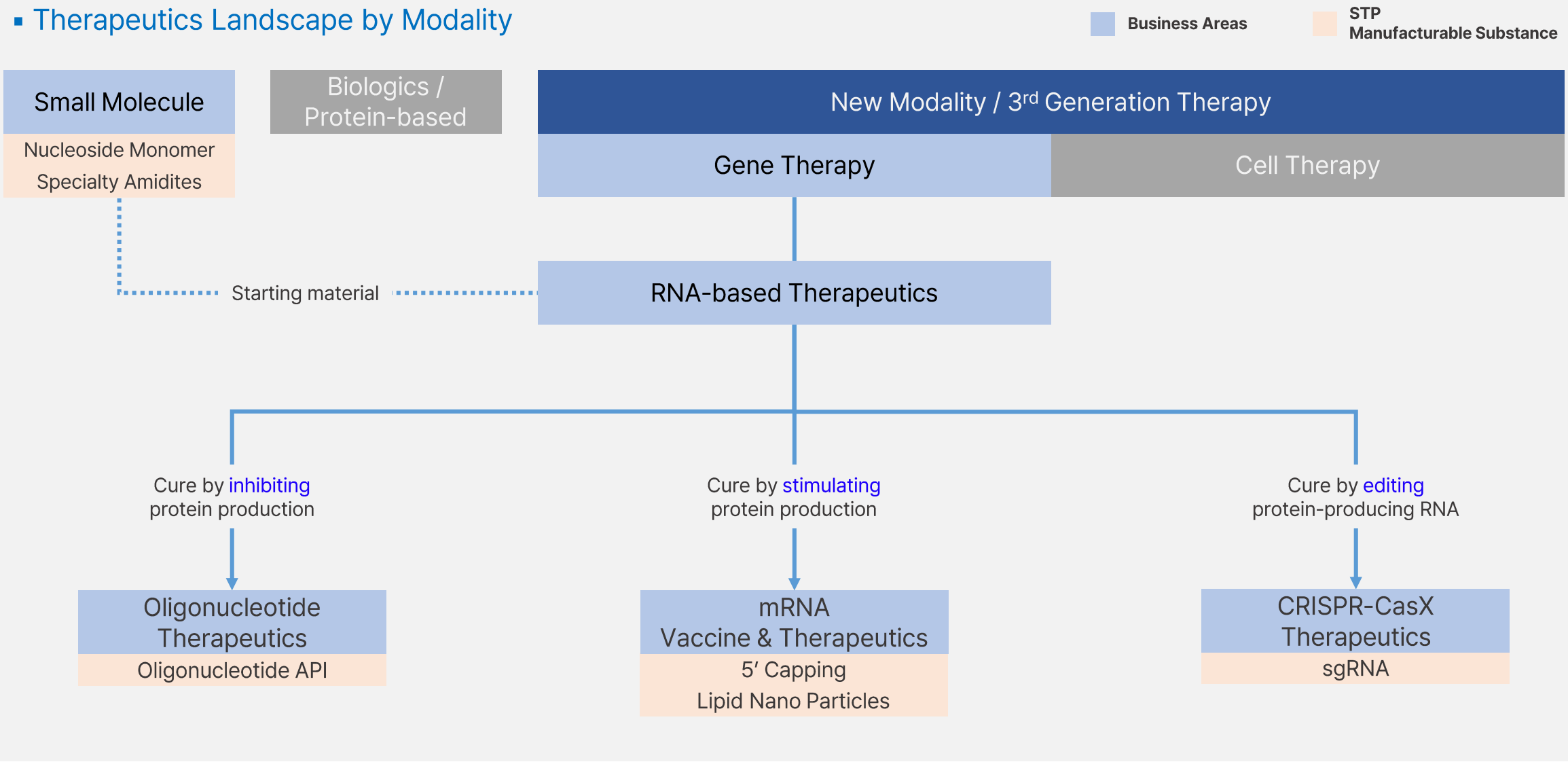
Dong-A Socio Group – Healthcare & CDMO Portfolio



Overview

Introduction to Core Business Areas

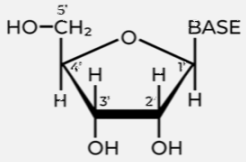
▪ Therapeutics Landscape by Modality



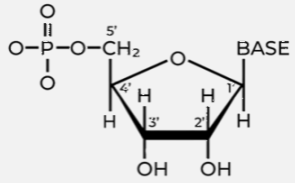
Overview

History & CDMO Records

Nucleosides API



Nucleoside



Nucleotide

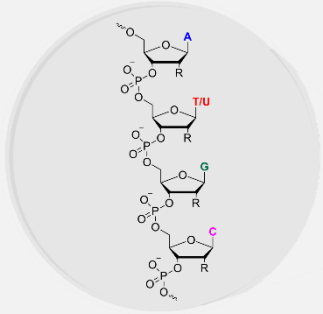
CDMO specializing in small-molecule nucleoside APIs for anti-viral medications

API Supplier of

GSK Thymidine
GSK Zidovudine
Novartis Telbivudine
Gilead Sofosbuvir

Integrated value chain from nucleosides to phosphoramidites

Oligonucleotide API




Oligonucleotide (Single-strand)

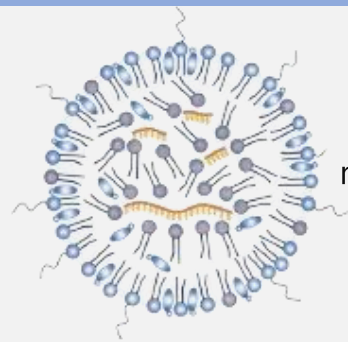
2018
- First commercial-scale Oligo Plant

2022
- NAI grade from US FDA PAI Inspection

2023
- US FDA Inspection for Banwol Site
- 2nd commercial-scale plant (under construction)

2024
- 3rd Commercialized Oligo CDMO received US FDA Approval

xRNA CDMO Platform


mRNA-LNP

2023
- Commercial-scale mRNA production facility

2024
- Application of STLNP® Patent(PCT)
- Supply Agreement with Quantoom Bio.
- Completion of in-house developed 5′-Capping (SmartCap®)

2025
- mRNA Partnership with Evonik AG (SmartCap®)

[Source: Difference Between Nucleotide and Nucleoside - GeeksforGeeks
Linde Schoenmaker, Dominik Witzigmann, Jayesh A. Kulkarni, Rein Verbeke, Gideon Kersten, Wim Jiskoot, Daan J.A. Crommelin. (2021) mRNA-lipid nanoparticle COVID-19 vaccines: Structure and stability, International Journal of Pharmaceutics]

Market

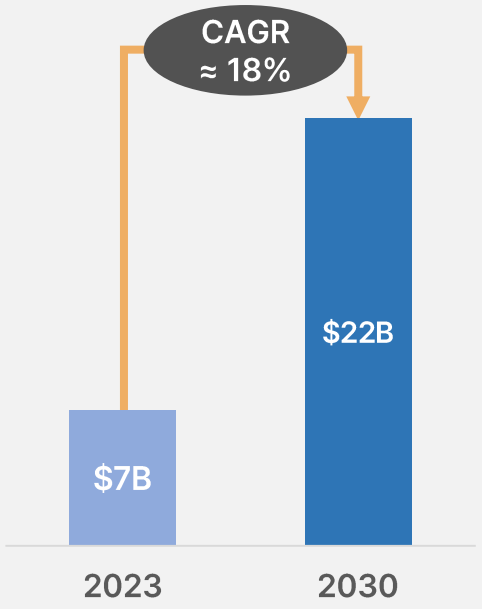
Oligonucleotide Therapeutics & CDMO Market

- Oligonucleotide Market Growth Forecast

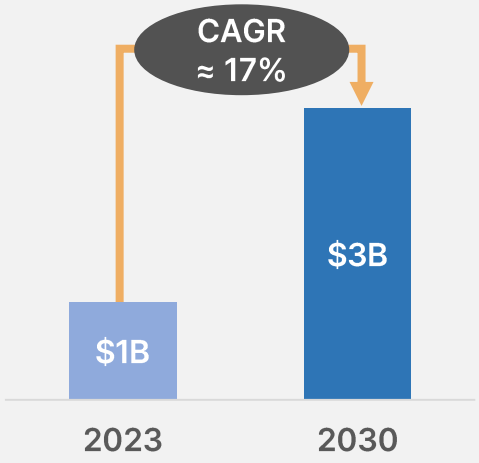
Therapeutics market size to achieve **double-digit growth** through 2030, with CDMO market reflecting ≈15% of downstream market

R&D landscape expanding to target diseases with larger population → **from rare & hereditary to chronic diseases (CVD, metabolic, etc.)**

Global Oligo Therapeutics Market



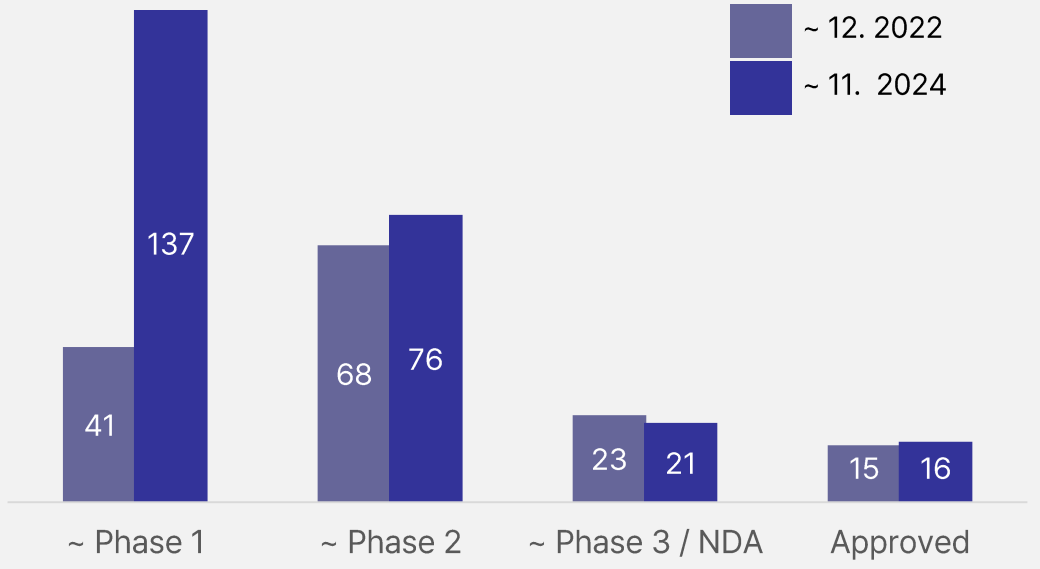
Global Oligo API CDMO Market



[Referred Source: Cortellis, LS Securities]

[Clinical experiments undergoing fast-paced advancements]

(Pipeline Counts, includes ASO and RNAi)



[Source: Synapse]

PART 02

Business Overview

Business

Production Facility (GMP)

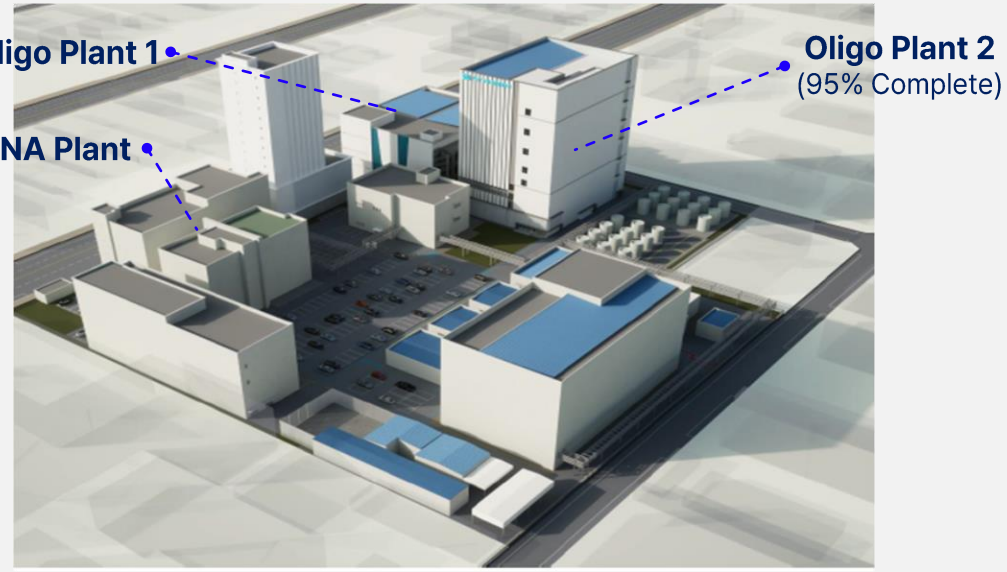
▪ Overall Capacity

Facility	Chemical Plant	Oligo Plant	mRNA Plant
	SM, Generic, Monomer	Oligonucleotide API	mRNA, Lipid Nano Particles
Equipment Status	96 (Reactors)	4 (Lines)*	-
Total Capacity	376,250 L	6.4 mole (≈ 2.2T)**	Max. 100M Dose/Year

* No. of Lines based on installed synthesizers
** 1 mole ≈ 167kg ~ 500kg

▪ View of Siwha Campus (Chemical)

▪ View of Banwol Campus (RNA Tx API)



Business

CDMO Business – New Drug API

▪ Major CDMO Projects

#	Client	Indication / Target Disease	Stage			
			P1	P2	P3	Approved
Oligonucleotide API						
1	Client A	Hyperlipidemia				
		Atherosclerotic(AS) CVD	↳ Indication expansion			
2	Client B	Spinal Muscular Atrophy (SMA)				
3	Client C	Myelodysplastic Syndrome (MDS)				
		Myelofibrosis (MF)	↳ Indication expansion			
4	Client D	Familial Chylomicronaemia Synd.				
		Severe Hyper-triglyceridema	↳ Indication expansion			
5	Client D	Hereditary Angioedema				
6	Client A	Atherosclerosis				
7	Client F	IgA Nephropathy				
8	Client E	Chronic Hepatitis B				
9	Client F	Chronic Hepatitis B				
10	Client F	Huntington's Disease				
Small Molecule API						
11	Client G	Not disclosed				
12	Client H	Mitochondrial Dysfunction				

▪ Capacity Expansion Schedule (Oligo Plant)

Facility	Operation starting by **25.Q4**	**2028 ~**
	Plant 2	**Plant 2 Expansion**
Total Lines	7	~ 10
Total Capacity	8 mole	TBD
CAPEX (KRW)	110 Billion	~ 40 Billion

▪ '23 ~ '24 Oligo CDMO Project Backlog Status (as of 3Q.24)

Project	Contract Duration	Contract Size	Backlog	Progress
Hyperlipidemia	23.03 ~ 24.12	$ 48.5 M	$ 18.7 M	62%
	24.08 ~ 25.12	$ 63.3 M	$ 63.3 M	0%
SMA	23.03 ~ 24.05	$ 9.0 M	$ -	100%
MDS	23.02 ~ 24.06	$ 8.6 M	$ -	100%
	23.05 ~ 24.12	$ 27.3 M	$ 12.0 M	56%
	23.06 ~ 24.12	$ 8.6 M	$ -	100%
	24.08 ~ 25.12	$ 35.7 M	$ 35.7 M	0%
FCS	24.06 ~ 24.12	$ 4.5 M	$ 4.5 M	0%
Others	-	$ 49.8 M	$ 24.1 M	52%
Total		**$ 255.2 M**	**$ 158.2 M**	**38%**

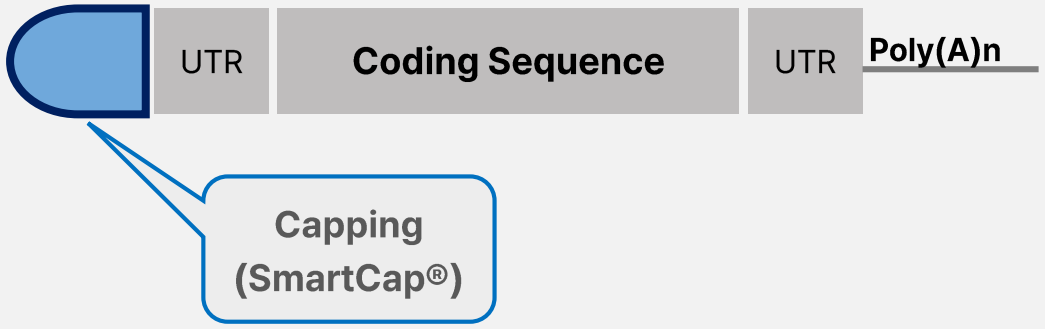
Business

CDMO Business – mRNA Platform

- ST Pharm's In-house Platform Technologies

SmartCap®

- Registered patent in Korea
- Ongoing PCT International Patent Publication
- Over 30 capping analogues → highly customizable
- Efficacy & Safety data through STP-2104 clinical trial (P1)

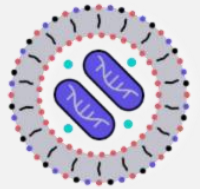


Supply Agreements & Partnerships:

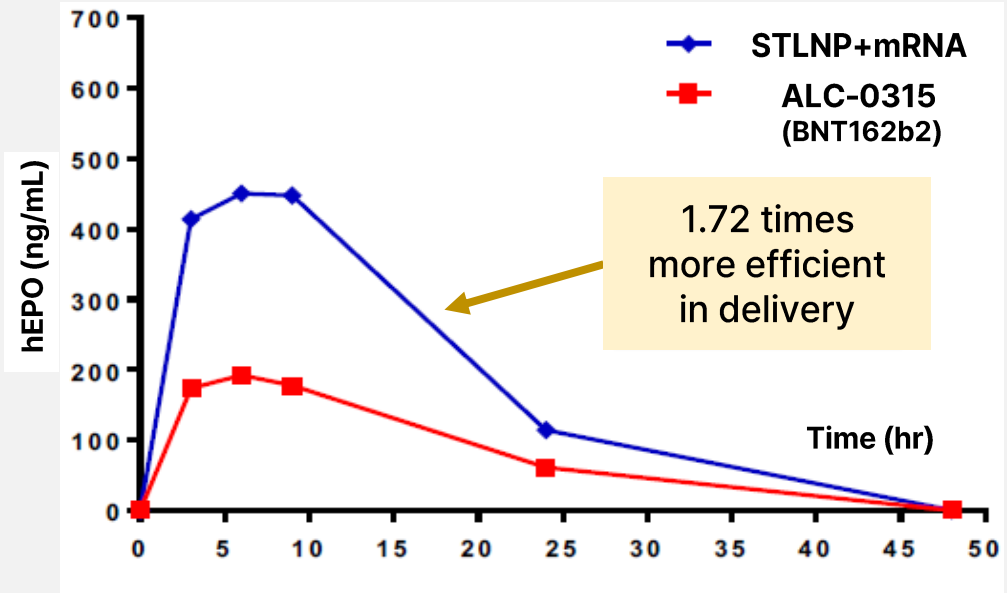
Quantoom Biosciences — Aug. 2024

EVONIK Leading Beyond Chemistry — Jan. 2025

STLNP®



- Ongoing PCT International Patent Publication
- Delivery efficacy data observed from nonclinical study



PART 03

Technology & Pipeline

Technology

Enzymatic Ligation for Oligonucleotide CDMO

- Development of **Enzymatic Ligation** approach to revolutionize API production at scale…

  Our Approach

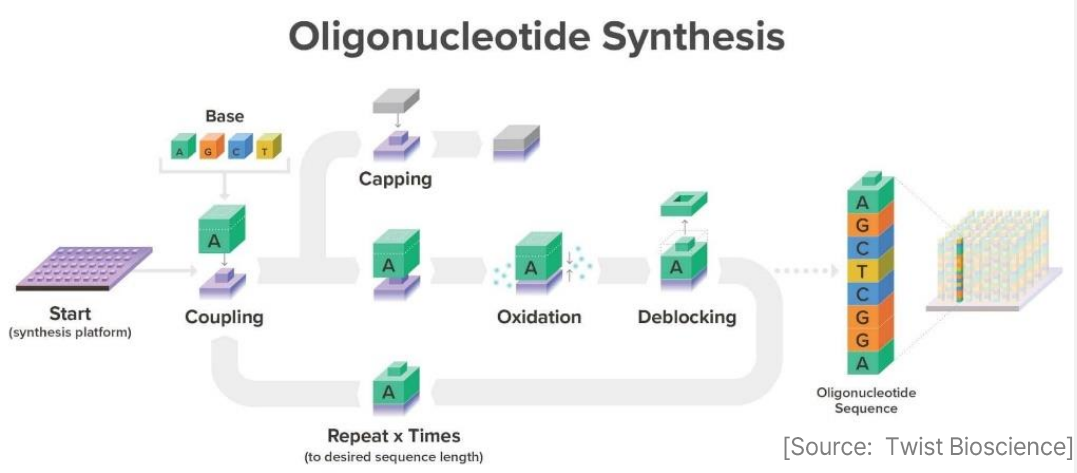
  1) Synthesize monomers into shortmers instead of phosphoramidites as individual building blocks
  2) Synthesize shortmers into full-length oligo APIs through enzymatic ligation

  ** Ongoing joint research with global pharmaceuticals/clients for commercialization of technology*

Why it matters

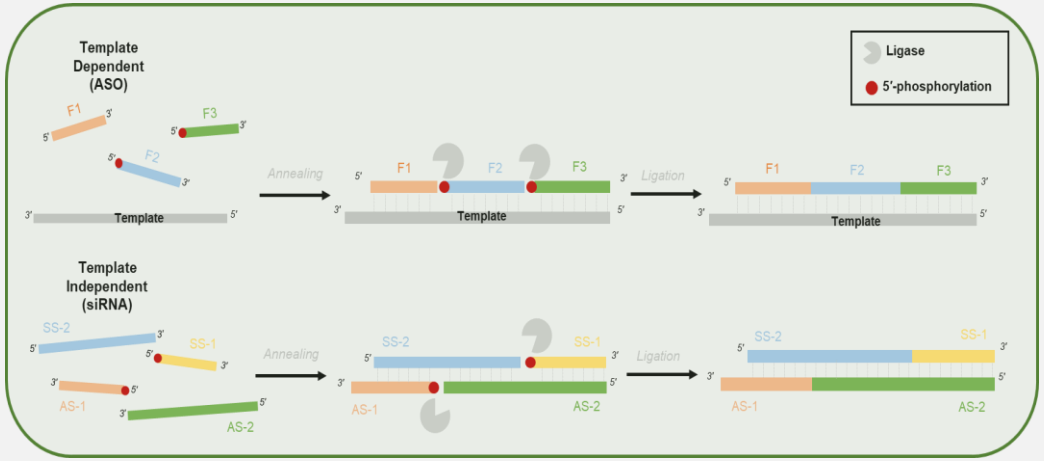
- Improves scalability & lowers production cost
- Eco-friendly, by using non-chemical organic solvents (ex. water)
- Allow efficient synthesis of longer-length oligomers/oligonucleotides

[Solid Phase OS]



[Source: Twist Bioscience]

[Enzymatic Ligation OS]



Technology

LPOS for Shortmer CDMO

- combined with **Liquid Phase Synthesis** for mass production of shortmers

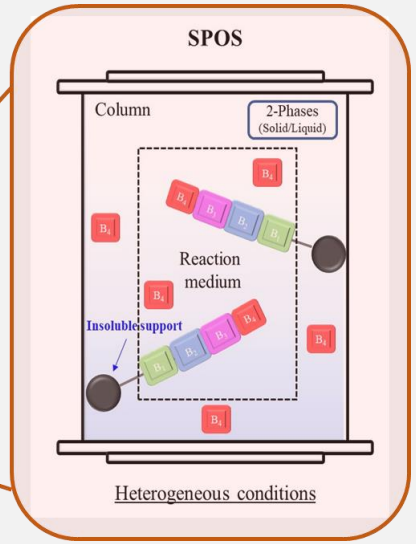
Our Approach

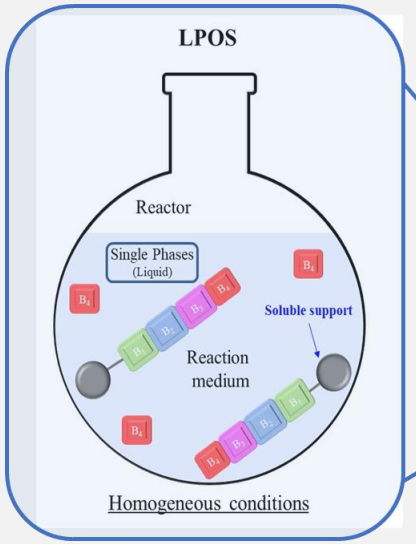
1) Mass produce shortmers through Small Molecule-like liquid phase synthesis
2) Synthesize LPOS-made shortmers into full oligo APIs through ligation

** Acquired global (excl. Japan) license of LPOS-enabling liquid resin from Fujimoto Chemical*

Why it matters

- Greatly enlarges batch size compared to SPOS-made shortmers (x10 of current SPOS batch size)
- Improve synthesis efficiency and shorten production lead time, resulting in cost optimization
- Eco-friendly; LPOS require less chemical solvents than SPOS





Technology

sgRNA Chemical Synthesis for CRISPR-Cas CDMO Service

- sgRNA synthesis in response to CRISPR-Cas demands

Successful manufacturing of 100-mer sgRNA

- Backed by +20 years of expertise in oligo./nucleotide synthesis and development of analytical methods
- Full in-house production capability

Ongoing developments and production augmentation

- 130-mer sgRNA development work-in-progress
- On schedule for installing dedicated line during 1Q.2025

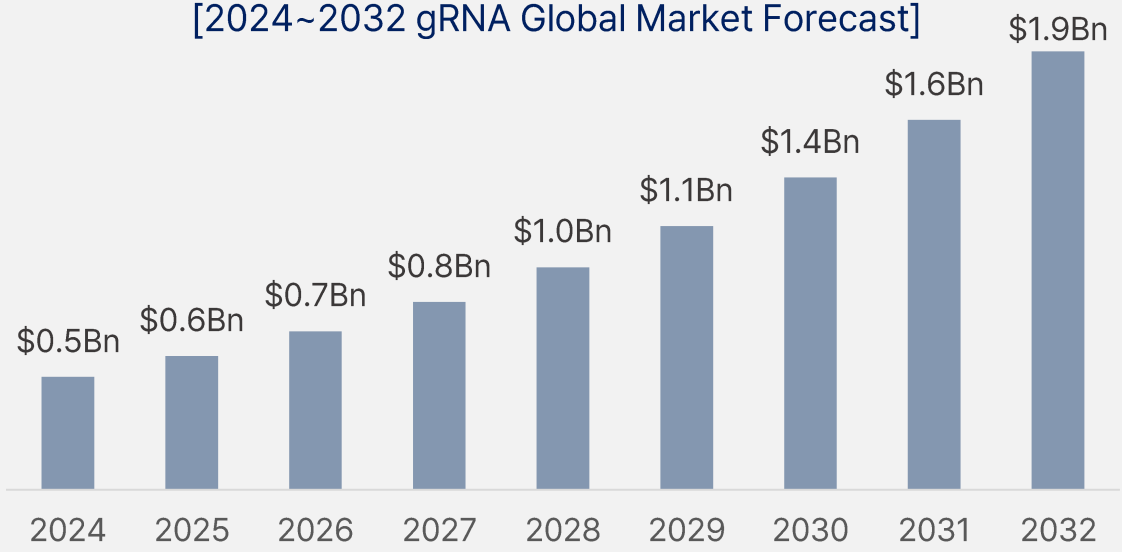
[100-mer sgRNA Purification Results]

As of Oct. 2024

Length	Modification	Crude (Pre-Purification)	Post Purification
100 mer	2′-OH	7~17 %	79~87%*

* Major competitor Target purification ≥ 80% (100-mer)

[2024~2032 gRNA Global Market Forecast]



[Source: AnalystView Market Insight]

[Production Facility Status (GMP)]

Status	Line	Capability
Installed	R&D Lab Line* (non-GMP)	50 μmol ~ 1.2 mmol
Installed	Small-scale Line*	1.2~20 mmol
Planned	Small-scale Line **[sgRNA-dedicated]**	1.2 mmol scale

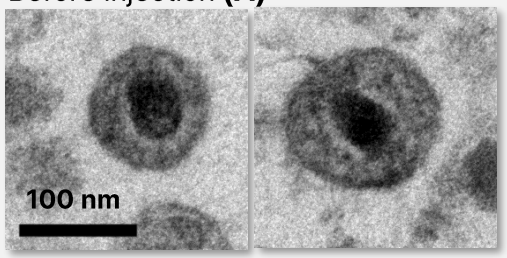
* Currently utilizing two installed lines for both oligonucleotide & sgRNA synthesis

Pipeline

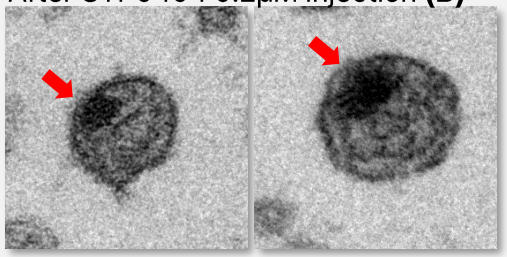
STP0404 - ALLINI Mechanism (New Mechanism)

▪ STP0404 Mechanism of Action

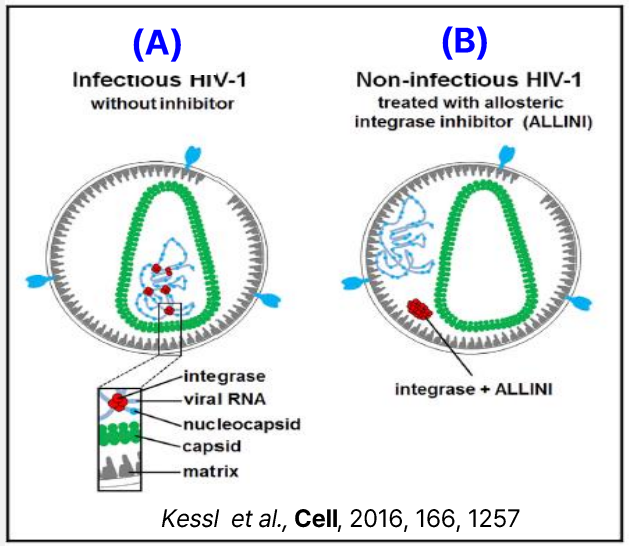
Before Injection **(A)**



After STP0404 0.2µM Injection **(B)**

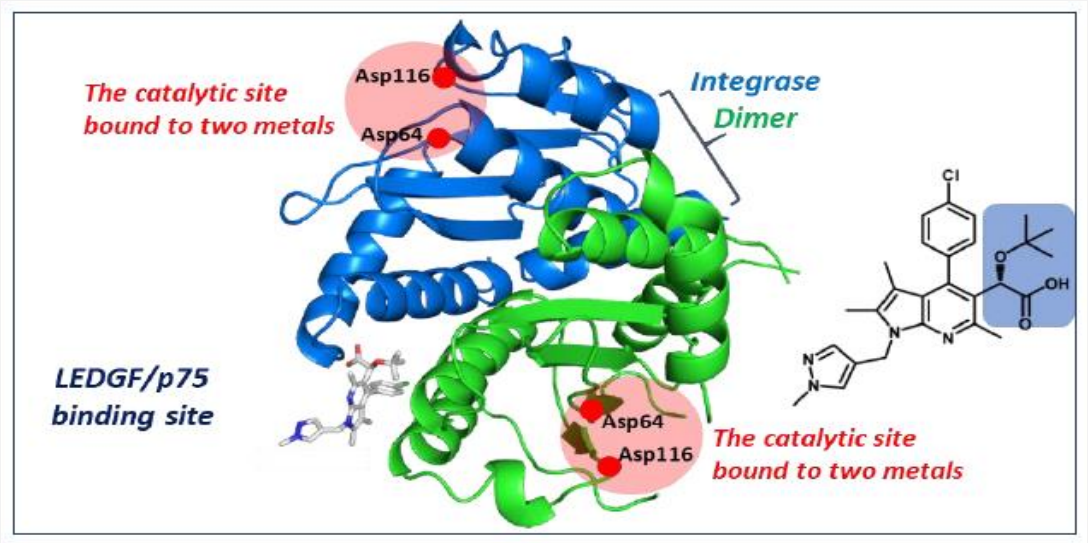


TEM study in Emory Univ.



Kessl et al., **Cell**, 2016, 166, 1257

▪ STP0404 X-ray Structure



- New mechanism ALLINI (Allosteric integrase inhibitor) founded by Prof. M. Kvaratskhelia (Univ. of Colorado) in 2016
- Integrase delivers HIV virus's RNA to host cell, inducing virion state (infection of host cell & capsid protection) **(A)**
- ALLINI inhibits delivery / merge of integrase with virus's RNA, causing mislocalization of HIV's RNA **(B)**
- STP0404 pulls the HIV virus's RNA outside the virus-protecting capsid, allowing the formation of non-infectious HIV-1 **(B)**
- New MOA for HIV-cure as "maturation inhibitor" - "Divide and Conquer", not 'Shock & Kill' or 'Block & Lock''
- Identification of ALLINI mechanism supported by US NIH grants in 2018. Collaboration with Emory University & University of Colorado Boulder

PART 04

Dong-A ST

Pipeline

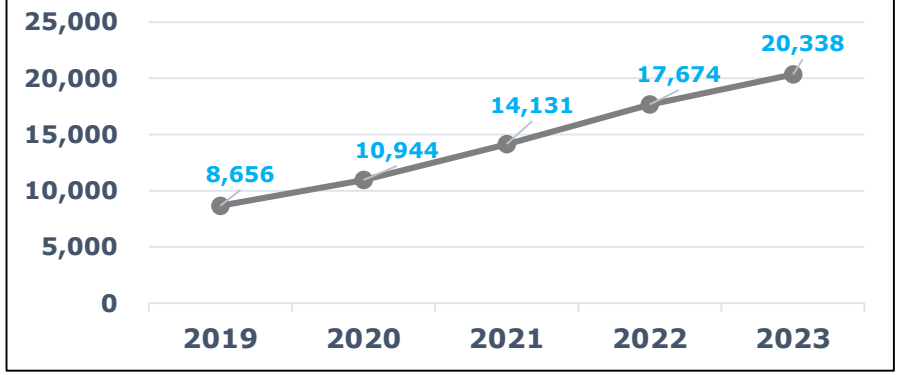
IMULDOSA : Stelara® Biosimilar

- Developer — Dong-A ST & Meiji Seika Pharma
- License Agreement — Accord BioPharma Inc. (US) / Accord Healthcare (EU)
- Manufacturing — Exclusive production from dedicated lines from STgen Bio
- Formulation — PFS (Pre-Filled Syringe): 45mg/0.5mL & 90mg/1.0mL (Subcutaneous administration)
  Vial: 130mg/26mL (Intravenous administration)
- Indication — Plaque psoriasis, psoriatic arthritis, Crohn's disease, ulcerative colitis
- Regulatory Actions — Oct. 24 US FDA Approval (Sales after May. 25), Dec. 24 EU EMA Approval (Sales after Jan. 25)

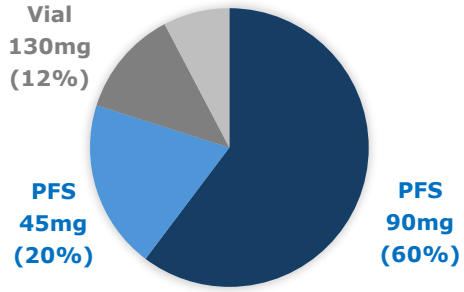
Stelara® Market Size

Global Market Size: $2 Billion (US accounting for 77%) in 2023*

Stelara® Global Sales (mil.USD)



Sales Breakdown (Formulation)



Sales Breakdown by Geography

	Country	2023 sales
1	US	$15,613,485,771
2	GERMANY	$873,639,172
3	CANADA	$663,584,550
4	SPAIN	$503,833,653
5	JAPAN	$431,487,690
6	UK	$379,793,159
7	FRANCE	$358,543,753
8	ITALY	$237,373,247
9	AUSTRALIA	$236,356,408
10	PUERTO RICO	$99,112,125

* Source: IQVIA global data

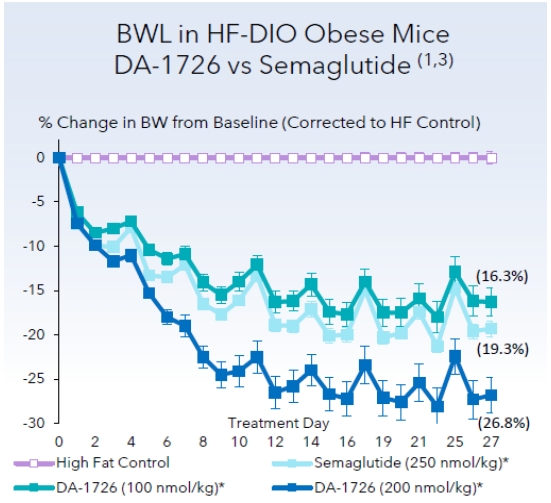
Pipeline

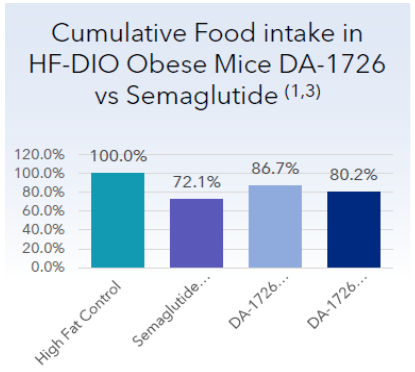
DA-1726 : Anti-Obesity (GLP1/GCG dual agonist)

- Indication: Obesity, MASH
- MOA: GLP1R / GCGR Dual Agonist
- Market Size: Global $2.8 Billion (2022) → $16.7 Billion (2028) [1)]
- Status: Reported positive safety results from Phase 1 [Part 1] (Oct. 24), **Ongoing Phase 1 [Part 2] (Expected release 1Q25)**
  Scheduled for Phase 1 [Part 3] during 2Q25 (24-week, expected 12-week interim results in 1H26)
- Highlight: Reported superior weight-loss despite higher food intake compared to Wegovy and Zepbound (Pre-clinical results)

Efficacy Results (Pre-clinical)

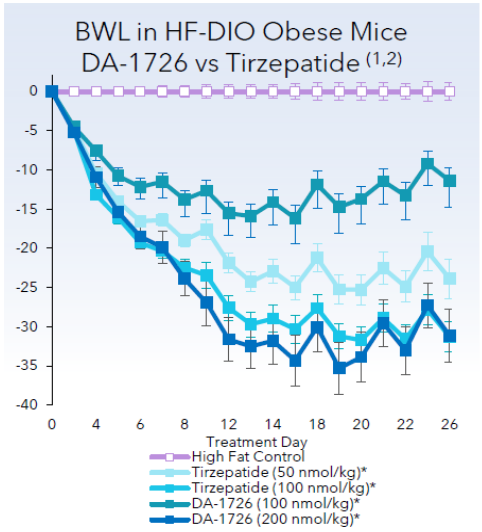
vs. Wegovy

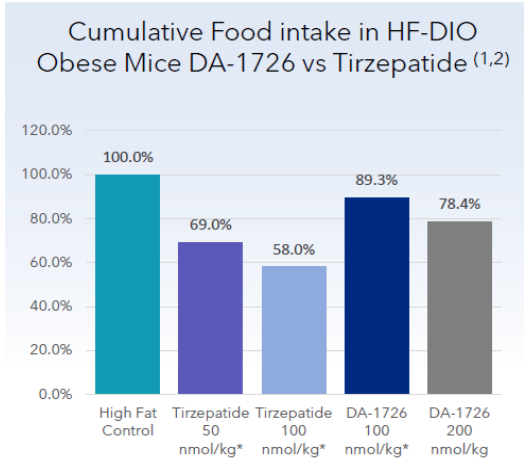




Weight loss observed from DA-1726 is attributed to reduced food intake via GLP1R and increased energy expenditure via the GCGR

vs. Zepbound





1) Evaluate Pharma

Thank You

ST PHARM

Technology-Driven Gene therapy CDMO
From Oligonucleotide to xRNA