

NOVEL BIOLOGICS FOR BETTER LIFE



Investor Relations | November 2020



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Investor Relations

ALTEOGEN Inc.

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 - Herceptin SC Biosimilar (ALT-LS2)
 - Eylea Biosimilar (ALT-L9)

Established 13th of May, 2008

CEO Soon Jae Park

Headquarter Daejeon

IPO KOSDAQ: 196170 (2014)

Subsidiary ▶ **Ceres F&D Inc.**
(KGMP Certified/cGMP planned)

- Teicoplanin
- Tacrolimus
- Everolimus



▶ **Altos Biologics Inc.**
- Eylea Biosimilar

History

- May 2008 Company Establishment
- June 2010 CEO Soon Jae Park inaugurated
- December 2014 KOSDAQ Market listed
- June 2018 A subsidiary company was established (Ceres F&D Inc.)
- October 2020 A subsidiary company was established (Altos Biologics Inc.)



ALTEOGEN's Business Domains

Platform Provider for Biobetter Drugs

Biobetter Platforms

Long-acting
Biobetter

- Technology to increase half-life

Antibody-Drug
Conjugate (ADC)

- Novel anti-cancer drug

Prioritized Biosimilars

Biosimilars

- Differentiated Biosimilar technology

Enabling Technology

Hyaluronidase

- Novel human hyaluronidase for mAb SC use
- Dermal and Ophthalmology use

ALTEOGEN's Business Domains

Platform Provider for Biobetter Drugs

Long-acting Biobetter

- long-acting **hGH**, and **GLP-NexP-FGF**

Antibody-Drug Conjugate (ADC)

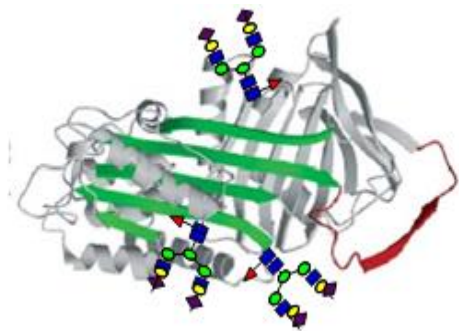
Hyaluronidase

Biosimilars



Development of NexP™ Fusion Technology – Long acting Biobetter

A1AT (Alpha 1 Anti Trypsin)



► Specification

- Abundant in human blood (1.5~3.5 g/L)
- Long *in-vivo* half life (4.5~6.0 days)

► Function

- Serine protease inhibitor
- Have been used for Emphysema

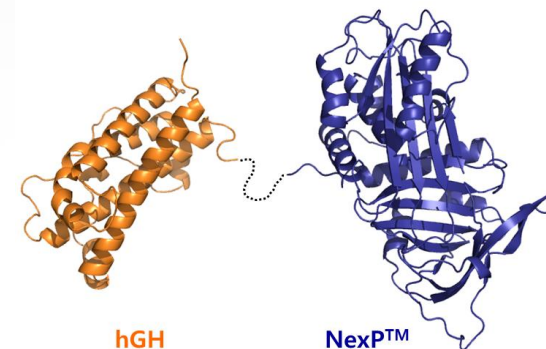
► As a long-acting carrier

- No side effect and immunogenicity in case of high dosage in long period
- Long *in-vivo* half life

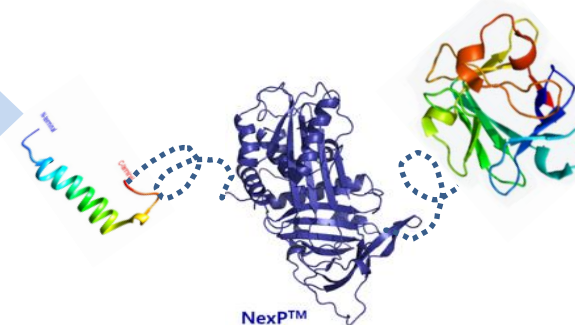
Protein Engineering



NexP Carrier



ALT-P1 (long acting hGH)



ALT-F2 (NASH treatment)

ALTEOGEN's Business Domains

Platform Provider for Biobetter Drugs

Long-acting
Biobetter

**Antibody-Drug
Conjugate (ADC)**

- Proprietary **NexMab™** conjugation technology
- **anti-breast/gastric cancer ADC**
- **anti-ovarian cancer ADC**

Hyaluronidase

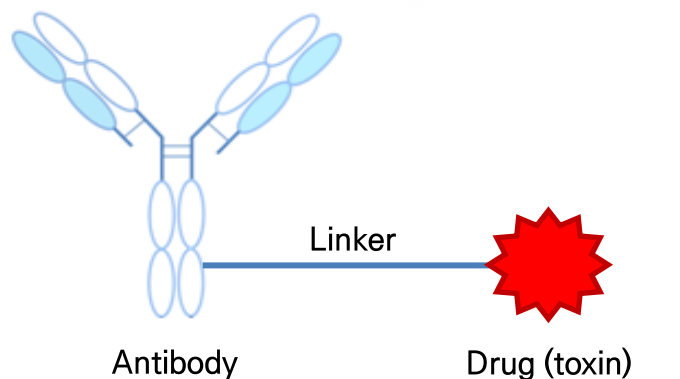
Biosimilars



Novel therapeutic anti –cancer antibody technology, ADC

■ Concept of ADC technology

Antibody–Drug Conjugate (ADC)



- High specificity to cancer cell
- Low cytotoxicity



- Low specificity to cancer cell
- High cytotoxicity

High specificity + High cytotoxicity
: **Higher efficacy but lower side effect**

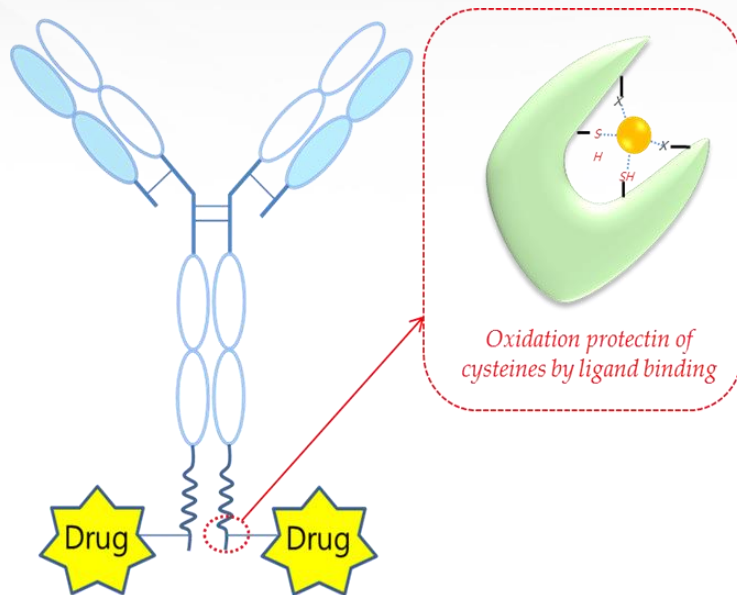
■ Mode of action of ADC

1. Antibody delivers the drug to the specific target antigen
2. Internalization of ADC
3. Drug released from ADC inside target cells
4. Drug kill the target cells



NexMab™ : Proprietary site-selective ADC conjugation technology

Alteogen's NexMab™ technology



Site-specific conjugation to C-terminus of Fc

Simple conjugation process

High productivity and homogeneity

High in vivo stability and low toxicity

*Simple and efficient
site-specific conjugation technology*

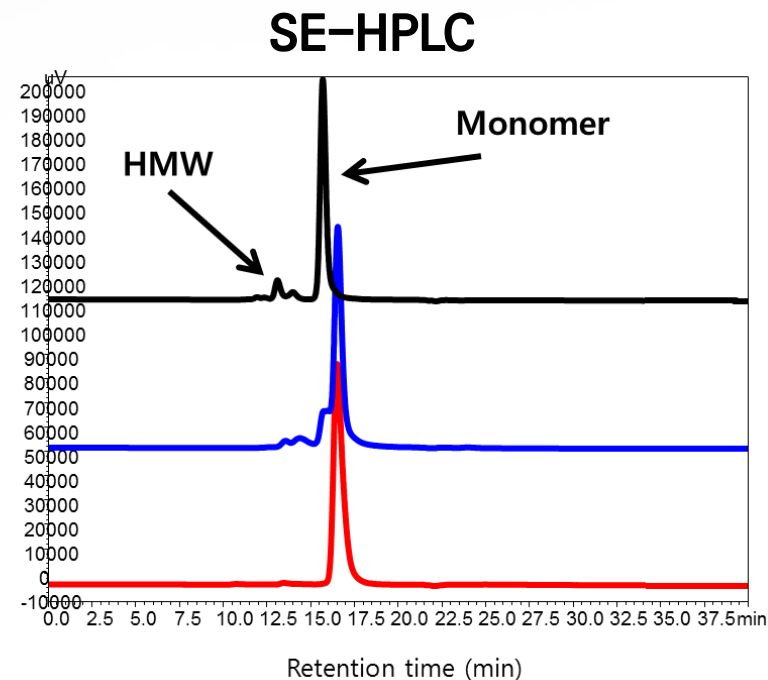
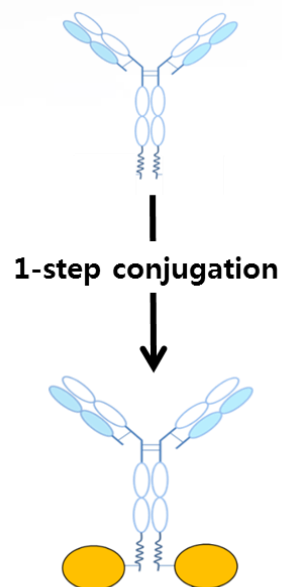
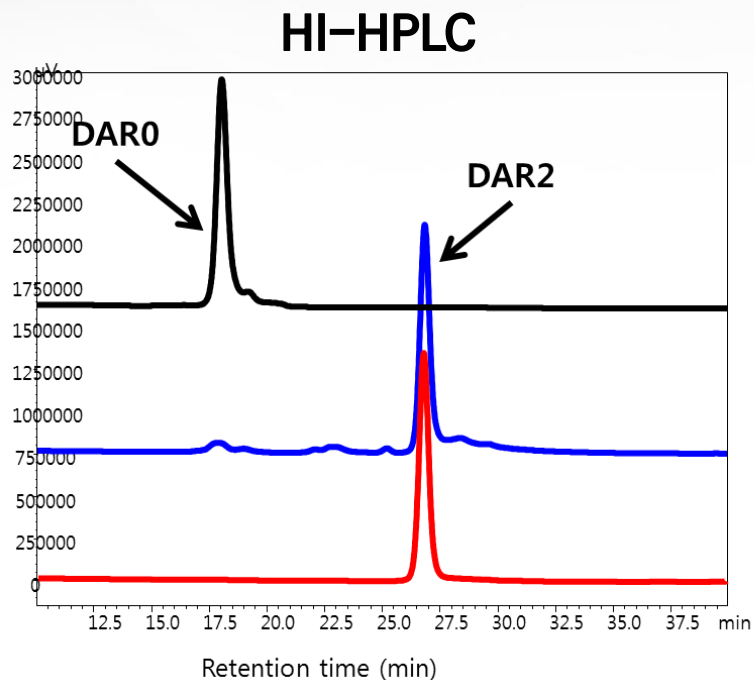
Patent
Registered

- USA(2017)
- EU (2020)
- Korea (2015)
- Russia (2016)
- Japan (2016)
- Mexico (2018)
- China (2018)
- Australia (2016)

Patent
Filed

Canada, Brazil

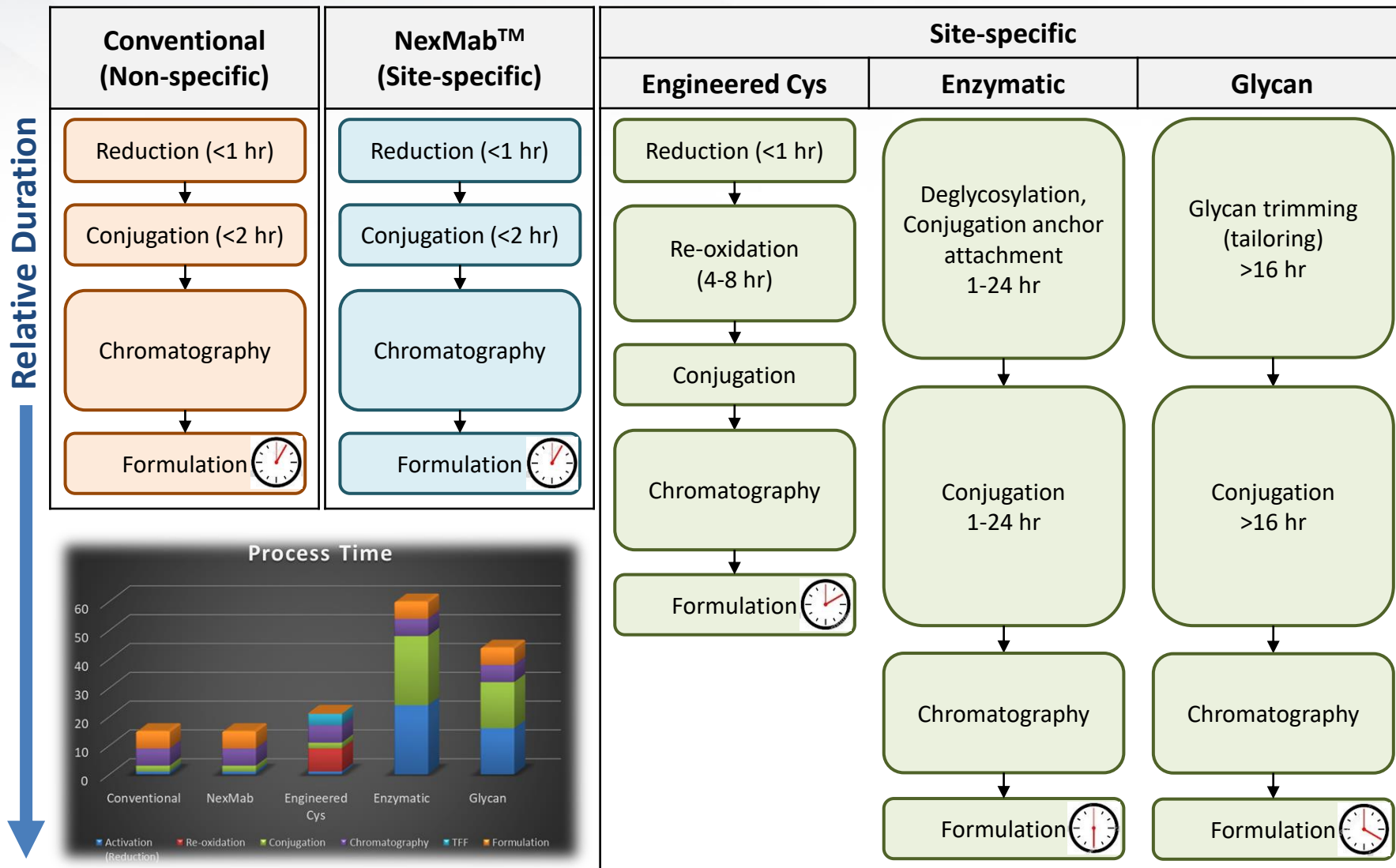
High conjugation efficiency & site-specificity (for MC-vc-PAB-MMAE conjugation)



- High conjugation efficiency (more than 85% DAR2 yield)
- High monomer purity

NexMab™: Superior manufacturability and scalability

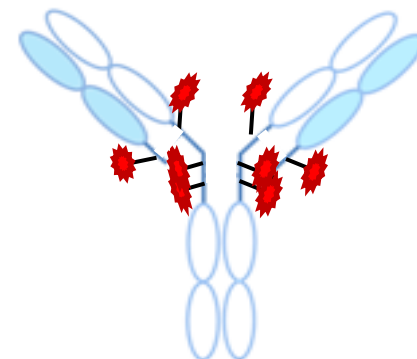
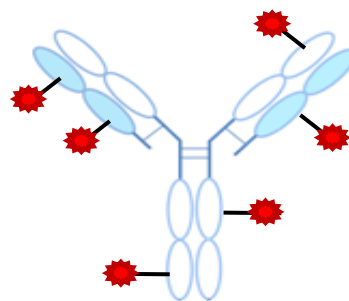
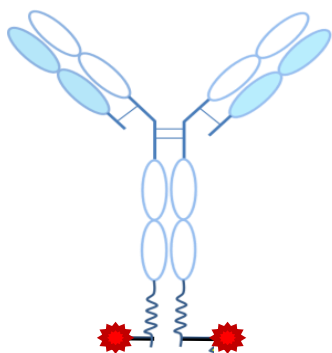
➤ Process comparison between conjugation methods



ALT-P7: Anti-breast/anti-gastric cancer ADC

Comparison of ALT-P7 with other HER2-targeted ADC

ADC	ALT-P7 (HM2-MMAE)	T-DM1 (Trastuzumab emtansine)	DS-8201 (Trastuzumab deruxtecan)
Company	Alteogen	Genentech (Roche)	Daiichi-Sankyo AstraZeneca
Linker	cleavable	non-cleavable	cleavable
Payload	MMAE	DM-1	DXd
DAR	2	3.5	~8
dosage	4.5 mpk (RP2D)	3.6 mpk	5.4 mpk



ALT-P7: Anti-breast/anti-gastric cancer ADC

ALT-P7 Phase 1 Summary

Characteristics (Total, n=27)	cohort1 (0.3mg/kg) (n=4)	cohort2 (0.6mg/kg) (n=3)	cohort3 (1.2mg/kg) (n=3)	cohort4 (2.4mg/kg) (n=3)	cohort5 (3.6mg/kg) (n=3)	cohort6 (4.8mg/kg) (n=5)	cohort7 (4.2mg/kg) (n=3)	cohort8 (4.5mg/kg) (n=3)
Age, years (median, SD)	53.23(±14.08)	60.3(±4.62)	49.3(±8.08)	44.3(±12.58)	57.3(±14.19)	63.4(±10.16)	45.0(±2.65)	45.3(±7.64)
<65years (n)	4	3	3	3	2	3	3	3
≥65years (n)	0	0	0	0	1	2	0	0
Her2 Expression								
IHC2+/FISH+ (n, %)	2(50%)	1(33%)	1(33%)	2(67%)	0	1(20%)	0	1(33%)
IHC3+ (n, %)	2(50%)	2(67%)	2(67%)	1(33%)	3(100%)	4(80%)	3(100%)	2(67%)
ER/PR Expression								
+/+			1	1	1	1	2	2
+/–	1			1	1	1		
–/+			1			1		
–/–	3	3	1	1	1	2	1	1
Previous anti-HER2 therapy								
Trastuzumab (n, %)	4(100%)	3(100%)	3(100%)	3(100%)	3(100%)	5(100%)	3(100%)	3(100%)
T-DM1 (n, %)	4(100%)	3(100%)	3(100%)	2(67%)	3(100%)	5(100%)	3(100%)	2(67%)
Pertuzumab (n, %)	2(50%)	1(33%)	2(67%)	1(33%)	3(100%)	1(20%)	1(50%)	3(100%)
Lapatinib (n, %)	4(100%)	1(33%)	2(67%)	1(33%)	2(67%)	3(60%)	3(100%)	1(33%)
Margetuximab (n, %)	0	0	1(33%)	0	0	0	1(50%)	0
Pozotinib (n, %)	0	1(33%)	0	0	0	1(20%)	1(50%)	0
DS-8201 (n, %)	0	0	0	0	0	0	0	1(33%)

MTD and RP2D of ALT-P7 was determined to be 4.5 mg/kg in HER2+ metastatic breast cancer

- The most common grade 3/4 TRAE was neutropenia (n=4)
⇒ Other TRAEs were myalgia, fatigue, sensory neuropathy, and rash.
- The subject who has been receiving ALT-P7 for the longest time has been maintained without cancer progression for more than 630 days.

Summary

- ALT-P7 was well tolerated up to a dose of 4.5mg/kg, in heavily pre-treated HER2-positive advanced breast cancer patients.
- ALT-P7 was very safe and the mild adverse reactions were shown in most of the patients
- Pharmacokinetic analysis showed ALT-P7-dose dependent parameters.
- There was no immunogenicity issue from 0.3 mg/kg to 4.8 mg/kg of ALT-P7

Future Plan of ALT-P7

Market situation

- ✓ Kadcyla®, the first Her2 targeted ADC, sales is more than US\$ 1B
- ✓ ALT-P7 is expected to be the third line Her2 targeted ADC

Key for Success in the market

- ✓ Achieving the unmet medical need :Efficacy and Safety
- ✓ Step wise approach: Moving to 2nd line Her2 targeted ADC

Combination Therapy of ALT-P7

- ✓ Combined with Immune check point Inhibitor or anti-cancer drug to pioneer new market

ALTEOGEN's Business Domains

Platform Provider for Biobetter Drugs

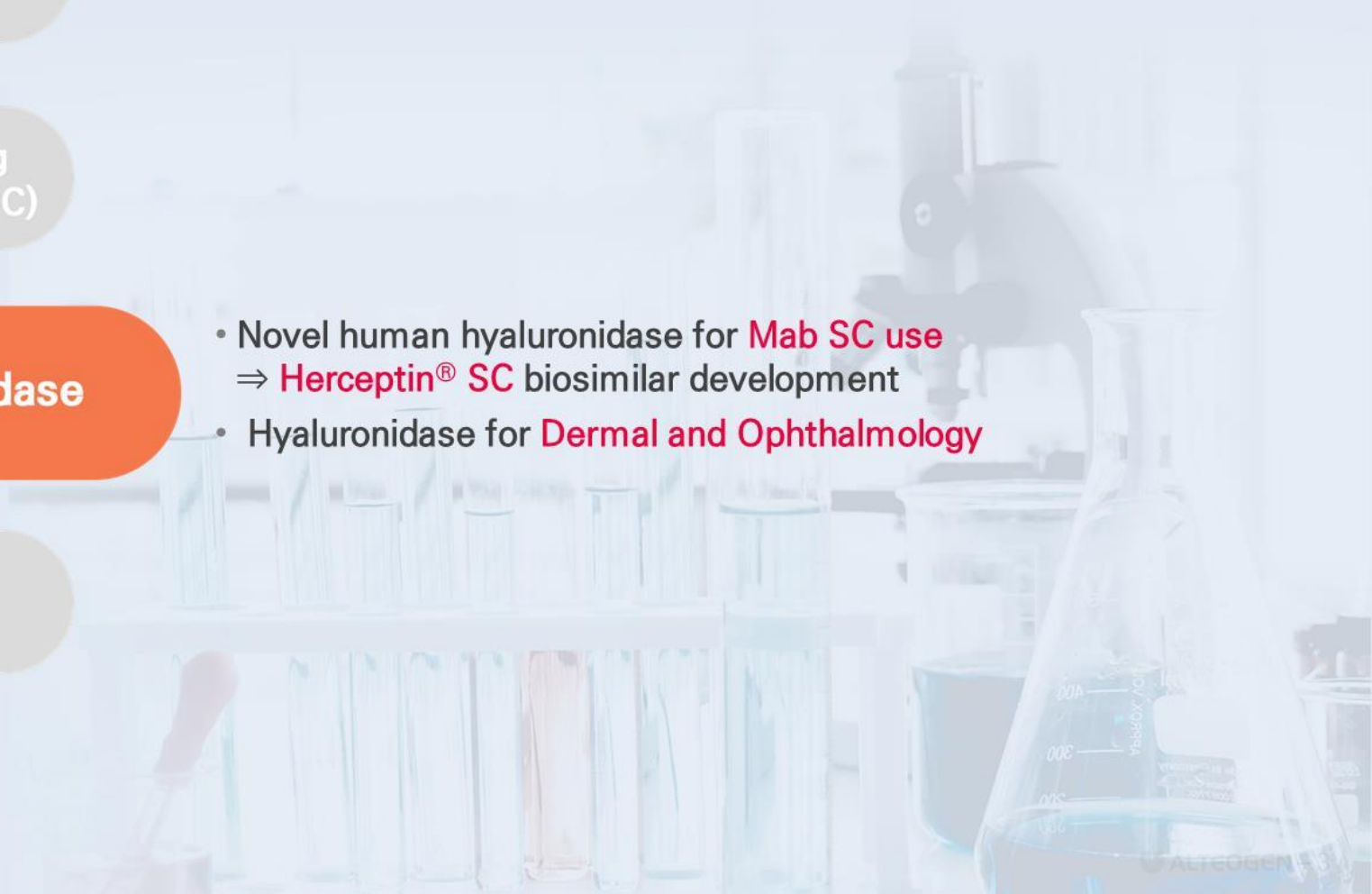
Long-acting
Biobetter

Antibody-Drug
Conjugate (ADC)

Hyaluronidase

- Novel human hyaluronidase for **Mab SC use**
⇒ **Herceptin® SC** biosimilar development
- Hyaluronidase for **Dermal and Ophthalmology**

Biosimilars



Routes of administration of biologics



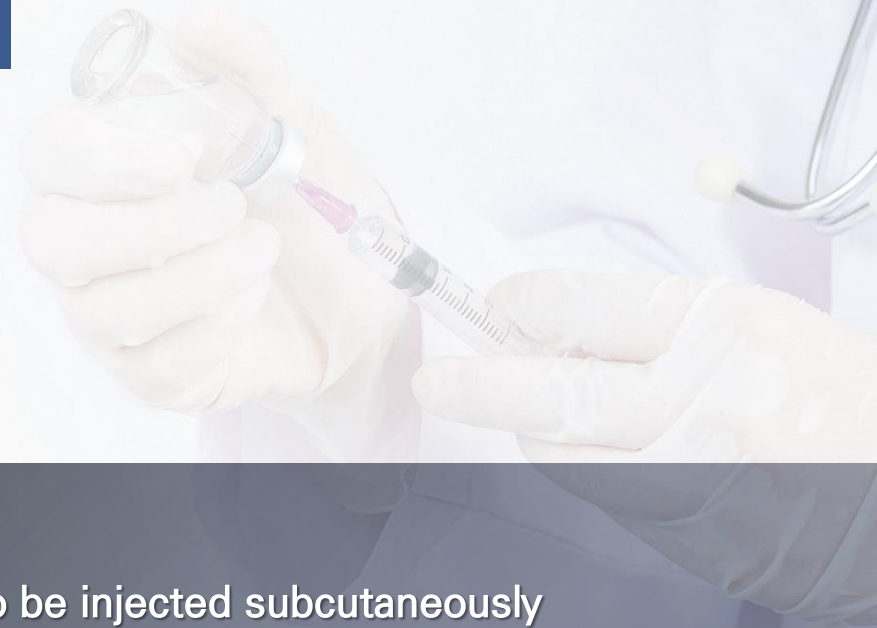
iv infusion

- ▶ Discomforts for patients, side-effect
- ▶ Time/cost efficiency is low



sc injection

- ▶ Short injection time
- ▶ Allows self-injection



- ▶ Current trend of switching to SC formulation
- ▶ Need Hyaluronidase when the large volume is to be injected subcutaneously

Subcutaneous injection of antibody using Human Hyaluronidase

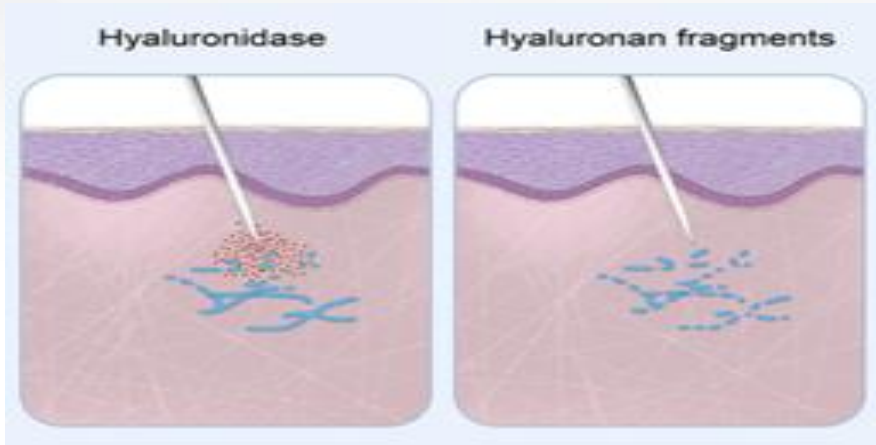


(Source: British Journal of Cancer(2013) 109, 1556–1561)

- Need Hyaluronidase when the large volume is to be injected subcutaneously

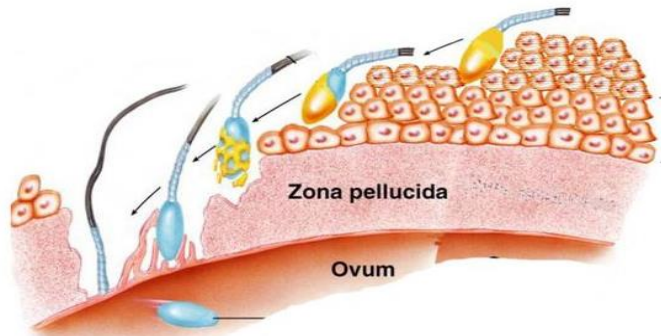
Hyaluronidase

- Enzyme hydrolyzing **hyaluronan** in the extracellular matrix

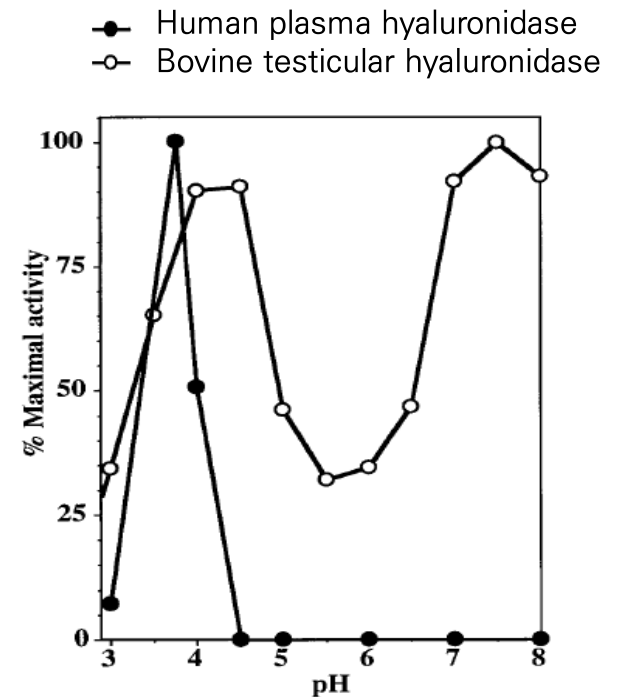


► Five Human Hyaluronidases

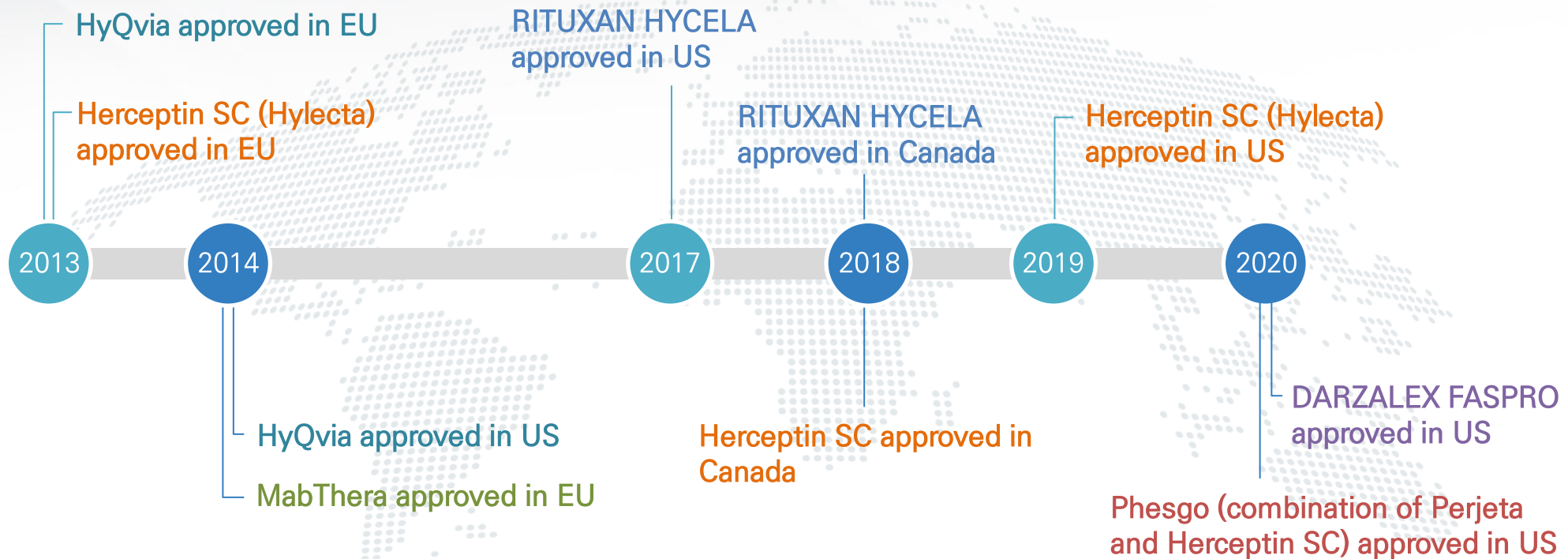
- Hyal1, Hyal2, Hyal3, and Hyal4: Optimum at pH 3
- PH20: Also active at pH 7~8



PH20 aids in penetrating the layer of cumulus cells



Development of SC formulation with Hyaluronidase



* At present clinical trials of Mab sc products are actively conducted by global Pharma/Biotech companies

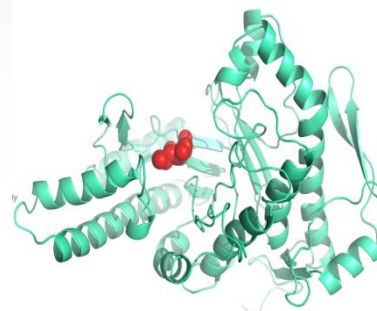
ALT-B4 : Novel Hyaluronidase Hybrozyme™ Technology

Novel Human Hyaluronidase

- ▶ Allows conversion of IV formulation of biologics to SC formulation
- ▶ Same mode of action (MoA), but enhanced enzymatic activity and thermal stability (aggregation temperature)

[Improved technology compared to competitor's]

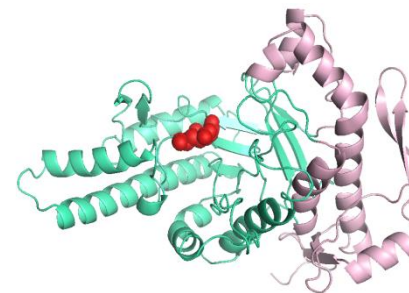
- Enhanced thermal stability and protein stability
- High Productivity
- Lower immunogenicity compared to wildtype PH20 determined by *in vitro analysis*
- Completed PCT filing



PH20











Hyal



ALT-B4

ALT-B4 : *In vivo* Study – Bleb Size measurement with mini pig

ALT-B4 (2ml/min)	0h	1h	2h	24h
0 U Buffer only				
2000 U				

* Experiments were performed by our partner company with six, 1-yr old male mini pigs

ALT-B4 : Business Model



Licensing-Out to global company for SC formulations

2019.12.02

Entered Non-exclusive License Agreement with a Top 10 Global Pharmaceutical Company (Total \$1.373B)

2020.06.24

Entered Non-exclusive License Agreement with a Top 10 Global Pharmaceutical Company (Total \$3.865B)

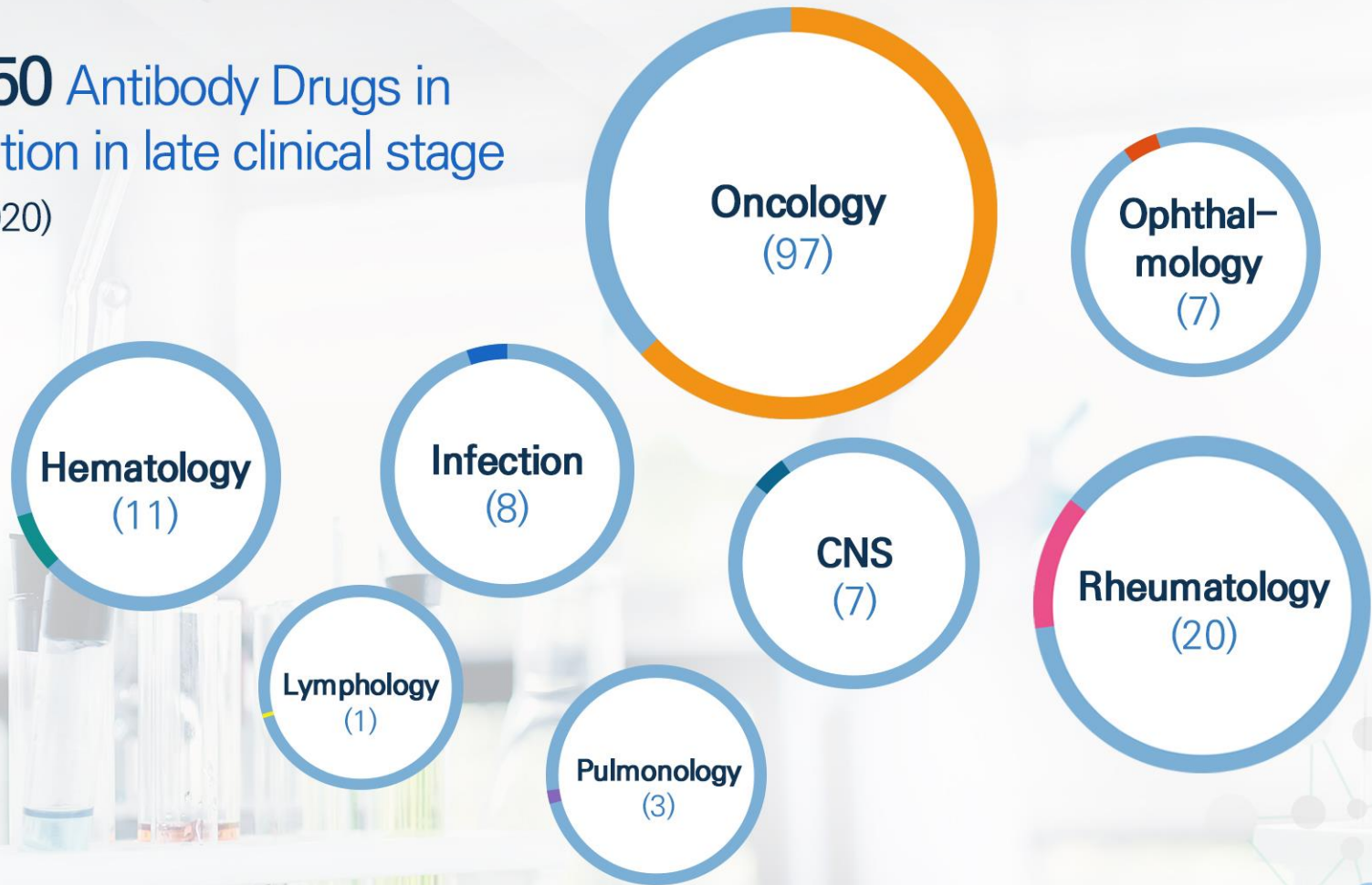
Current

In discussion with multiple global Pharmaceutical companies

* Alteogen will provide ALT-B4 Drug Substance globally

Novel and Biosimilar mAb: 2024 ~\$329B
Conversion from IV to SC : \$\$\$\$ Potential Market

└ **About 150** Antibody Drugs in
IV formulation in late clinical stage
(As of July 2020)



About 610 novel antibody drugs in early to late clinical stages

ALT-B4 : Business Model (Standalone)

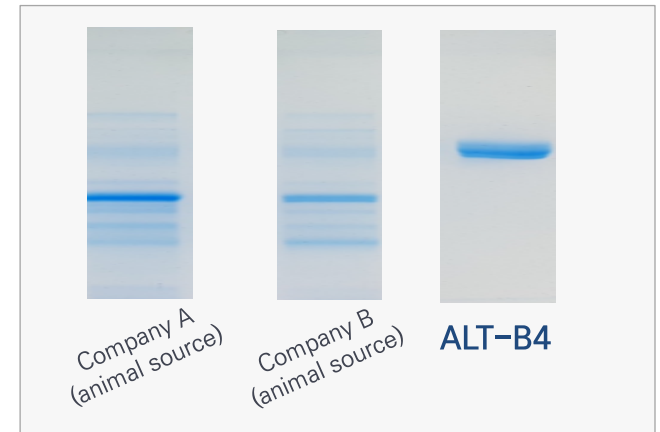
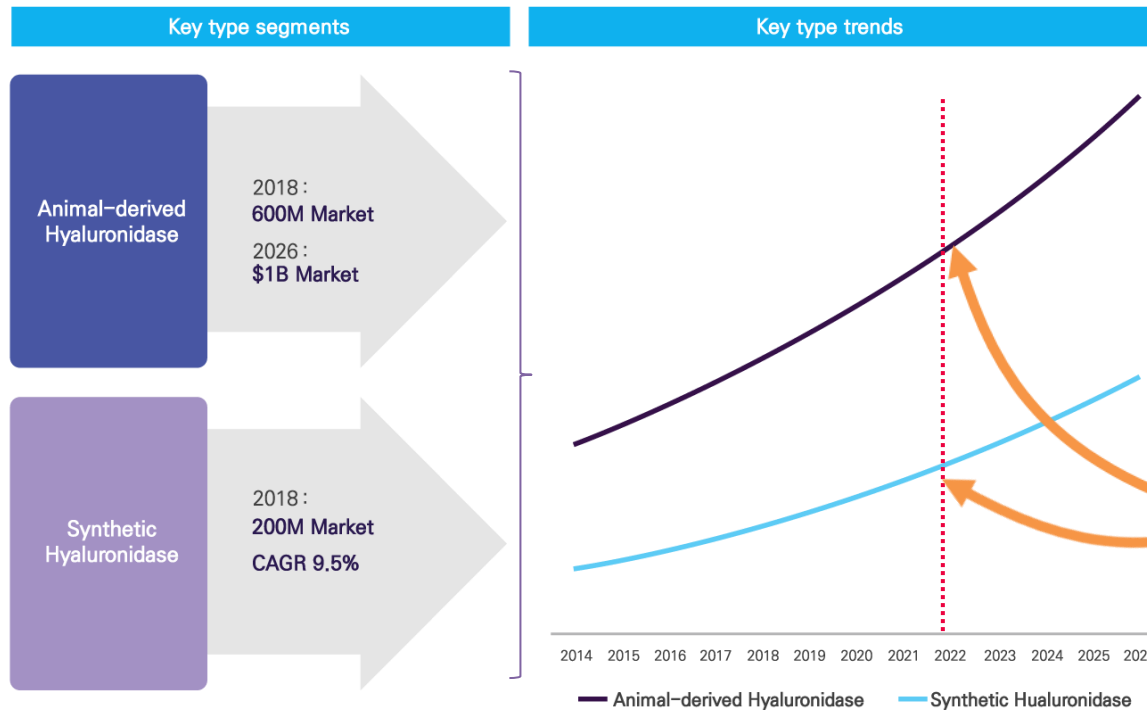
• ALT-B4 : Approval of standalone product for global market

- ✓ Replacing animal-derived Hyaluronidase
- ✓ Starting with Korea-launch in 2021, it will be exported globally

Indications

- Dermatology
- Ophthalmology
- Plastic Surgery
- Reduce Pain

Hyaluronidase market: Type movement analysis



- 2022 \$1B Market
- 2026 \$2B Market (Ceres F&D Export)
- ✓ Aim Market Share > 30%

ALTEOGEN's Business Domains

Platform Provider for Biobetter Drugs

Long-acting
Biobetter

Antibody-Drug
Conjugate (ADC)

Hyaluronidase

Biosimilars

- **Eylea®** biosimilar development



Biosimilar Market Analysis and Strategy

Business Environment

Switched to **Red Ocean** from **Blue Ocean**

Herceptin iv Biosimilar : 6 Products approved in EU as of September 2020

Less hurdle for biosimilar development technology:
Rapid rise of Chinese and Indian companies

Original companies' patent extension strategies: differentiated with biobetter products

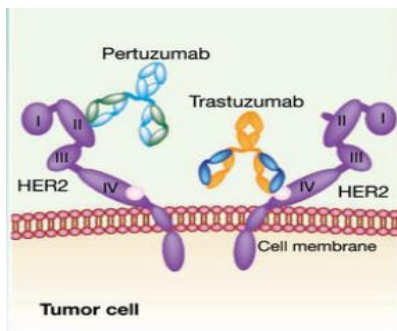
An attractive field, given the cost and probability of success in new drug development

Need differentiated Biosimilar Strategy

Development of differentiated biosimilar using ALT-B4 (1)

- Roche's HER2 targeted anti-cancer drug development strategy

Herceptin iv



- 2019 Herceptin sales: ~ US\$ 7B
- 2019 Perjeta sales: ~ US\$ 3B

Herceptin HYLECTA™
trastuzumab and hyaluronidase-oysk
INJECTION FOR SUBCUTANEOUS USE | 600 mg/10,000 units

Herceptin sc



Perjeta iv

PHESGO™
pertuzumab/trastuzumab/hyaluronidase-zzxf
SUBCUTANEOUS INJECTION / 1,200 mg/600 mg/30,000 units
600 mg/600 mg/20,000 units

(Herceptin + Perjeta) sc

Alteogen is the only company to develop **Herceptin sc** and **Perjeta sc** using ALT-B4

Development of differentiated biosimilar using ALT-B4 (2)

- Alteogen can develop **Blockbuster sc Biosimilar** using ALT-B4
→ establish differentiated biosimilar strategy



Rituxan® sc Biosimilar (US\$ 7.0 B)



Opdivo® sc Biosimilar (US\$ 7.9 B)



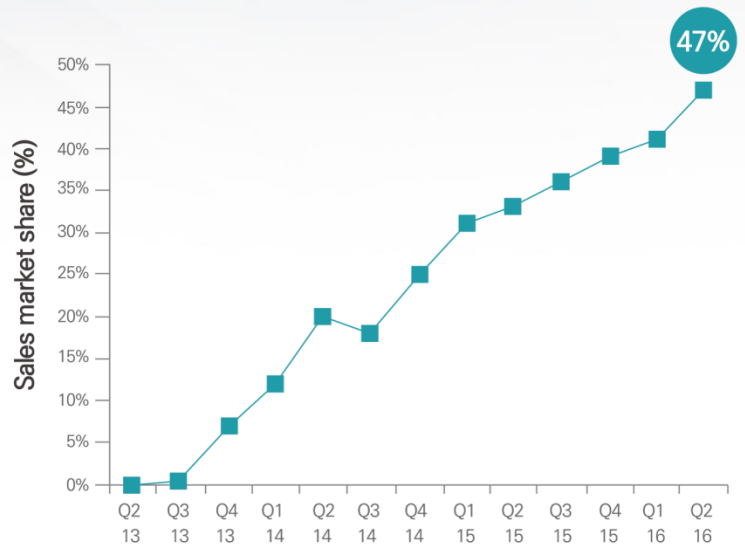
Remicade® sc New drug (US\$ 4.5B)



Darzalex® sc Biosimilar (US\$ > 3B)

ALT-LS2 : Herceptin SC biosimilar

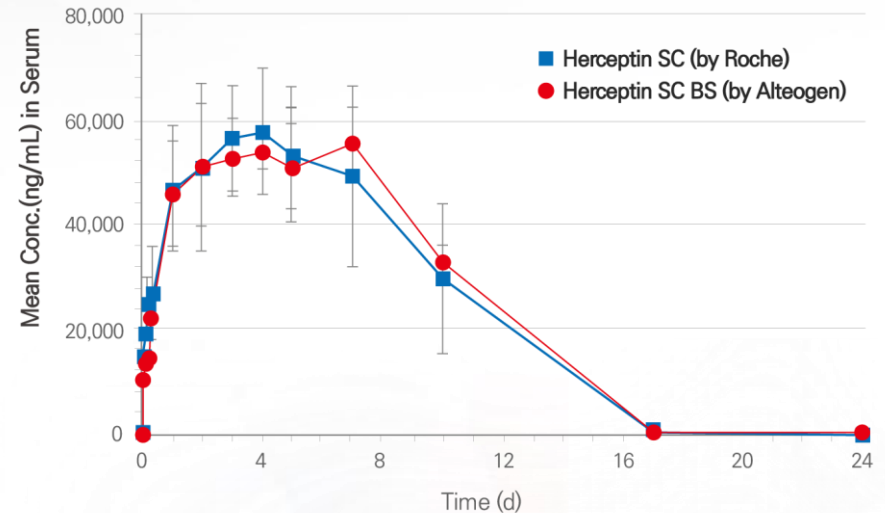
Herceptin SC in Europe



(자료: Roche, 대신증권 Research&Strategy본부)

- Rapid rise of Herceptin sc in Market
 - Future Market Share over 50%
 - US FDA approval in 2019
- Convenient for patients
 - Total cost is less than iv injection
- Competitive Market for Herceptin iv Biosimilar
 - Limitation on iv biosimilar products

PK Profiles



- ✓ Roche's Formulation Patent Expires in 2030
- ✓ Formulation Patent Filed (2019)

The first and only
Herceptin SC biosimilar in the world
Aim > US\$ 1B annual sales revenue

ALT-L9 : Eylea® Biosimilar



Ingredient

Aflibercept

Developer

Regeneron, Bayer

Indications

- Wet Age-related Macular Degeneration (wAMD)
- Diabetic Macular Edema (DME)
- Macular Edema Following Retinal Vein Occlusion (RVO)
- Myopic CNV

Patents
Expiration

- Substance Patent: 2024~2025
- Formulation Patent: 2027~2030

Molecule
Structure

Fc fused VEGF Receptors

- ▶ 2019 : US\$ 8B
- ▶ 2025 : > US\$ 10B Expected

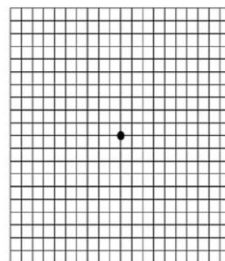
Drusen (deposits) causing
macula degeneration
(dry AMD)

8.7% of
World population
(WHO)

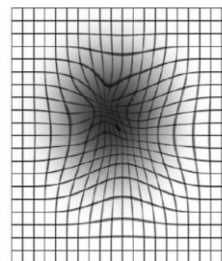
Abnormal new blood vessels
cause rapid and severe loss of
central vision (wet AMD)

~ 10–15% develop
wAMD

Progression to reduced vision and blindness



Normal
Vision



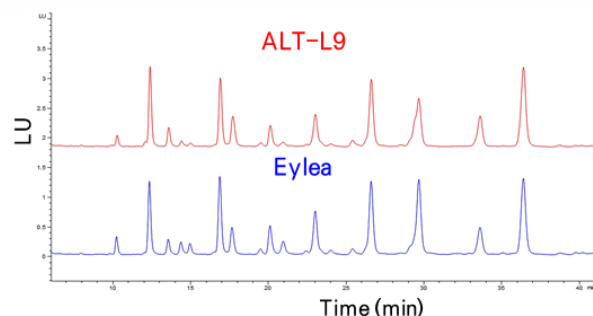
wAMD
Vision

Leading cause of blindness
in patients over 60 years old

ALT-L9 : Competitive Edge

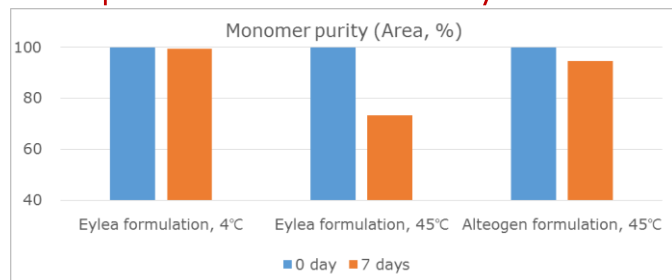
01 Alteogen uses the same Cell Line which has been used by originator

- ✓ Cell line may affect the carbohydrate pattern and similarity in biosimilar products
- ✓ ALT-L9 has an excellent similarity in Glycan Profile comparing to Eylea®



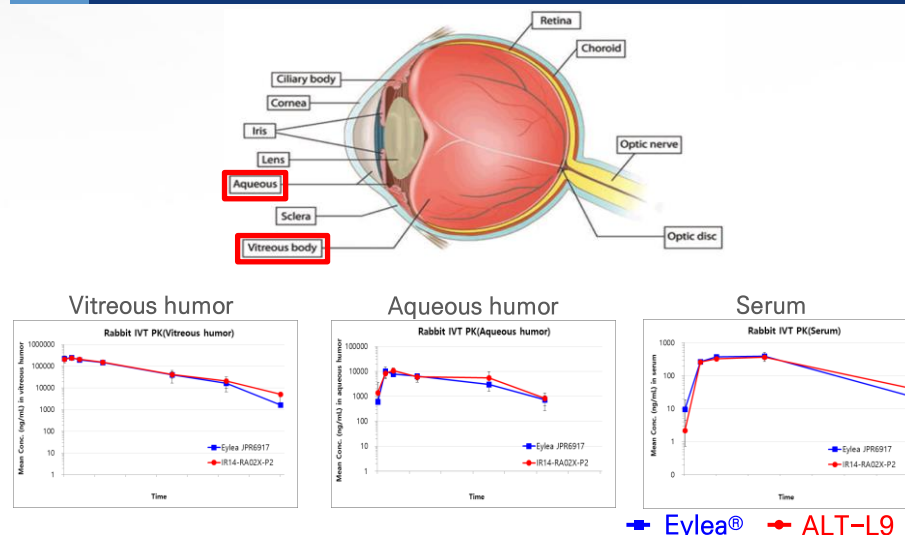
03 Alteogen developed a unique formulation

► Improved thermal Stability



- ✓ The formulation patent of the originator expires in 2027–2030
- ✓ Patent is registered in Korea, US, Russia, and Japan and filed in
- ✓ 8 additional countries including EU

02 High level of similarity in PK profile in animal studies



04 Alteogen obtained Process Patent

► Fermentation of Aflibercept fusion protein

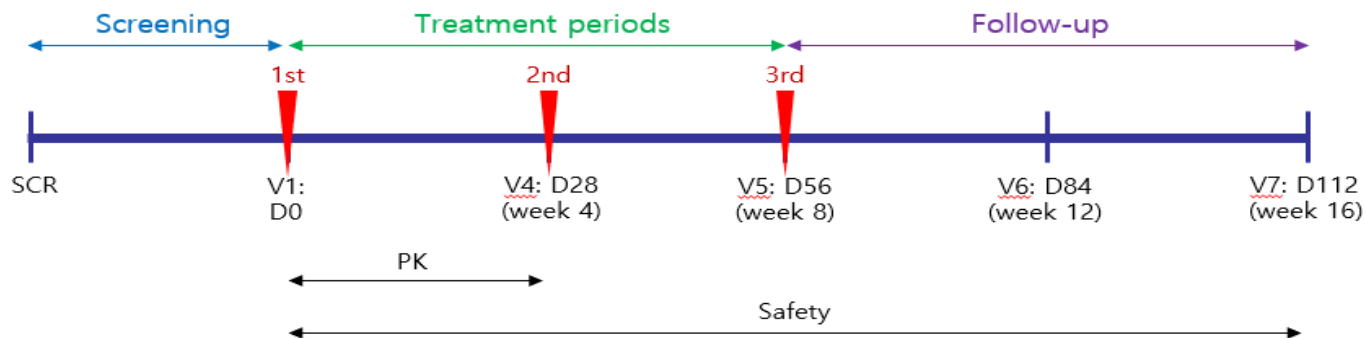
- Other Eylea® biosimilar developing companies who produce Aflibercept under fed-batch fermentation mode may infringe Alteogen's fermentation patent.
- ✓ Alteogen is in position to block other companies' attempt to develop Eylea® biosimilar
- ✓ Registered in Korea, Japan, Australia and Russia

Phase 1 trial of ALT-L9

• Clinical Trial Protocol

Title	A randomized, double-masked, active-controlled, parallel-group, Phase 1 Study to evaluate safety, efficacy and pharmacokinetics of ALT-L9 in patients with neovascular (wet) age-related macular degeneration
Clinical Products	Test Drug: ALT-L9 (2.0 mg/eye), Reference: Eylea (EU) (2.0 mg/eye)
Patients	Neovascular (wet) age-related macular degeneration
Injection interval	Three injections, every 4 weeks
Patient Numbers	30 patients (15 / per each arm)

[Study Flow]



➤ Conclusion: *No IP related adverse reactions observed*

ALT-L9 : Business Model



First to be launched when the substance patent expires



After launching in 2025 (Total Market US\$10B Expected),
Market Share Target: >30% in Eylea biosimilar Market

ALT-L9 Annual Sales of \$500M ~ \$800M Expected

| Alteogen's Strategy as Platform Provider



ALTEOGEN

- ALT-B4 (Hyaluronidase) for sc injection
 - ▶ Collaboration with Global Partners
- ALT-B4 for stand alone
 - ▶ Global marketing
- ALT-L9 (Eylea Biosimilar)
 - ▶ Entering Global Market
- ALT-P7 (Cancer) / ALT-P1 (GHD) / ALT-F2 (NASH)
 - ▶ Novel drugs based on ADC/
long-acting technologies



[Establishing own
manufacturing facility]



**Thank you
for your attention!**



www.alteogen.com

이 종목의 더 많은 IR정보 [확인하기](#)

IR GO 주주와 기업을 연결하고 응원합니다.