Building Global Opportunity by Open Innovation Strategy
(오픈이노베이션 전략을 통한 글로벌 경쟁력 확보)

Sang Hoon Lee, PhD

CEO, ABL Bio

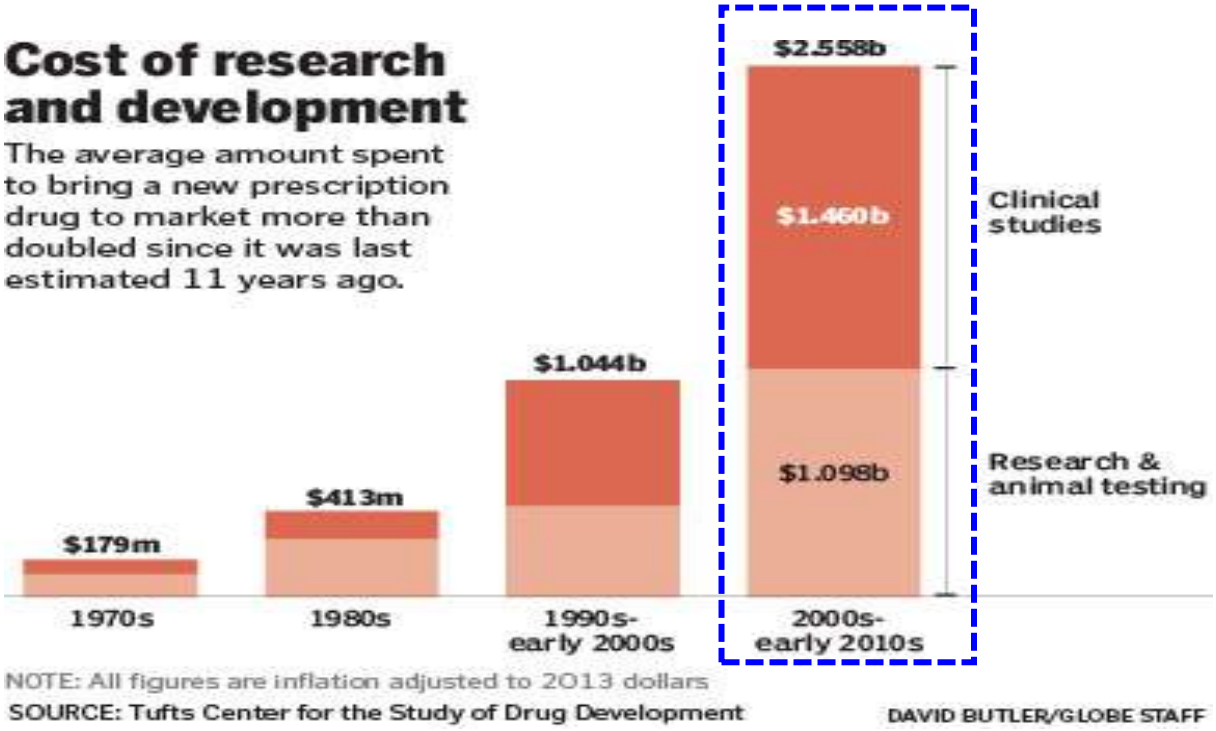
BIOPLUS INTERPHEX KOREA

Tufts Estimates the Average Costs of Drug Development and Approval to be 2.5 Bil. USD

A Tough Road: Cost To Develop One New Drug Is $2.6 Billion;

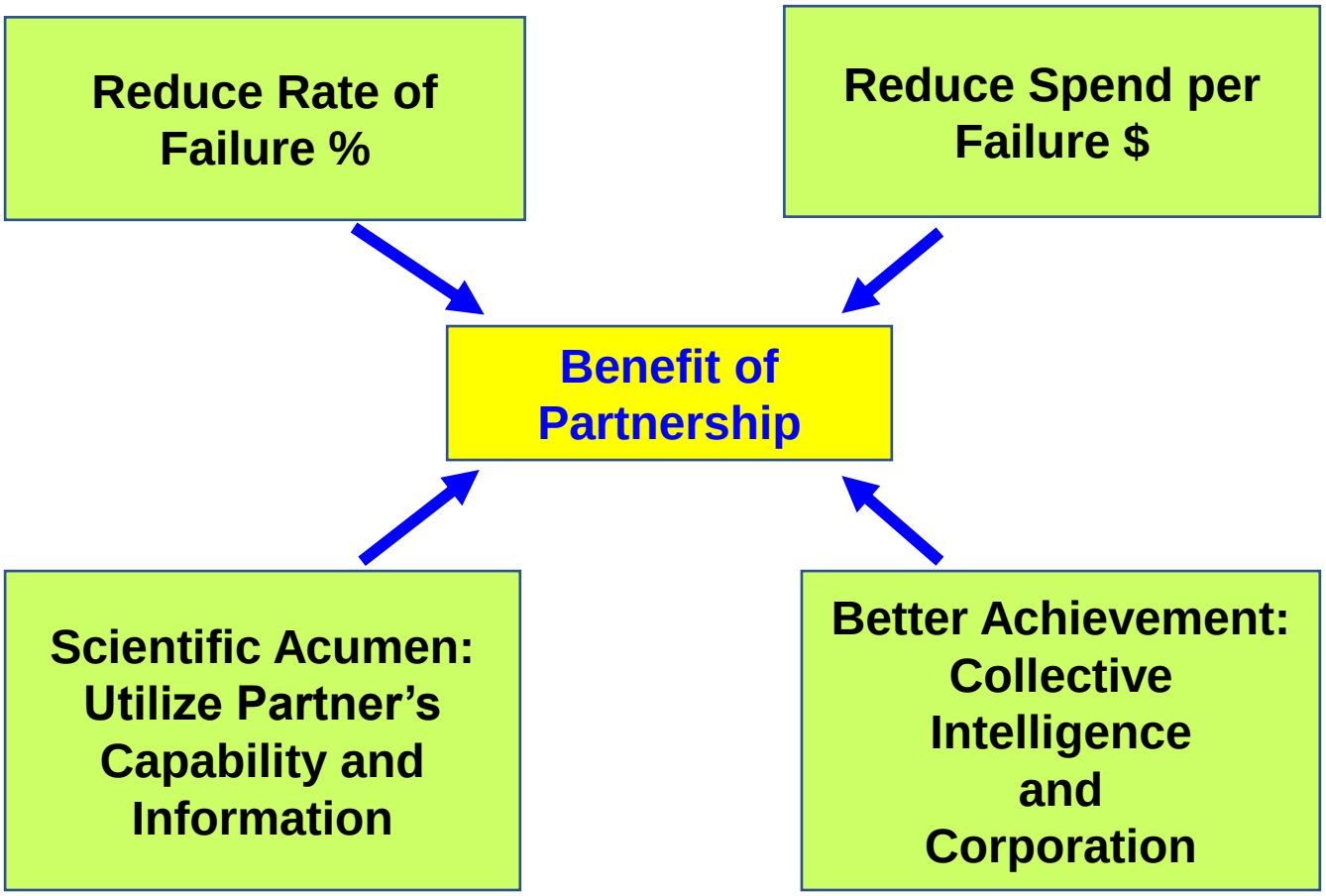
Approval Rate for Drugs Entering Clinical Development is Less Than 12%

- Out of Pocket Cost: 1.4 billion USD
- Times Cost: 1.1 billion USD
- This is up from $802 million in 2003—equal to approximately $1 billion in 2013 dollars, and thus a 145 percent increase in the ten-year study gap



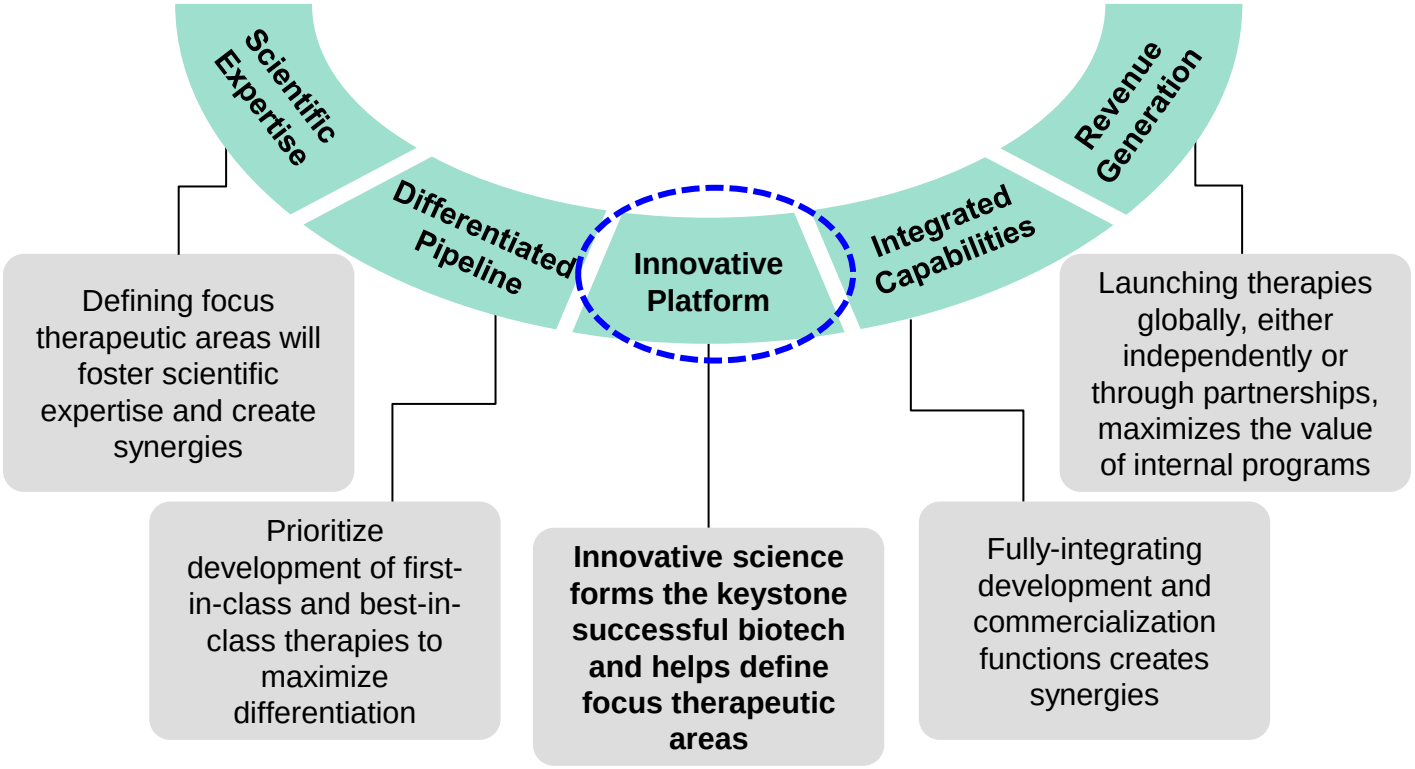
Why and How to Increase R&D Efficiency with Partnership

"Partnership ultimately drives renewed R&D productivity"

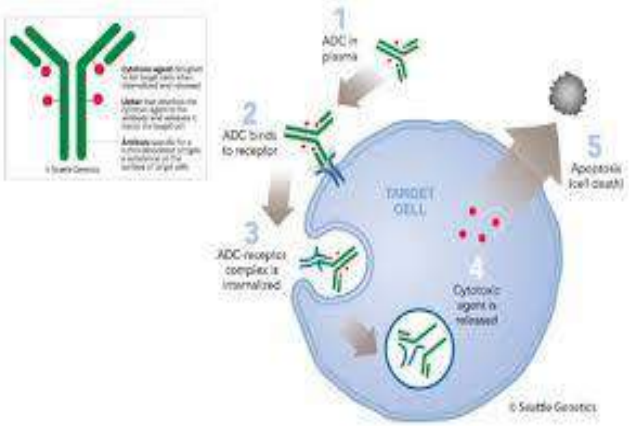


How to Build a Fully-Integrated Enterprise from Innovative Platform

Characteristics of a Successful Biotech



Multiple Deals/Partnership by Platform-based Company: Seattle Genetics



PROGRAM / TUMOR TYPE	PHASE 1	PHASE 2	PHASE 3	PARTNER
Brentuximab vedotin				
Frontline Hodgkin lymphoma (HL)	Stage 3/4 HL (ADCETRIS, nivolumab and AD)			Takeda ONCOLOGY
Relapsed HL and PTCL	Retreatment with ADCETRIS			
Frontline HL or PTCL (unfit for combo chemotherapy)	Single-agent ADCETRIS			
Relapsed HL (pediatrics)	CheckMate 744: combination with nivolumab			
Second-line HL	Combination with nivolumab			
Late-Stage Programs				
Enfortumab Vedotin				
Metastatic urothelial cancer	EV-301: post PD-1 or PD-L1 inhibitor			astellas
	EV-201: post PD-1 or PD-L1 inhibitor		BLA filed by U.S. FDA; PDUFA March 2020	
First-line metastatic and muscle invasive urothelial cancer	EV-103: combination w/ platinum agents and/or pembrolizumab			
Tucatinib				
Metastatic HER2+ breast cancer	HER2CLIMB: combination with chemotherapy		NDA Submission to U.S. FDA Planned 1Q 2020	
	HER2CLIMB-02: combination with T-DM1			
Metastatic HER2+ colorectal cancer	MOUNTAINEER: combination with trastuzumab			
Neoadjuvant breast cancer	I-SPY 2			
Tisotumab Vedotin				
Recurrent/metastatic cervical cancer	innovaTV 204		Pivotal	Genmab
First-line cervical cancer	innovaTV 205			
Other solid tumors	innovaTV 207			
Ovarian cancer	innovaTV 208			

Multiple Deals/Partnership by Platform-based Company: Seattle Genetics

Seattle Genetics is a Diversified Global Oncology Company with Three FDA-Approved Products and a Robust Development Pipeline

ADCETRIS® brentuximab vedotin | for injection

- Q1 2020 net sales $164M; maintaining 2020 guidance range of $675M to $700M
- Partner Takeda continues to make regulatory progress in ROW
- Ongoing and planned trials provide opportunities for additional growth

PADCEV enfortumab vedotin-ejfv
Injection for IV infusion 20 mg & 30 mg vials

- Q1 2020 net sales of $34M; strong launch in first full quarter on market
- Pursuing an accelerated approval pathway in first-line metastatic urothelial cancer
- PADCEV + KEYTRUDA to be evaluated in muscle-invasive bladder cancer in ongoing Merck phase 3 trial

TUKYSA™ tucatinib
50 mg | 150 mg tablets

- Strong FDA label based on HER2CLIMB; U.S. launch underway
- Investing in broad clinical development program
- Expanding European capabilities to support potential ex-U.S. approvals

SeattleGenetics®

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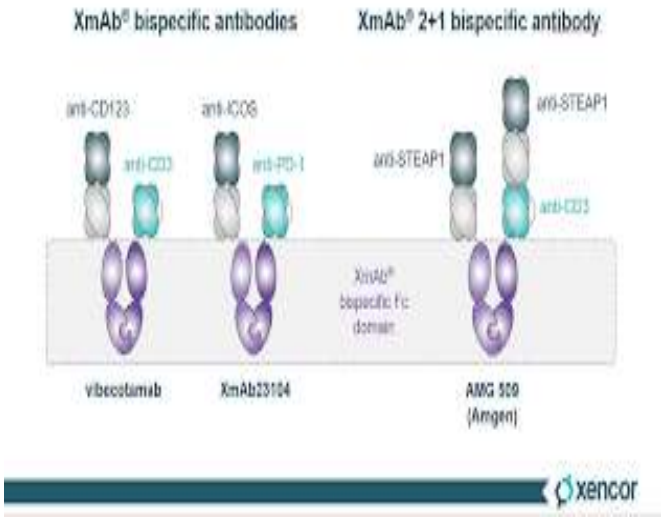
Multiple Deals/Partnership by Platform-based Company: Xencor



	PROGRAM	Fc DOMAIN	PRIMARY INDICATION	DISCOVERY	PRECLIN	PHASE 1	PHASE 2	COMMERCIAL RIGHTS
LEADS	XmAb5871	Immune Inhibitor	Autoimmune					Xencor Option to AMGEN
LEADS	XmAb7195	Immune Inhibitor	Asthma/allergy					Xencor
LEADS	XmAb5574/MOR208	Cytotoxic	Oncology CLL/NHL/ALL					morphosys
INTERNAL PRECLINICAL	Xtend-TNF	Xtend	Autoimmune					Xencor
INTERNAL PRECLINICAL	CD3 x CD38	Heterodimer	Oncology					Xencor
INTERNAL PRECLINICAL	CD3 x CD123	Heterodimer	Oncology					Xencor
INTERNAL PRECLINICAL	Anti-X/CD32b	Immune Inhibitor	TBD					Xencor
XmAb LICENSEE	Undisclosed	Cytotoxic	Oncology					Boehringer Ingelheim
XmAb LICENSEE	Undisclosed	Cytotoxic	Oncology					Boehringer Ingelheim
XmAb LICENSEE	Undisclosed	Cytotoxic	Oncology					CSL
XmAb LICENSEE	Undisclosed	Xtend	Hematology					CSL
XmAb LICENSEE	Undisclosed	Xtend	Autoimmune					janssen
XmAb LICENSEE	Undisclosed	Stability	Autoimmune					MERCK
XmAb LICENSEE	Undisclosed	Xtend	Undisclosed					ALEXION

Multiple Deals/Partnership by Platform-based Company: Morphosys

Our Clinical Pipeline

morphosys

29 Product Candidates in Clinical Development, One Product Launched

Most advanced development stage

Program	Partner	Target	Disease area	Phase 1	Phase 2	Phase 3	Launched
Tremfya® (guselkumab)	Janssen	IL-23p19	Psoriasis				✓
Gantenerumab	Roche	Amyloid-ß	Alzheimer's disease			2	
MOR208	-	CD19	Hematological malignancies				
Anetumab ravtansine (BAY94-9343)	Bayer	Mesothelin (ADC)	Solid tumors				
BAY1093884	Bayer	TFPI	Hemophilia				
BHQ880	Novartis	DKK-1	Multiple myeloma				
Bimagrumab (BYM338)	Novartis	ActRIIB	Metabolic diseases				
CNTO6785	Janssen	-	Inflammation				
Ianalumab (VAY736)	Novartis	BAFF-R	Inflammation				
MOR103/GSK3196165	GSK	GM-CSF	Inflammation				
MOR106	Novartis/Galapagos	IL-17C	Inflammation			14	
MOR202	I-Mab Biopharma	CD38	Multiple myeloma				
NOV-12 (MAA868)	Novartis	Factor XI	Prevention of thrombosis				
Setrusumab (BPS804)	Mereo/Novartis	Sclerostin	Brittle bone syndrome				
Tesidolumab (LFG316)	Novartis	C5	Eye diseases				
Utomilumab (PF-05082566)	Pfizer	4-1BB	Cancer				
Xentuzumab (BI-836845)	BI	IGF-1	Solid tumors				
BAY2287411	Bayer	Mesothelin	Cancer				
Elgemtumab (LJM716)	Novartis	HER3	Cancer				
MOR107 (LP2-3)*	-	AT2-R	Not disclosed				
NOV-7 (CLG561)	Novartis	-	Eye diseases				
NOV-8	Novartis	-	Inflammation				
NOV-9 (LKA651)	Novartis	-	Diabetic eye diseases				
NOV-10 (PCA062)	Novartis	-	Cancer				
NOV-11	Novartis	-	Blood disorders				
NOV-13 (HKT288)	Novartis	-	Cancer				
NOV-14	Novartis	-	Asthma				
PRV-300 (CNTO3157)	ProventionBio	TLR-3	Inflammation				
Vantictumab (OMP-18R5)	OncoMed	Fzd 7	Solid tumors				

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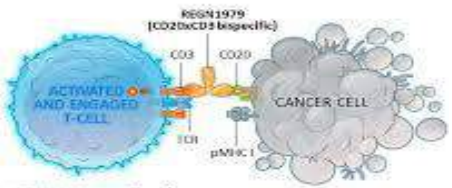
Partnered Discovery Programs
Proprietary Development Programs
Out-licensed Proprietary Development Programs

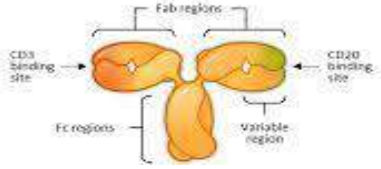
* Phase 1 in healthy volunteers completed; currently in preclinical investigation

Multiple Deals/Partnership by Platform-based Company: Regeneron

REGN1979 mode of action



REGN1979 molecular structure



REGENERON-DISCOVERED APPROVED AND INVESTIGATIONAL MEDICINES

Arcalyst® (rilonacept) Injection for Subcutaneous Use
EYLEA® (aflibercept) Injection For Intravitreal Injection
ZALTRAP® (ziv-aflibercept) Injection for Intravenous Infusion
Praluent® (alirocumab) Injection
DUPIXENT® (dupilumab) Injection 200mg · 300mg
KEVZARA® (sarilumab) injection 200 mg | 150 mg
LIBTAYO® (cemiplimab-rwlc) Injection 350 mg

PHASE 1

- Cemiplimab* (PD-1)
- REGN1979 (CD20xCD3)
- REGN5458* (BCMAxCD3)
- REGN5459* (BCMAxCD3)
- REGN4018* (MUC16xCD3)
- REGN5678 (PSMAxCD28)
- REGN5093 (METxMET)
- REGN4659 (CTLA-4)
- REGN3767 (LAG-3)
- REGN5713-5714-5715 (Betv1)

PHASE 2

- REGN4461 (LEPR)
- Pozelimab (C5)
- Garetosmab (Activin-A)
- Evinacumab (ANGPTL3)
- Cemiplimab* (PD-1)
- REGN1979 (CD20xCD3)
- REGN3500* (IL-33)
- Dupilumab* (IL-4R)
- Sarilumab* (IL-6R)
- REGN1908-1909 (Feld1)
- REGN5069 (GFRα3)
- Aflibercept (VEGF Trap)

PHASE 3

- Evinacumab (ANGPTL3)
- Alirocumab* (PCSK9)
- Cemiplimab* (PD-1)
- Dupilumab* (IL-4R)
- Sarilumab* (IL-6R)
- REGN-EB3 (Ebola virus)
- Fasinumab† (NGF)
- Aflibercept (VEGF Trap)

CARDIOVASCULAR/ METABOLIC DISEASES · ONCOLOGY · IMMUNOLOGY & INFLAMMATORY DISEASES · INFECTIOUS DISEASES · PAIN · OPHTHALMOLOGY · RARE DISEASES

REGENERON®

* In collaboration with Sanofi
† In collaboration with Teva and Mitsubishi Tanabe

This slide contains investigational products not yet approved by regulatory authorities

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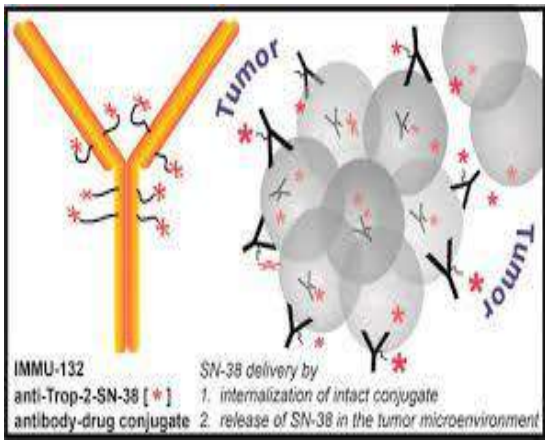
Multiple Deals/Partnership by Platform-based Company: Immunomedics

Gilead to acquire Immunomedics for $21 billion



Broad Pipeline of ADC Therapies

Research/Preclinical	Phase 1	Phase 2	Phase 3	FDA Review	Registration

First-in-Class Antibody-Drug Conjugate (ADC) Programs

- **Sacituzumab govitecan/IMMU-132 (anti-Trop-2-SN-38 ADC)**
  - Metastatic triple-negative breast cancer (*FDA granted BTD*) — BLA
  - Metastatic urothelial cancer — Pivotal
  - Metastatic ER+/HER2- breast cancer
  - Solid tumors IITs
- **Labetuzumab govitecan/IMMU-130 (anti-CEACAM5-SN-38 ADC)**
  - Metastatic colorectal cancer
- **IMMU-140 (anti-HLA-DR-SN-38 ADC)**
  - Solid and liquid cancers

Other Product Candidates include Epratuzumab, Veltuzumab, Milatuzumab and IMMU-114 for Oncology and Autoimmune Disease Indications

Immunomedics - Investor Event ASCO 2018

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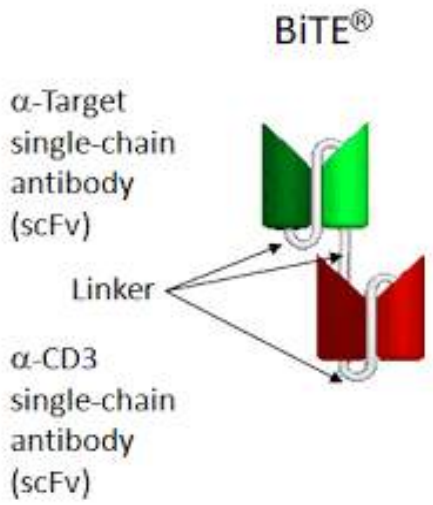
Amgen: Bispecific Antibody Platform “BiTE”



TWELVE FIRST- AND SECOND-GENERATION BITE® MOLECULES ARE CURRENTLY IN THE CLINIC OR IND-ENABLING TOXICOLOGY

	Pre-IND	Phase 1
First-Generation BiTE® Format		BLINCYTO® CD19 *Lymphoma*; AMG 330 CD33 *Leukemia*; AMG 420 BCMA *Multiple Myeloma*; AMG 596 EGFRviii *Brain*
Half-Life Extended BiTE® Format	*Prostate*; *Leukemia*; *Lymphoma*; *Melanoma*; *Multiple Indications*	AMG 673 CD33 *Leukemia*; AMG 701 BCMA *Multiple Myeloma*; AMG 757* *Multiple Indications*

*Not yet enrolling patients
EGFRvIII = epidermal growth factor receptor variant III
BCMA = B-cell maturation antigen; IND = investigational new drug
Provided December 9, 2017, as part of an oral presentation and is qualified by such, contains forward-looking statements, actual results may vary materially; Amgen disclaims any duty to update.

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Hematologic Malignancies | Solid Tumors

AMGEN

Company Profile

Company Snapshot

Date of Est.	Feb 16th 2016
Location	Korea Bio Park(Pan-Gyo), South Korea
No. of Employees	86 (As of July 2020)
No. of R&D	68 (As of July 2020)
Business Area	Development of therapeutic antibody for immuno-oncology & neurodegenerative diseases

History of Capital

Series A Investment	₩ 9 billion / March 31st 2016
Series B Investment	₩ 20 billion / March 31st 2017
Series C Investment	₩ 70 billion / June 9th 2018
Bonus Issue of New Shares	38,201,130 shares / June 26th 2018
KOSDAQ IPO(298380.KQ)	Dec 19th, 2018 (₩ 90 billion)

CEO

President (CEO) Sang Hoon Lee, Ph.D.

- Head of Bio Division at Hanwha Chemical
- Co-founder and CSO at PharmAbcine
- Chiron (Novartis), AstraZeneca, Genentech and Exelixis in US
- Scientist at Stanford Medical School & Postdoc at Harvard Medical School and UCSF
- Ph.D. at The Ohio State University
- BA & MS at Seoul National University

- Entrepreneur and leadership in new start-up, operational management
- R&D discovery, development and business leadership
- Global leadership experiences in drug discovery and development
- 11 INDs and clinical development

Who We Are: “A NEW TREND LEADER”

BIOPLUS · INTERPHEX KOREA

Right Business Domain

IO & CNS

- Unmet Medical Needs
- Mega Deal Size Market

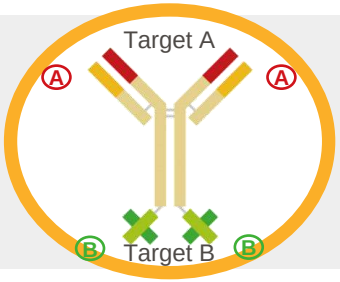
Immuno-Oncology & Targeted Therapy

Neurodegenerative Disease (CNS)

Platform Strategy

Bispecific Antibody Grabody BsAb Platform by ablbio

- IO: Grabody-T & Grabody-I
- Blood Brain Barrier (BBB) Shuttle Grabody-B



Business Strategy

Rapid Growth & High Return

- Financial Stability
- Minimizing Risk
- Innovative Pipelines

Open Innovation

Integrated R&D Team

Early Licensing out

Grabody BsAb Platform by ablbio

ablbio medicine for a better life

NEW TREND LEADER

The Bispecific Antibody Boom

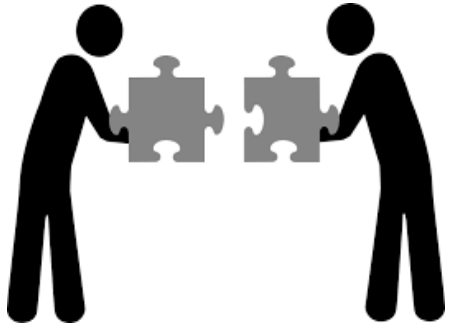
Date	Company	Bispecific Antibodies	Contract	Source
June 4, 2017	F-star/ Merck KGaA	5 BsAbs including PD-L1xLAG-3	$1.2 billion	F-star press release
October 3, 2017	CytomX/ Amgen	EGFRxCD3	$455 million ($40 & $20 million upfront & stock purchase)	CISION PR Newswire provided by Amgen
February 9, 2018	Pieris/Seattle Genetics	3 undisclosed BsAbs	$1.2 billion ($30 million upfront)	Pieris press release
February 05, 2019	Xencor/ Genentech	IL-15/IL15Ra-Fc	$160 million ($120 million upfront)	Endpoints News
February 05, 2019	Merck KGaA/ GSK	PD-L1xTGFbRII	$4.2 billion ($342 million upfront)	Pharmaphorum
February 11, 2019	Teneobio/ AbbVie	BCMAxCD3	$90 million upfront	Endpoints News

Sanofi's latest R&D remodeling spotlights what's hot (bispecific) and what's not (CTLA-4) in oncology today; Endpoints News (Feb. 12, 2019)

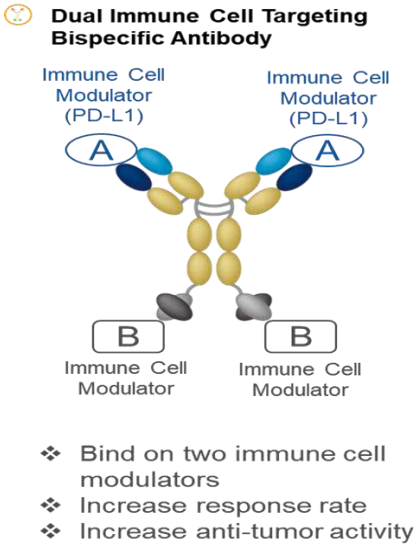
ABL Bio and I-Mab Biopharma Announce Global Collaboration on Innovation Bispecific Antibodies

Global Collaboration for Developing BsAb:

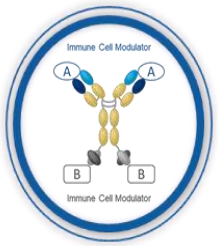
I-Mab Biopharma and ABL Bio Announce Global Collaboration on Innovative Bispecific Antibodies (June 26, 2018)



- The two companies agreed to co-develop two novel Immuno-oncology (IO) BsAbs utilizing ABL Bio's innovative BsAb platform
  - ABL503 (PD-L1x4-1BB BsAb, IND, Q4, 2020)
  - ABL111 (Claudin18.2x4-1BB BsAb, IND, Q1, 2021)
- The companies will share the development costs as well as rights in China, South Korea and rest of the world in different configurations
- ABL Bio licensed in additional I-Mab antibody sequences for development using ABL Bio's BsAb platform
  - ABL501 (PD-L1xLAG-3 BsAb, IND, Q1, 2021)



Multiple BsAb Collaboration with I-Mab



Program	적응증	Target Validation	Antibody Screening	In Vitro Efficacy	In Vivo Efficacy
Dual Immune Cell Targeting Bispecific Antibody (BsAb)					
ABL50X	Solid Cancer				
ABL50X	Solid Cancer				
ABL50X	Solid Cancer				
ABL50X	Solid Cancer				

Collaboration

天境生物 I-MAB BIOPHARMA

- Long term partnership for developing 4 BsAb (IO + IO)
- 1 First-in-Class and 3 Best-in-Class BsAbs
- 50:50 cost sharing
- Goal: US IND and license out deal to global big pharma

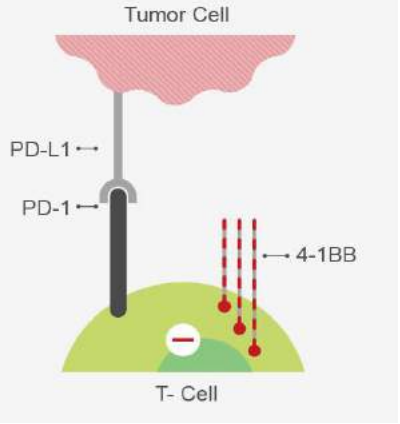
Why I-Mab as Strategic Partner?

- I-Mab Successfully Raised USD 220 Million in Series C Funding
  - June 29, 2018
- MorphoSys and I-Mab Sign Strategic Partnering Agreement for MorphoSys's Novel Immuno-Oncology Agent MOR210
  - Nov 15, 2018
- After closing one of China's biggest-ever raises, I-Mab Biopharma nabs $104M Nasdaq IPO
  - Jan 7, 2020
- AbbVie and I-Mab Enter Into Global Strategic Partnership for Differentiated Immuno-oncology Therapy (CD47 MoAb)
  - AbbVie will pay I-Mab $200 million now and up to $1.74 billion in milestone payments in the future
  - Sep 5, 2020
- Chinese Biotech I-Mab to Raise USD 418MM in Private Placement
  - Sep 5, 2020

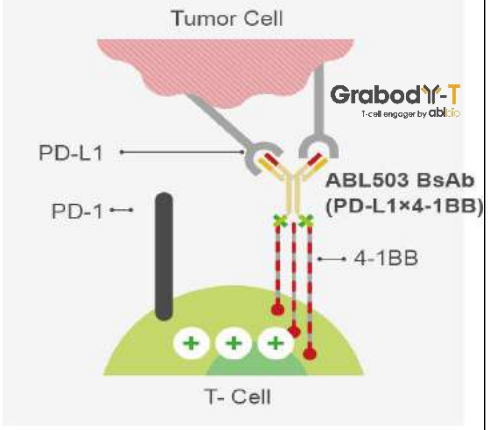
Grabody™-T: ABL503 (PD-L1x4-1BB BsAb)

MOA of ABL503

Immune Suppressive Tumor Microenvironment



ABL503 Induces T Cell Activation in Tumor Microenvironment



Competitive Landscape of ABL503

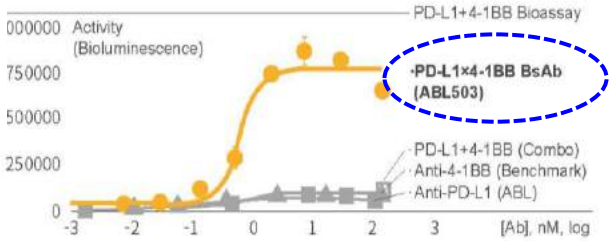
Drug Name	Global Status	Originator
PD-L1x4-1BB	Phase I	INHIBRX
PD-L1x4-1BB	Phase I	Merus
PD-L1x4-1BB	Phase I	Genmab
PD-L1x4-1BB	Preclinical	ablbio
PD-L1x4-1BB	Preclinical	pieris
PD-L1x4-1BB	Preclinical	NUMAB
PD-L1x4-1BB	Preclinical	F-star
PD-L1x4-1BB	Preclinical	MacroGenics

Anti-Tumor Effect of ABL503

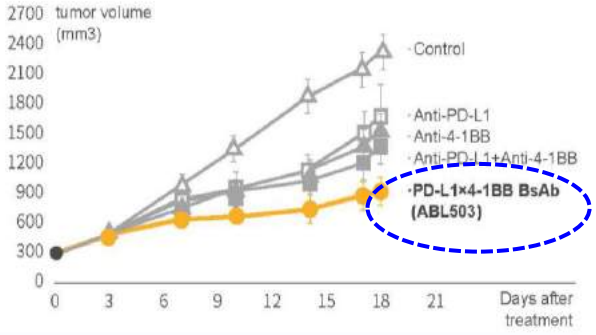
ABL503, PD-L1x4-1BB BsAb in Tumor Microenvironment

- Clustering 4-1BB only in the presence of PD-L1 in tumors to minimize the risk of liver toxicity
- Enhancing anti-tumor activity through simultaneous 4-1BB mediated T-cell co-stimulation and PD-1/L1 checkpoint inhibition

▸ **In Vitro Functionality Study**



▸ **In Vivo Efficacy Study (hPD-1/h4-1BB Tg mice)**



ABL503: PD-L1x4-1BB BsAb shows superior T-cell activation and better efficacy than PD-L1 alone or combination

Claudin18.2x4-1BB BsAb: ABL111 (TJ-CD4B) as First-in-Class BsAb in Gastric & Pancreatic Cancers

4-1BB (CD137) Key Costimulatory Target

- Ameliorates T cell exhaustion
- Induces anti-tumor T cell (CTL) activity
- Drives memory T cell differentiation for sustained response

Challenge for 4-1BB agonist

- Liver tox of 4-1BB agonist (Urelumab: BMS)

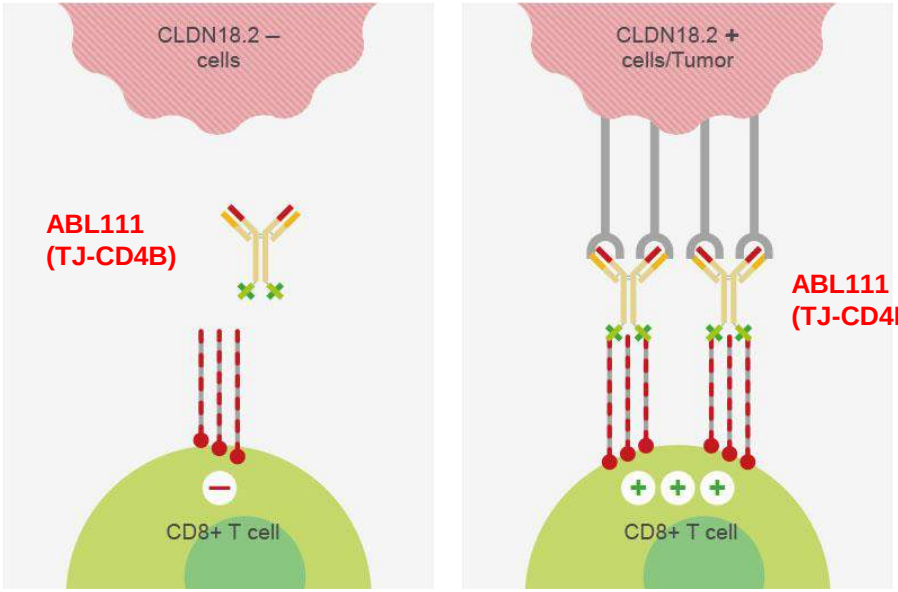
Competitive Landscape

Drug Name	Global Status	Originator
Claudiximab	Phase Ⅲ	astellas
CLDN18.2 CAR-T	Phase Ⅰ	CARSGEN THERAPEUTICS
CLDN18.2-CD3	Preclinical	astellas
CLDN18.2-CD3	Preclinical	abpro
CLDN18.2x4-1BB	Preclinical	ablbio medicine for a better life + I-MAB BIOPHARMA (First in Class)

Key Scientific Rationale

- CLDN18.2 dependent 4-1BB activation
- Both CLDN18.2 Hi and Low patient can benefit from CLDN18.2x4-1BB BsAb therapy
- Better therapeutic efficacy than Claudin18.2 MoAb

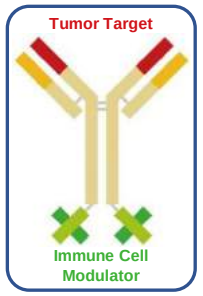
CLDN18.2 dependent 4-1BB Activation

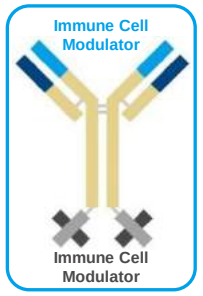


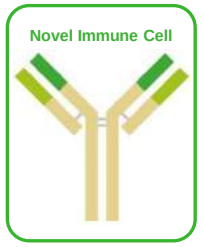
Multiple Immuno-Oncology Pipelines

GrabodY-T
T-cell engager by ablbio

GrabodY-I
Immune Modulator by ablbio





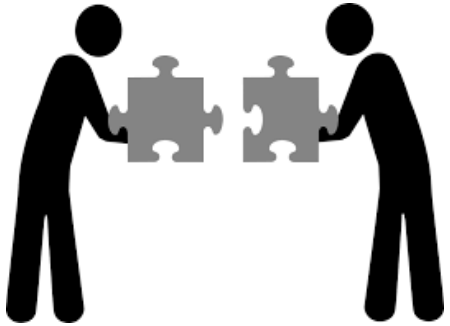


Program	Indication	Target Validation	Antibody Screening	In Vitro Efficacy	In Vivo Efficacy	Preclinical	Collaboration
T-cell Engager Bispecific Antibody (BsAb)							
ABL101	Hematologic Cancer			IND: Q4, '21			TRIGR THERAPEUTICS
ABL10X	Breast Cancer(TNBC)						
ABL10X	Solid Cancer						yuhan CORPORATION
ABL10X	Gastic Cancer			IND: Q4, '21			
ABL10X	Hematologic Cancer Solid Cancer						DONG-A ST
ABL111	Solid Cancer			IND: Q1, '21			I-MAB BIOPHARMA
Dual Immune cell Targeting Bispecific Antibody (BsAb)							
ABL501	Solid Cancer			IND: Q1, '21			
ABL503	Solid Cancer			IND: Q4, '20			I-MAB BIOPHARMA
ABL50X	Solid Cancer						
ABL50X	Solid Cancer						
Immune cell Targeting Monoclonal Antibody (mAb)							
ABL40X	Colon, Kidney, Ovarian Cancer						
ABL40X	Breast Cancer(TNBC), Ovarian, Liver Cancer						
ABL40X	Solid Cancer						GENOME& COMPANY
ABL40X	Solid Cancer						

Strategic Partnership: ABL Bio & WuXi Bio (CMO)

Long Term Strategic Partnership

- WuXi Biologics and ABL Bio Enter an Exclusive Development and Clinical Manufacturing Partnership for Multiple Bispecific Antibodies (Nov 28, 2018)
  - Use technical expertise and capabilities of WuXi Biologics in developing bispecific programs
  - The partnership includes collaboration programs between ABL Bio and I-Mab Biopharma



- ABL Bio Expands Strategic Collaboration with WuXi Biologics and Licenses WuXiBody(TM) Platform for Novel Immune Check Point Bispecifics (Feb 27, 2019)
  - Excess to WuXi's discovery program
  - Excess to WuXi's CD3 Bispecific Antibody Platform

Why WuXi Bio as Strategic Partner?

WuXi Biologics
Global Solution Provider

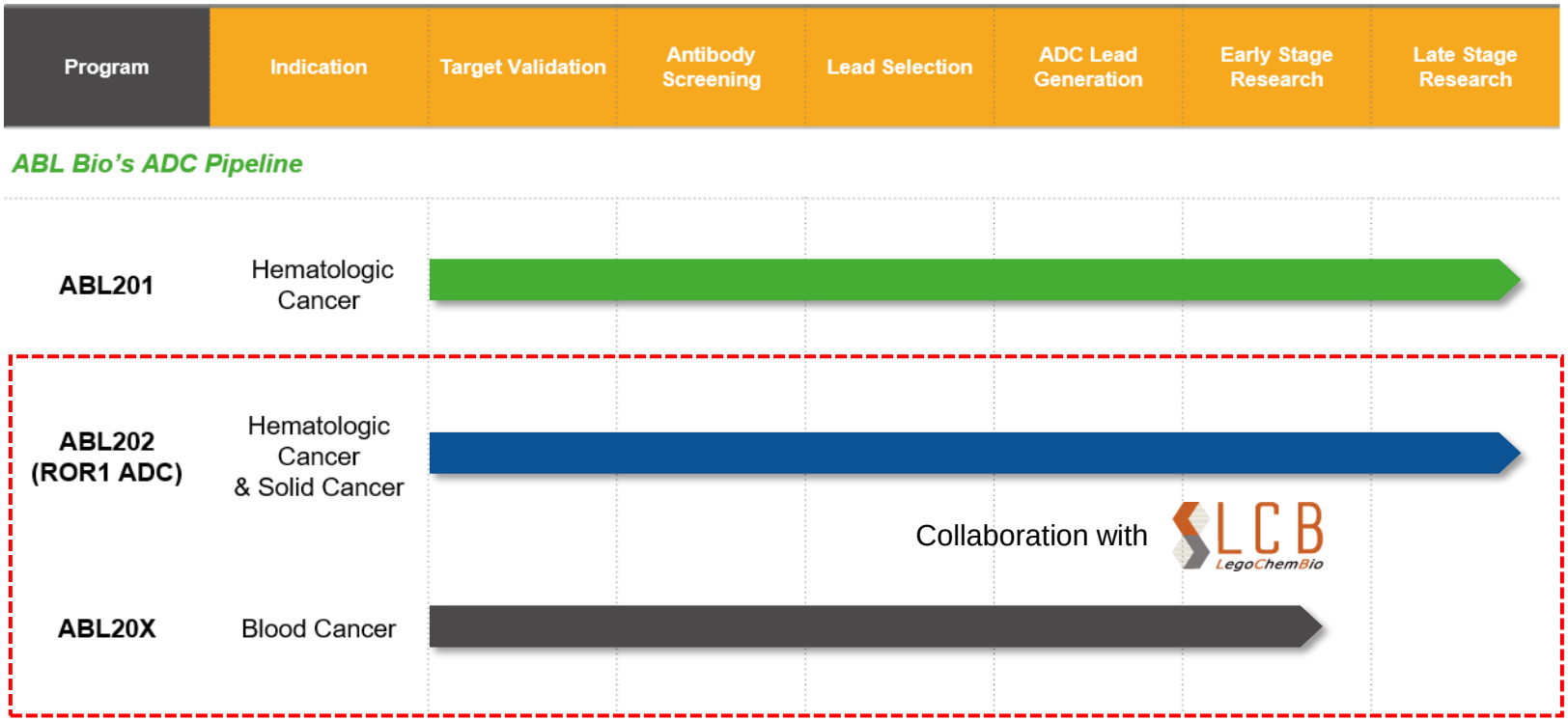
❖WuXi Biologics (stock code: 2269.HK), a Hong Kong-listed company, is a leading global open-access biologics technology platform offering end-to-end solutions to empower organizations to discover, develop and manufacture biologics from concept to commercial manufacturing

❖As of June 30, 2020, there were a total of 286 integrated projects

- 141 projects in pre-clinical development stage
- 125 projects in early-phase (phase I and II) clinical development
- 19 projects in late-phase (phase III) development
- One project in commercial manufacturing

❖With total estimated capacity for biopharmaceutical production planned in China, Ireland, the U.S., Germany, and Singapore exceeding 280,000 liters after 2023

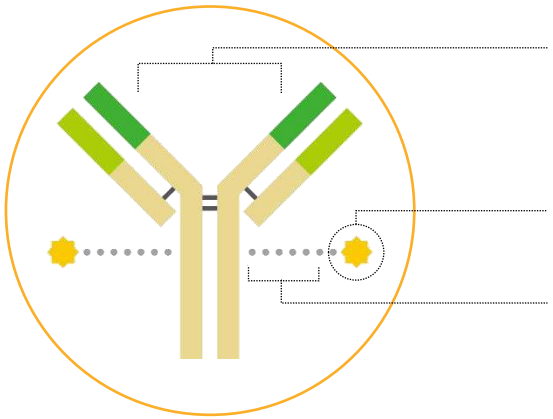
ABL Bio's ADC Pipeline



* ADC: 항체약물접합체, Antibody-Drug Conjugate

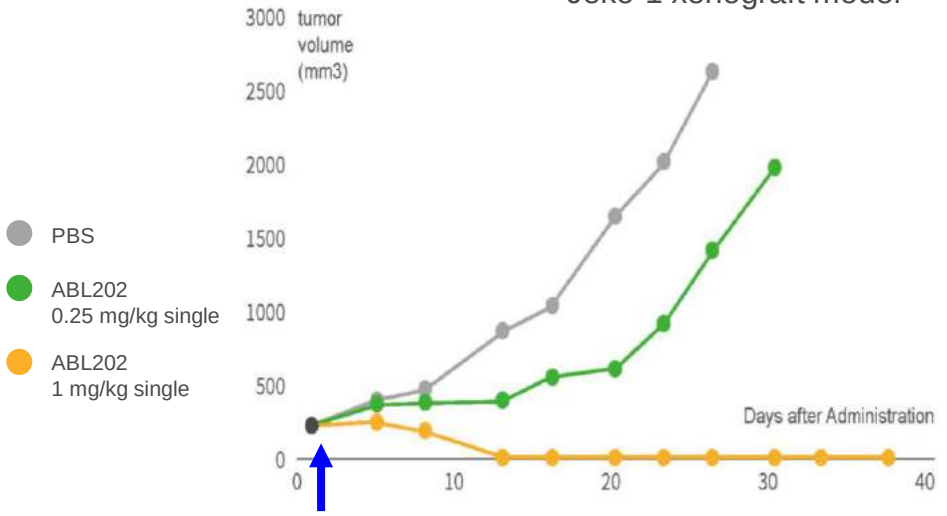
Building ADC Pipeline by LogoChem Collaboration: Antibody (ABL Bio) & ADC Linker (LegoChem) Combination

Site-Specific ADC (LegoChem Collaboration)



In vivo Efficacy of ABL202 (ROR1-ADC): Tumor Regression at 1 mg/kg single dose

Jeko-1 xenograft model



ABL202: ROR1-ADC for Solid Cancer and Leukemia

Hit → In vitro → In vivo → Tox Study → Cell Line Dev.

Indication	Solid Cancer, CLL
Target	ROR1
Payload	LCB's Proprietary PBD
Conjugation	ConjuAll™
IC50	<1nM

Collaboration with LCB LegoChemBio

Indication (Cell Line)	In vitro (IC50)	In vivo (TGI)
Lung Cancer	<0.1 nM	>100%
Lymphoma	<0.1 nM	>100%
Breast Cancer	<0.3 nM	>100%
Gastric Cancer	<1 nM	> 80%

ADC Research Program:
ABL Bio/LegoChem Biosciences

Global Collaboration for developing ADC

❖The two companies agreed to co-develop two novel ADC

❖ABL Bio: responsible for novel antibody

❖LegoChem: responsible for linker technology

"South Korea's LegoChem In Deal With Takeda To Develop Antibody-Drug Conjugates" (March, 2019)

Takeda gains certain rights to LCB's antibody-drug conjugate or ADC technology, ConjuAll, including LCB's proprietary linker and conjugation platform, to research, develop and commercialize targeted immuno-oncology therapeutics.

ConjuAll is a next-generation ADC platform technology utilizing novel linker chemistry combined with site-specific enzymatic conjugation.

Recent Major ADC Deals

- AstraZeneca and Daiichi Sankyo enter collaboration for novel HER2-targeting antibody-drug conjugate (March, 2019)
  - Using Daiichi Sankyo's DXd proprietary ADC technology, trastuzumab deruxtecan has been designed to deliver chemotherapy selectively to cancer cells and reduce systemic exposure
  - AstraZeneca will pay Daiichi Sankyo an upfront payment of $1.35bn
- Promise of TROP2 ADCs: AstraZeneca, Daiichi Sankyo's $6bn collaboration (Aug, 2020)
- Gilead to buy cancer drugmaker Immunomedics for $21 billion (Sep 13, 2020)
  - Trodelvy, First-in-Class Antibody-Drug Conjugate Approved to Treat Triple-Negative Breast Cancer
- Merck to pay Seattle Genetics $1.6B to ally on breast cancer ADC (Sep 14, 2020)
  - Merck has struck a deal to develop Seattle Genetics' antibody-drug conjugate (ADC) ladiratuzumab vedotin. The agreement will see Merck pay $600 million and make a $1 billion investment in Seattle Genetics in return for the chance to embark on a joint development program.

Grabody™-B and ABL301 Overview

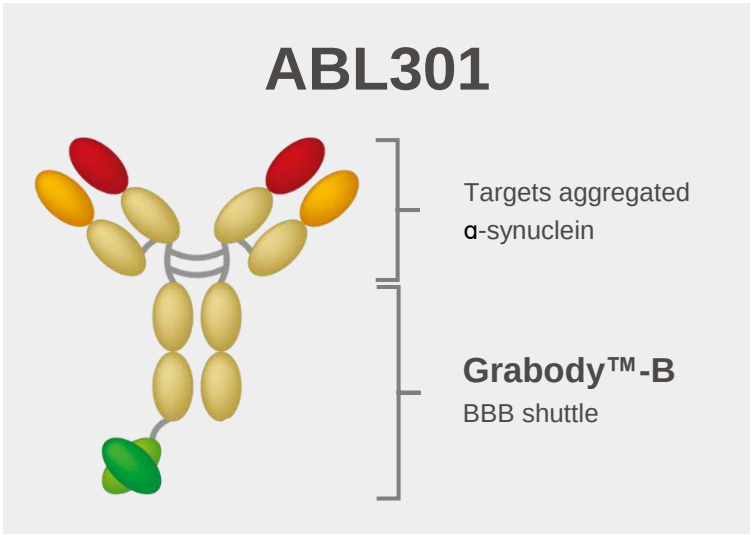
Grabody™-B Platform

Core Technologies

- **IGF1R**-mediated BBB (Blood Brain Barrier) penetration
- **Affinity Matured, Fc engineered, and Valency** modified BBB shuttle

Distinction

- IGF1R is **primarily expressed in the BBB/ brain**
- Comparable **CNS expression** as TfR
- **Cross-species expression**



ABL301: used for analyzing Grabody™-B efficacy

Indications

- **Parkinson's Disease (PD)**
- **Multiple System Atrophy (MSA)**

MOA & Effects

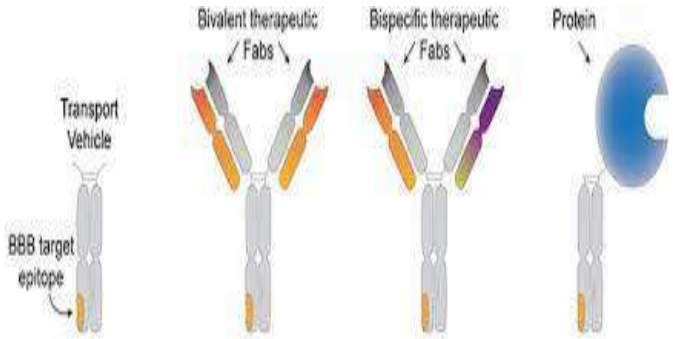
- Preferential binding to **pathological α-synuclein**
- 2nd gen BBB shuttle **(Grabody™-B)**

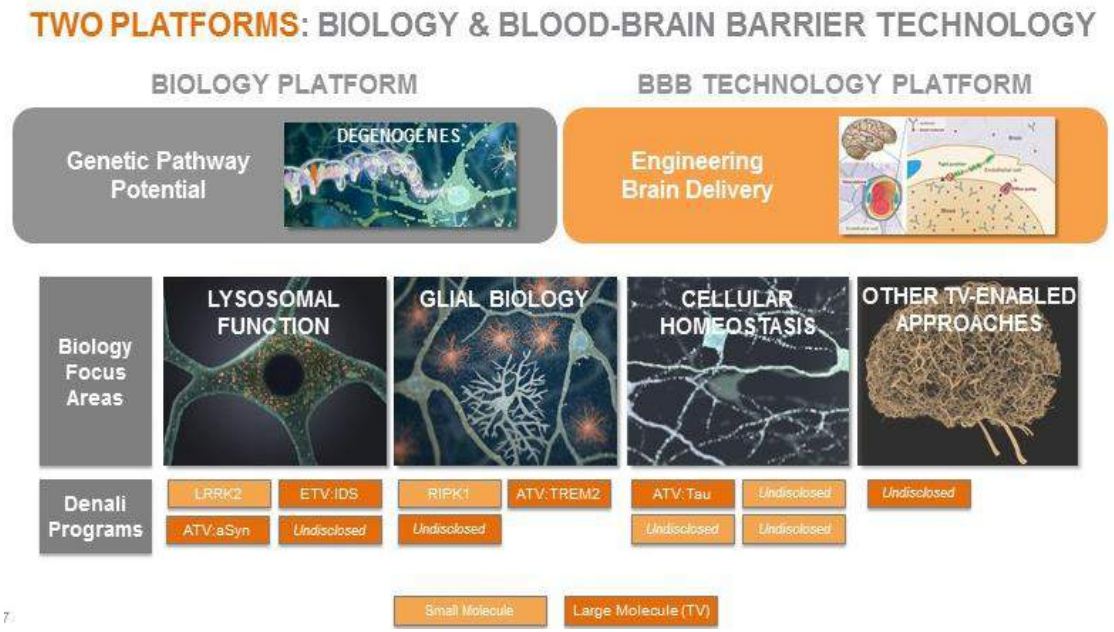
Nonclinical Study Results

- Confirmed reduction in PD pathology *in vivo*
- Confirmed better BBB penetration compared to mAb *in vivo*

Denali Therapeutics: CNS & BBB Platform

- Takeda and Denali Therapeutics Collaborate to Develop and Commercialize Therapies for Neurodegenerative Diseases (Jan, 2018)
  - Collaboration includes three named programs for the treatment of Alzheimer's disease and other neurodegenerative diseases, utilizing Denali's Antibody Transport Vehicle (ATV) technology to enhance blood-brain barrier (BBB) penetration
- Biogen and Denali sign Parkinson's drug deal worth $2bn
  - Denali's portfolio of small molecule LRRK2 inhibitors and transport vehicle technology platform has potential in a number neurodegenerative diseases, including Parkinson's disease – the focus of the Biogen deal





It's Not too Late to Develop ABL901

Global Competitive Landscape of Neutralizing Antibody

As of September 1st, 2020

No.	Company	Partner	Isotype	Phase	Country of Clinical Study	Start of Current Phase
1	Lilly	AbCellera	IgG1	Phase III	U.S.	Aug 2020
		Junshi Biosciences; Chinese Academy of Sciences	IgG1	Phase I	China	Jun 2020
2	REGENERON science to medicine®	Roche	N/A	Phase II/III	U.S.	Jun 2020
3	gsk GlaxoSmithKline	VIR	IgG1	Phase II/III	Worldwide	Aug 2020
4	AstraZeneca	The Chinese Academy of Sciences; Vanderbilt University Medical Center	IgG1	Phase I	U.K.	Aug 2020
5	CELLTRION		N/A	Phase I	South Korea	Jul 2020
6	TYCHAN		N/A	Phase I	Singapore	Jun 2020
7	HiFiBiO THERAPEUTICS CS	ablbio medicine for a better life	IgG4	IND	U.S.	Sep 2020(expected)

Source: BioCentury and company website

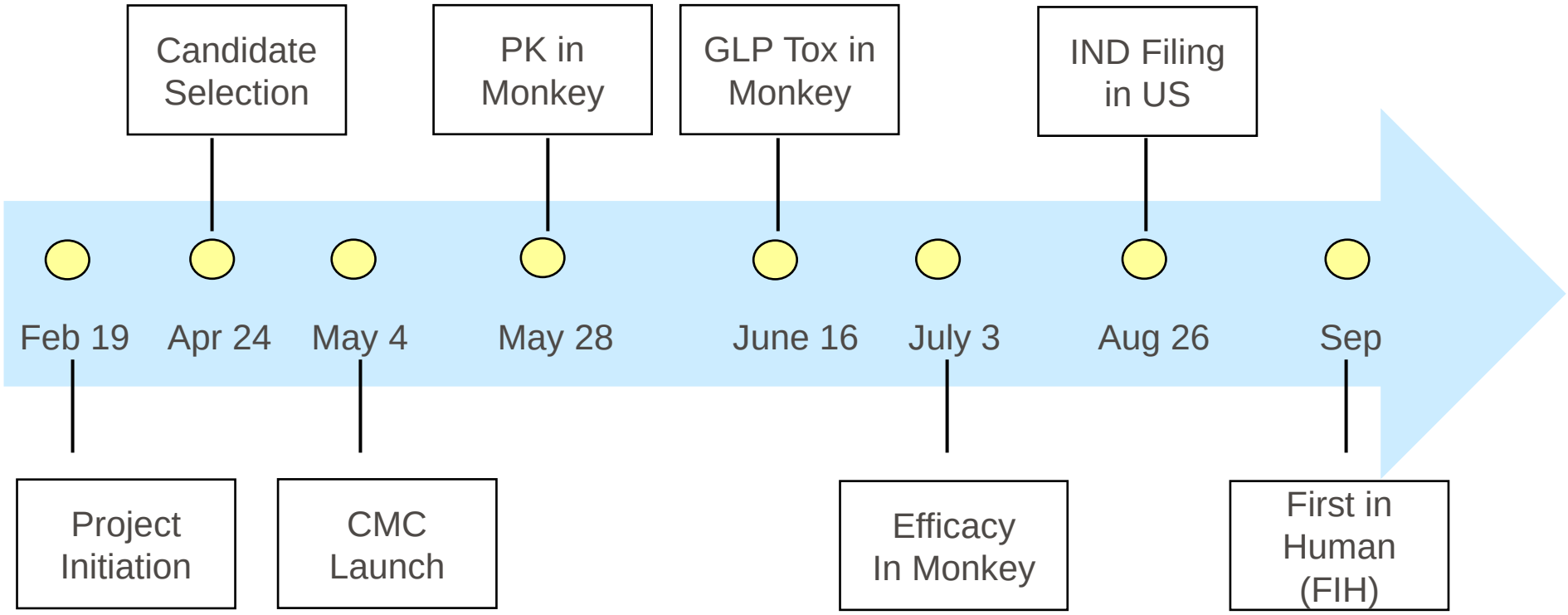
ABL901: A Differentiated Neutralizing Anibody

- **Fully Human:** Low immunogenicity risk, selected from screening convalescent patients
- **Highly Effective:** Therapeutic efficacy at low dose in a NHP model of COVID-19 via blocking SARS-COV-2 RBD
- **Broad Spectrum:** Neutralizes all SARS-CoV-2 variants tested, minimizing risk for escape mutations and resistance
- **Safer:** Complement and FcγR binding is dialed out for minimal risk of antibody dependent enhancement (ADE)
- **Respiratory Protection:** An IgG4 with anticipated preferential distribution to respiratory fluids providing protection against respiratory infection
- **Prolonged Protection:** Extended half life, predicted to protect for > 3.5 months after a single infusion
- **Intramuscular injection formulation is in development:** Solubility at high concentrations, high potency, long half life, and low potential for toxicity enables an IM dosing form that can be administered without IV infusion

ABL901: IV infusion that can save lives in the hospital and protect first responders, formulable as IM injection formulation that may protect “at risk” individuals for several months with a single injection, concentrating neutralizing antibodies in respiratory secretions

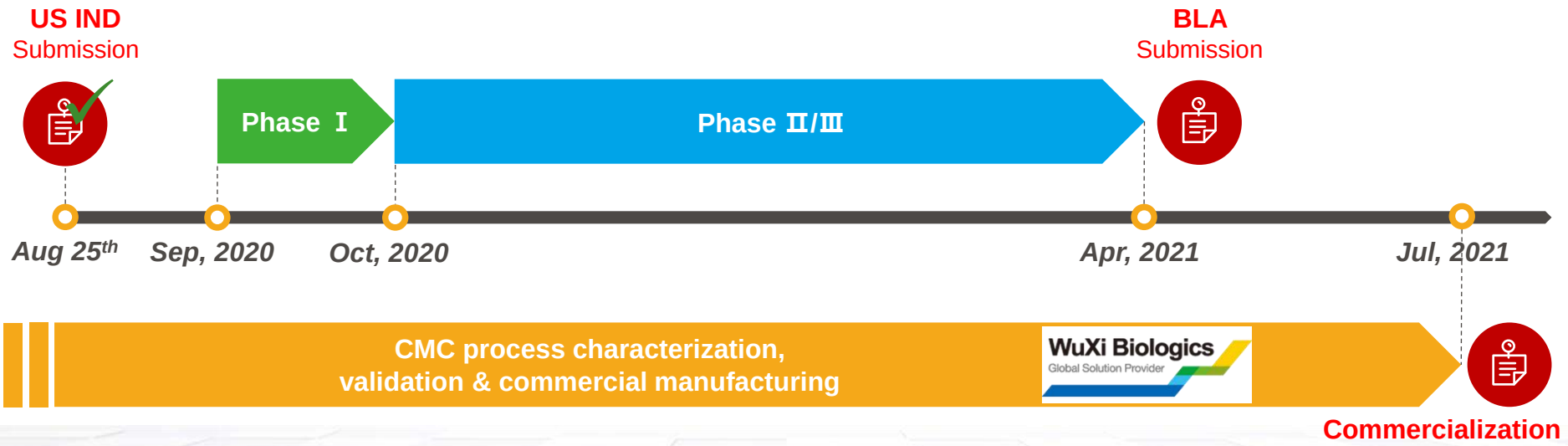
ABL901(HFB30132A): Rapid Race from Discovery

Rapid discovery of potent neutralizing antibodies against SARS-CoV2 to treat COVID-19 patients



- **Fully human IgG4**
- **Engineered for long half lie**
- **Targeting SAR-CoV2 & Blocking virus entry for COVID-19**

Accelerated Development Timeline to Commercialization



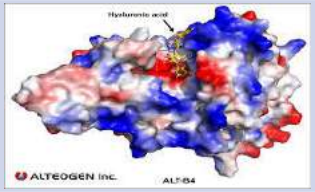
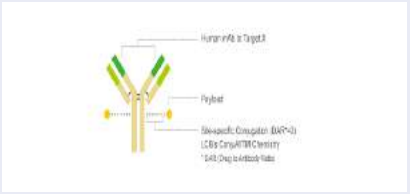
Accelerated clinical development with parallel development of technology for patient stratification as well as commercial manufacturing activities enable rapid commercialization

Note: Phase Ⅱ/Ⅲ – Prophylaxis (Tentative) expected to complete in Oct, 2021

Global Partnering Trend in 2020

Licensee	Licensor	Deal Value	Deal	Deal Structures
Novartis	Dino Therapeutics	$ 2B	Licensing	Focus on using artificial intelligence (AI) technology to develop adeno-Associated Virus (AAV) vectors
Gilead	Pionyr	$ 275MM	Acquisition	Gilead to Acquire 49.9% Equity Interest in Pionyr and Exclusive Option for $275 Million (Trem2 Antibody; Novel IO)
Gilead	Forty Seven	$ 4.9B	Acquisition	Anti-CD47 antibody
Gilead	Immomedics	$20B	Acquisition	ADC
Merck	Foghorn Therapeutics	$ 425MM	Collaboration	Strategic collaboration for class of therapeutics targeting the chromatin regulatory system in oncology
Merck	Skyhawk	$ 600MM	Collaboration	Develop Novel Small Molecules that Modulate RNA Splicing
Sanofi	Kymera	$ 2B	Strategic Partnership	Novel Protein Degrader Therapies
AbbVie	I-Mab	$ 2B	Licensing	Anti-CD47 antibody

Platform Based Companies in Korea

Company	Platform Name	Platform	Technology
Alteogen (알테오젠)	ALT-B4		정맥주사(IV) 제형을 피하주사(SC) 제형으로 바꾸는 플랫폼인 '인간 히알루로니다제
LegoChem Bioscience (레고켐바이오사이언스)	ConjuAll		Site specific conjugation (약물 항체 결합 기술)
Hanmi (한미약품)	Lapscovery		Long Acting Protein / Peptide Discovery Platform Technology
ABL Bio (에이비엘바이오)	Grabody T Grabody I Grabody B (BBB)		Bispecific Antibody (이중항체)


ablbio
medicine for a better life

THE JOURNEY OF LICENSING at BIOTECH

SUNG HO HAN, Ph.D.

GENUV ㈜지뉴브 대표이사

BIOPLUS INTERPHEX KOREA

THE JOURNEY OF LICENSING at BIOTECH

SUNG HO HAN, Ph.D. (한성호 박사) | GENUV ㈜지뉴브 대표이사

BIOPLUS INTERPHEX KOREA 2020

GENUV

TODAY'S AGENDA

01 BEING a BIOTECH

02 BIOTECH BUSINESS

03 GENUV INC.

01 BEING a BIOTECH

HISTORY OF BIOTECH

Louis Pasteur
Father of Microbiology

1822 - 1895

Pasteur Quadrant by Stokes

Fundamental understanding of scientific problems & immediate use for society

Source: Wikipedia

Herbert Boyer

1973

RECOMBINATION
"Modern Biotechnology"

Source: www.labiotech.eu/in-depth/history-biotechnology-genentech

Genentech
A Member of the Roche Group
+ Venture Capitalist Robert Swanson

1976

1977, PoC
1st Biotech IPO (1980)
Acquired by Roche (2009): $46.3B

In 2019 (by Oct), 61 biotech IPOs, 126 biotech acquired, 124 biotech ceased to exist worldwide

10x GENOMICS®

gossamerbio

Human microbiome
Gene therapy
Immunotherapy
CRISPR-Cas9
CAR-T cell Therapy

Source: Deloitte Insights

BIOTECH: SCIENCE & INNOVATION

Scientific Innovation

Use Biotechnology in Medical and Pharmaceutical Industry

- **Dx** Diagnostics
- **Rx** Therapeutics
- Medical Device

Source: Adapted from Wikipedia https://en.wikipedia.org/wiki/Biotechnology

RED BIOTECH

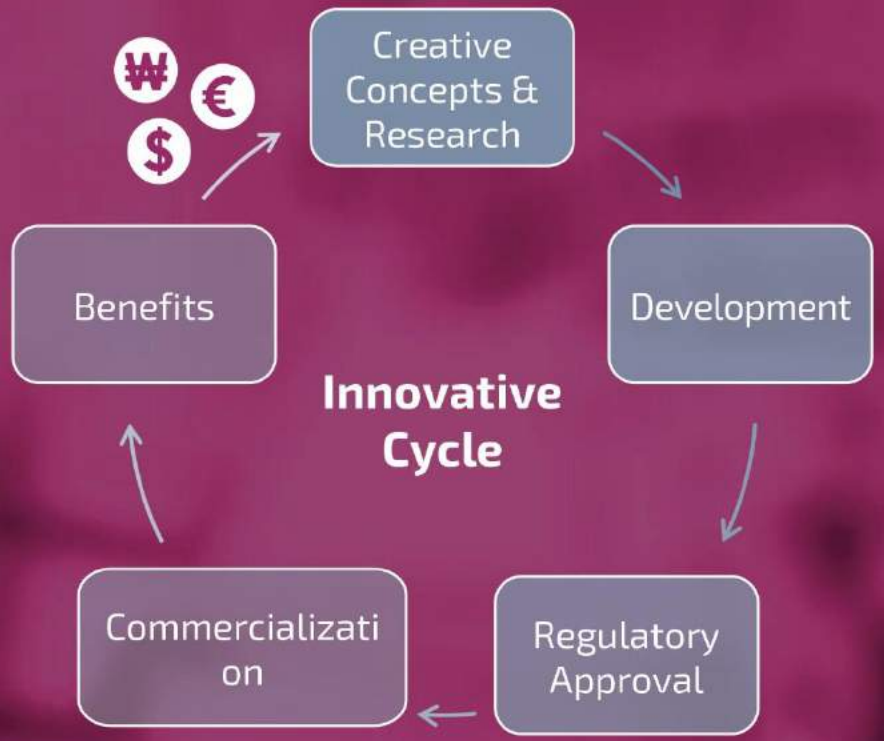
The innovation cycle in the biotechnology sector is complex, expensive and long, and success is uncertain.

Unmet Needs — Market

Break Through — Market

YET

"Do No Harm" — **PATIENT**



Source: European IPR Helpdesk, Fact Sheet, Intellectual property in Biotech

02 BIOTECH BUSINESS

BIOTECH FROM INNOVATION & SCIENCE
BIOTECH BUSINESS FROM INTELLECTUAL PROPERTY

▪ Patents

- Scientific Innovation only pays off when it is developed as "assets"
- Typical claims in medicinal biotech patents
  - Product claims
  - Use claims
  - Method of production claims

▪ Trademarks

- Important component for commercialization

▪ Trade secrets / Know-how

- Critical for maintaining competitiveness

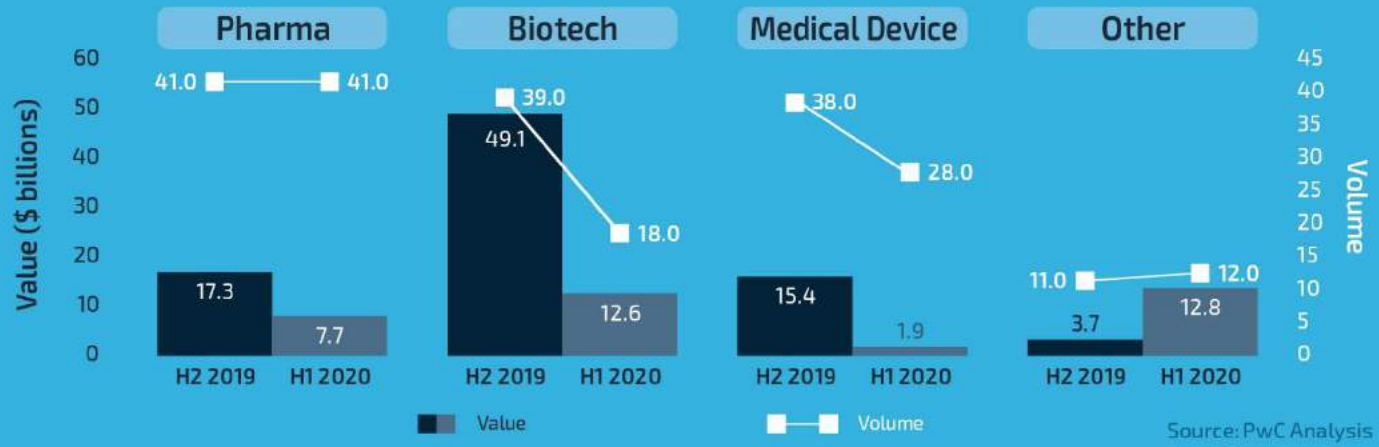
Source: Adapted from European IPR Helpdesk, Fact Sheet, Intellectual property in Biotech

LICENSING MARKET & TREND (1/2)

▪ Total Deal Value and Volume

Source: PwC Analysis

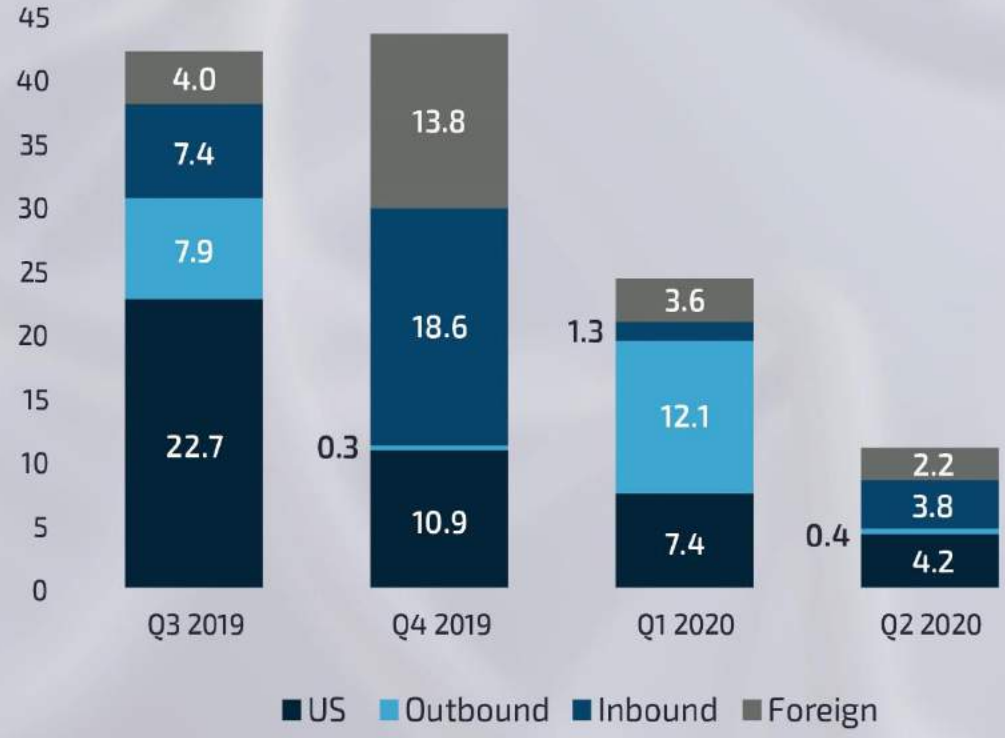
▪ Subsector Mix



Source: PwC Analysis

LICENSING MARKET & TREND (2/2)

Cross-Border Deals Volume



Landscape under COVID-19

- Economic "Pause"
- Disruption in deals process
- Switching to buyer's market
- Increased uncertainty

Source: PwC Deals Blog

Disruption in R&D Activities

- Pre-clinical: Labs in research-based biotechs → Productivity at 30-50%
- Clinical trials: 1099 stopped for COVID-19 related reasons between 2019 Dec and 2020 MAY

Source: nature.com

TIME OF UNPRECEDENTED UNCERTAINTY

▪ Risk-Hedging Strategy

- Operational excellence
- Safety
- Flexibility
  - Work environment
  - Deals → Territory, Terms
  - PATENT strategy to be revisited
- INNOVATIVE SCIENCE & PLATFORM-based DRUG DISCOVERY and DEVELOPMENT

Source: Adapted from nature.com

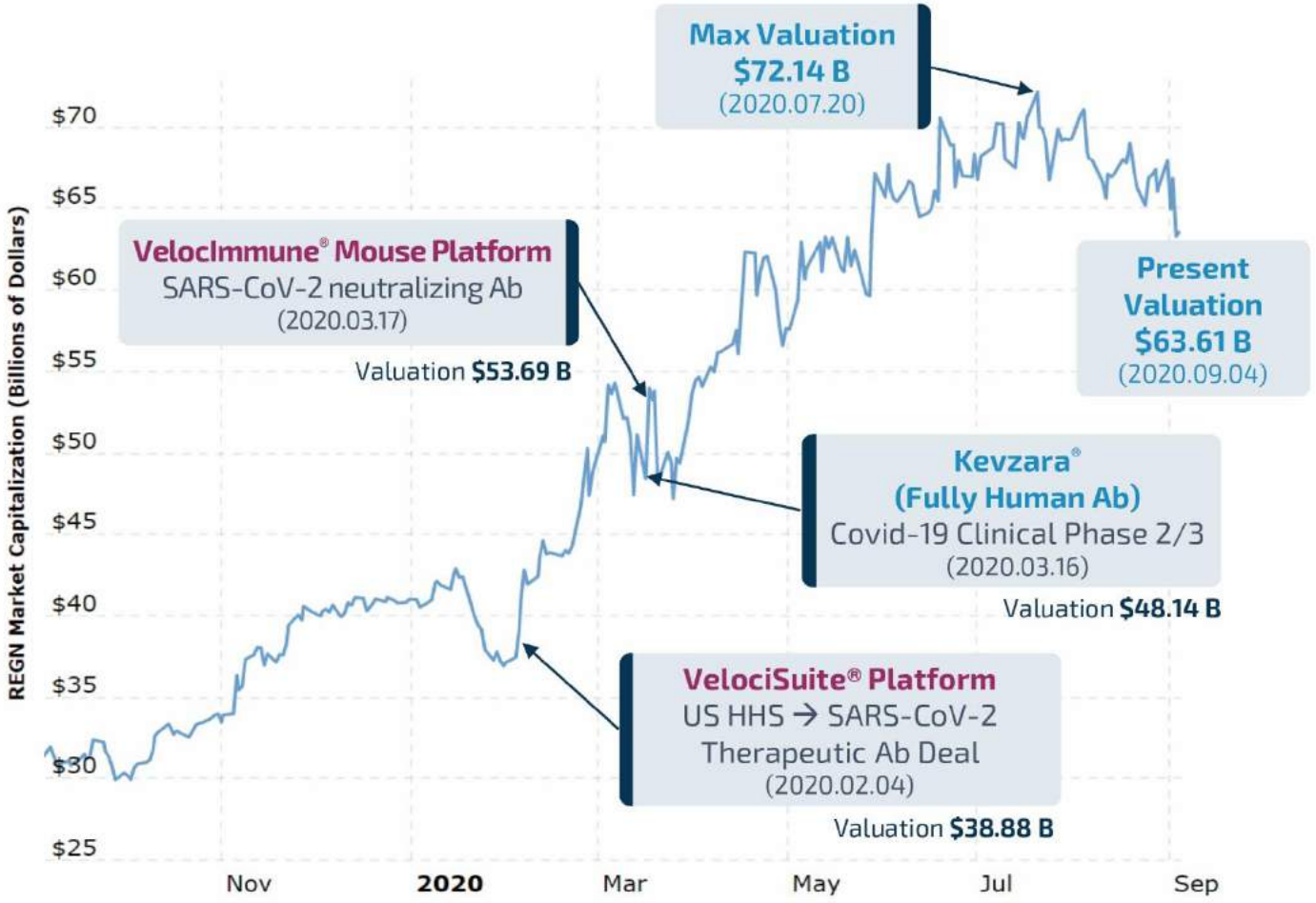
▪ External Environment

Reasons for confidence for biopharma sector

- More $$
- More companies
- More experienced teams
- Broader investor base
- Scientific progress

Source: nature.com

REGENERON (NASDAQ: REGN) STOCK PRICE



Source: www.macrotrends.net

03 GENUV INC.

Translate scientific imagination into realities for the healthy lives of people.

Ingenuity **Integrity** **Humility** **Generosity**

OUR HISTORY

- **2016.03** Established
- ATRIVIEW® **PoC (2016) of "Cell & Bio-Marker" Technology Platform**
- Research Lab (2016) **Research Center (2019)**
- **SAB including Dr. Robert Langer (2019)**
- **Patent Awards (2019, 2020)**
- **1st Clinical Trial Approval (2019.09),** 1st Patient In (2020.07)
- SHINE MOUSE® PoC (2020) of Antibody & Druggable Antigen Diversity Platform

OUR STRATEGY

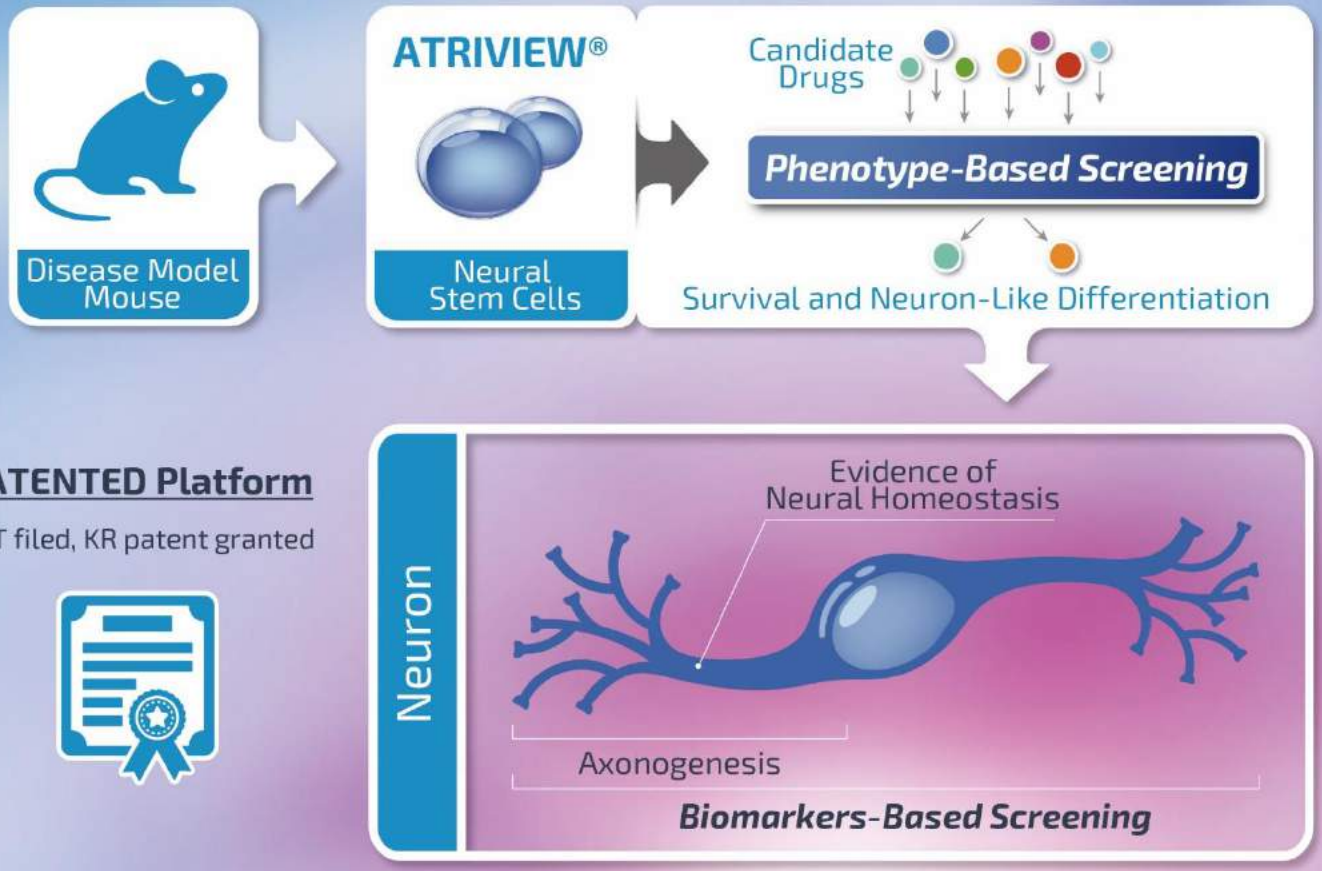
INNOVATIVE NEW DRUG DEVELOPMENT

Local ⇨ Global / Speed, Quality, Control

GENUV RESEARCH

ATRIVIEW® REGENERATIVE CNS TARGET & DRUG SCREENING PLATFORM

COMBINATION OF STEM CELL & BIOMARKER TECHNOLLOGIES



PATENTED Platform

PCT filed, KR patent granted

ALS Phase I/IIa
MFDS Korea

ANTIBODY DISCOVERY PLATFORM

SHINE MOUSE® & GENUV MOUSE™

Mouse Ab *In Vivo* Platform

Reverse Chimeric Ab Platform
Human Variable + Mouse Constant Regions

SHINE MOUSE®

Antibody & Druggable Antigen Diversity

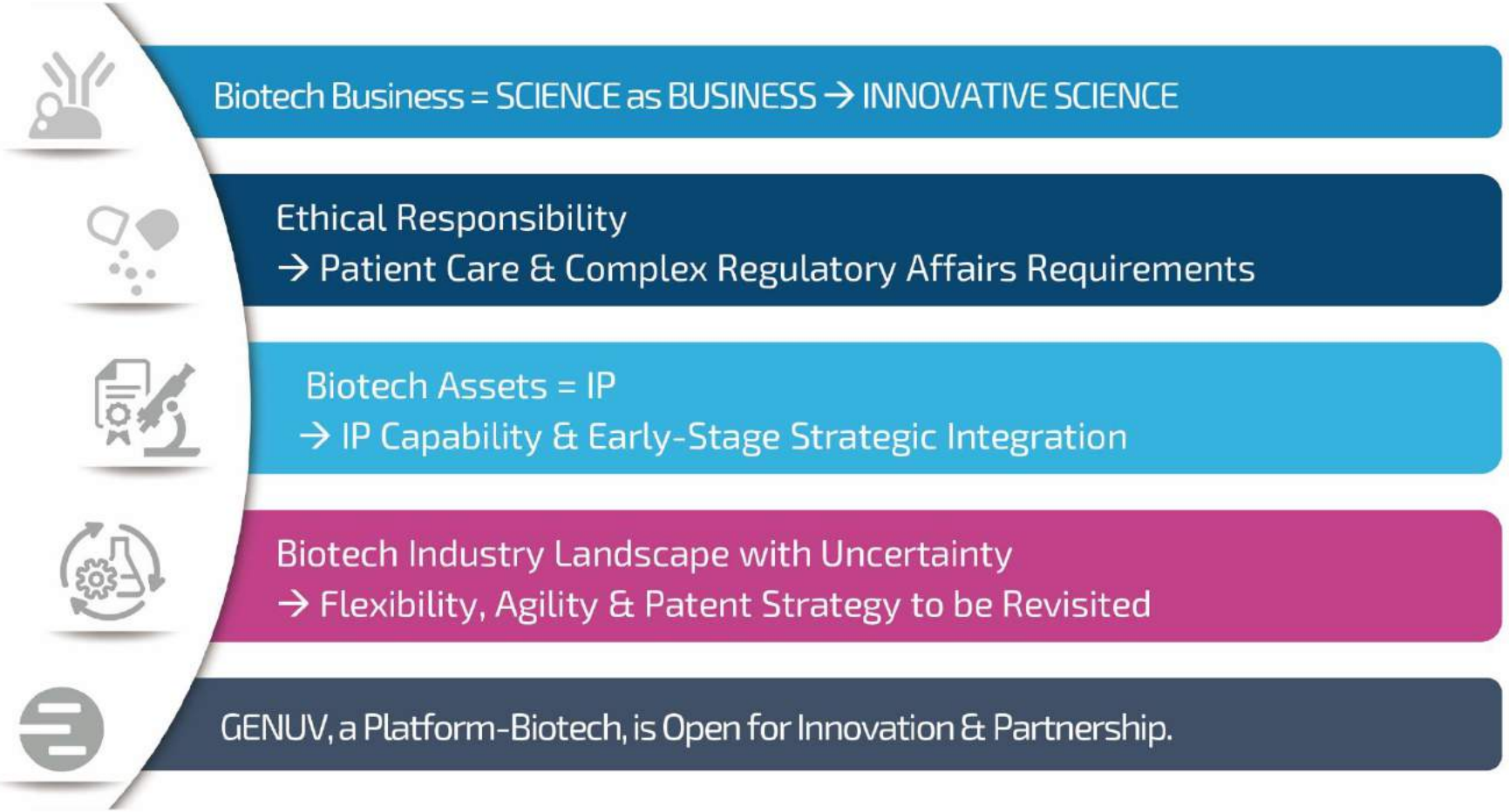
- GNUV201 = PD 1 Ab
  Keytruda-Comparable IC_{50}
  Human·Mouse Equal Reactivity
  Novel Epitope

GENUV MOUSE™

1ST GENERATION (<WT)	2nd GENERATION (=WT)	3rd GENERATION (>WT)

Increase in Epitope & Druggable Antigen(i.e. GPCR) Diversity

PRESENTATION SUMMARY



THANK YOU!

GENUV

WWW.GENUV.COM