Investor Relations

GENEXINE

November . 2020

01 Genexine Overview

Genexine

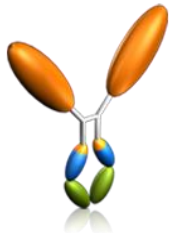
"Focused on the Development of Innovative Immunotherapeutics and Saving the lives of Patients."

Chairman/CEO	• Young-Chul Sung Ph.D.
Key Milestones	• Established in June, 1999 • Listed on KOSDAQ since 2009
Core platform technologies	• hyFc antibody fusion technology • DNA vaccine technology
Focus area of R&D	• Immuno-oncology • Orphan drugs
Employees	• 155 (MD 1, Ph.D 20, MS 55)
Market Cap	• $2.5 bn (October 2020)
Location	• Pangyo Korea Bio Park, Gyeonggi-do, Korea

02 Genexine's Platform Technologies

Innovative platform technologies aiming for global expansion

hyFc™ (Long-acting protein drug)



Increased protein activity by combining IgD (flexible hinge) & IgG4 (stable long acting) for applying various APIs.

First-in-Class

- Immuno-oncology drug (GX-I7)
- Immunosuppressive drug (GX-P1, GX-P10)

Best-in-Class

- Growth hormone deficiency treatment drug (GX-H9)
- Chronic kidney disease-induced Anemia correction drug(GX-E4)
- Neutropenia correction drug (GX-G3)
- Type 2 Diabetes treatment drug(GX-G6)
- Short bowel syndrome treatment drug(GX-G8)

DNA vaccine (cancer therapeutic/ infectious disease)

innovative gene therapy can provide preventive and therapeutic vaccines through strong immune response.

First-in-Class

Therapeutic DNA Vaccine

- Cervical cancer, Head and Neck cancer vaccine (GX-188E, GX-200 series)

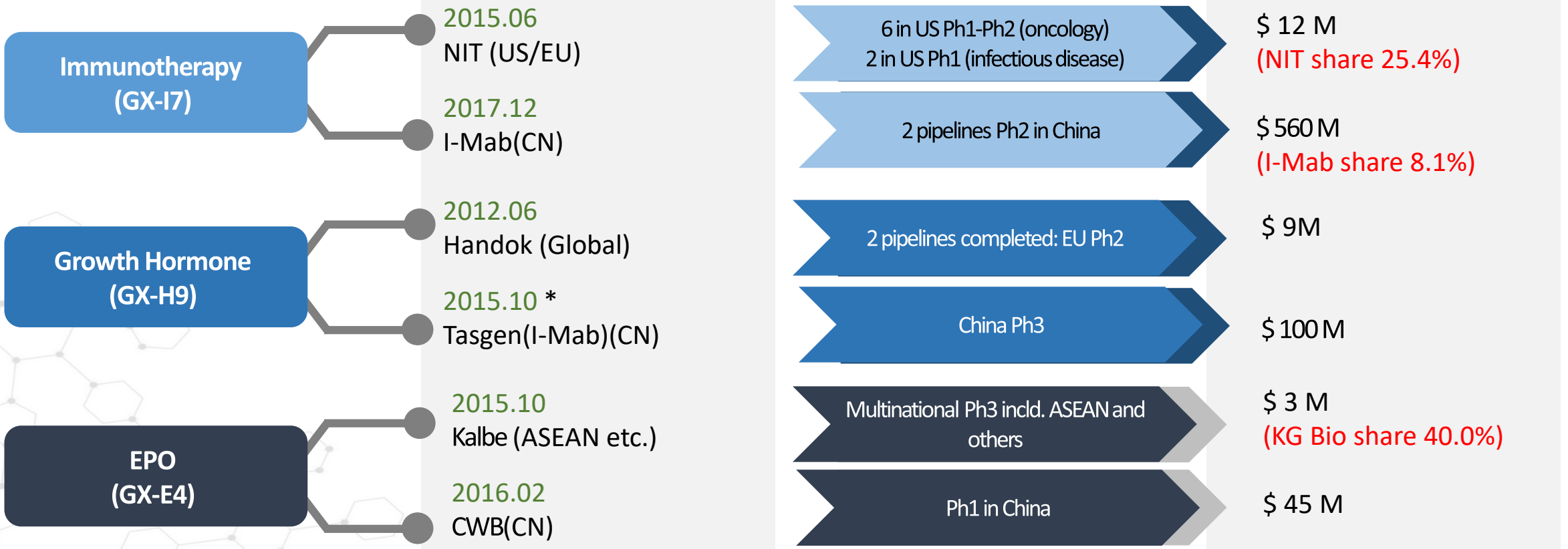
First-in-Class

DNA Vaccine for Prevention

- COVID-19 vaccine (GX-19)

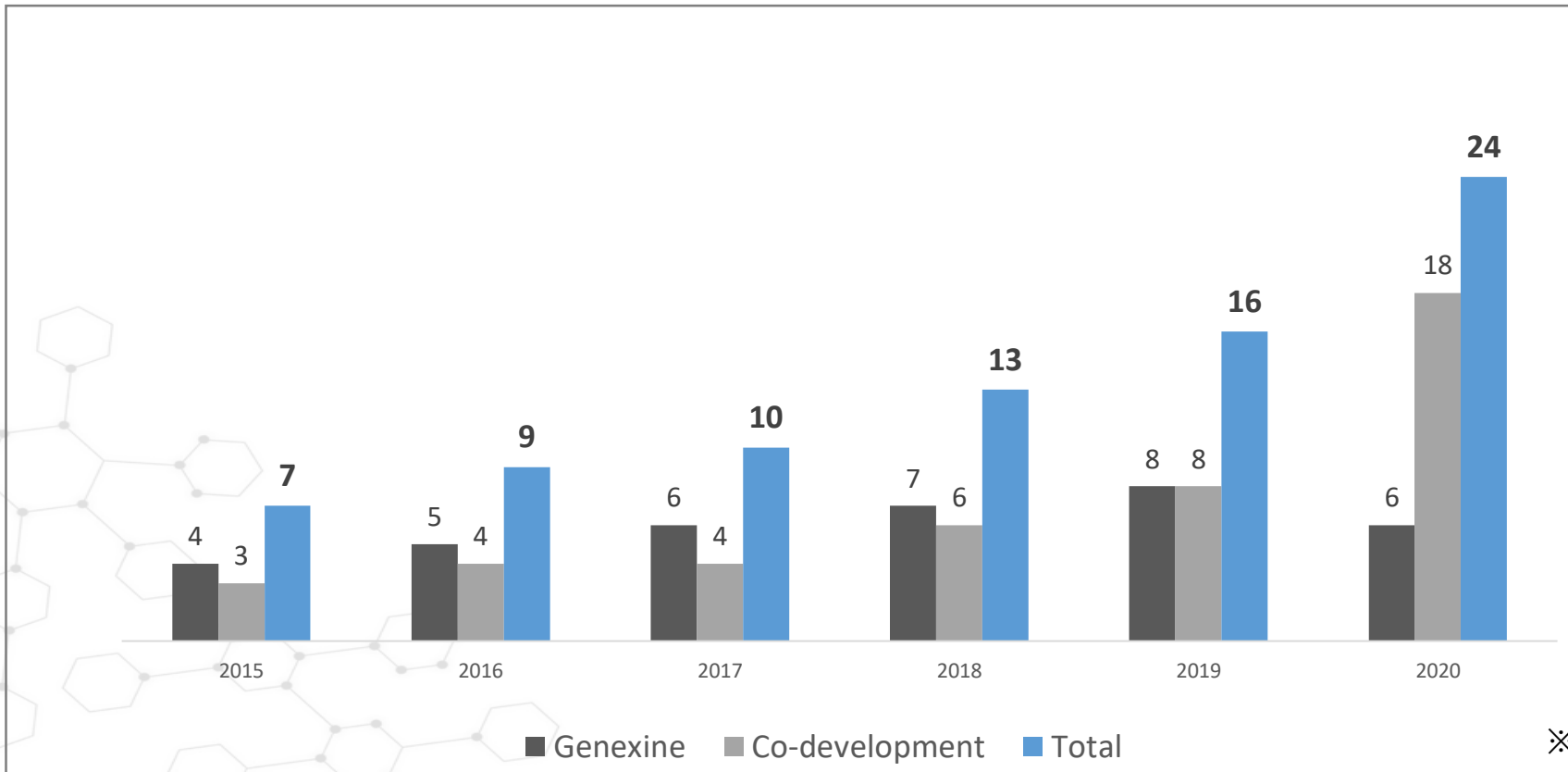
03 Genexine's Open Innovation - L/O and Strong Partnership

- Win-Win strategy with L/O partner company: share hold leads to strong partnership building process
- As clinical stage advances partners' company value increases + L/O value increases.



04 Genexine's Open Innovation : Co-development Strategy

- 6 (by GX alone) +18 (co-development trials) = **24 pipeline in clinical stage**
- Compare to 2015 number of clinical pipelines increased 3.5-folds
- R&D cost kept approx. $ 40 M since 2017



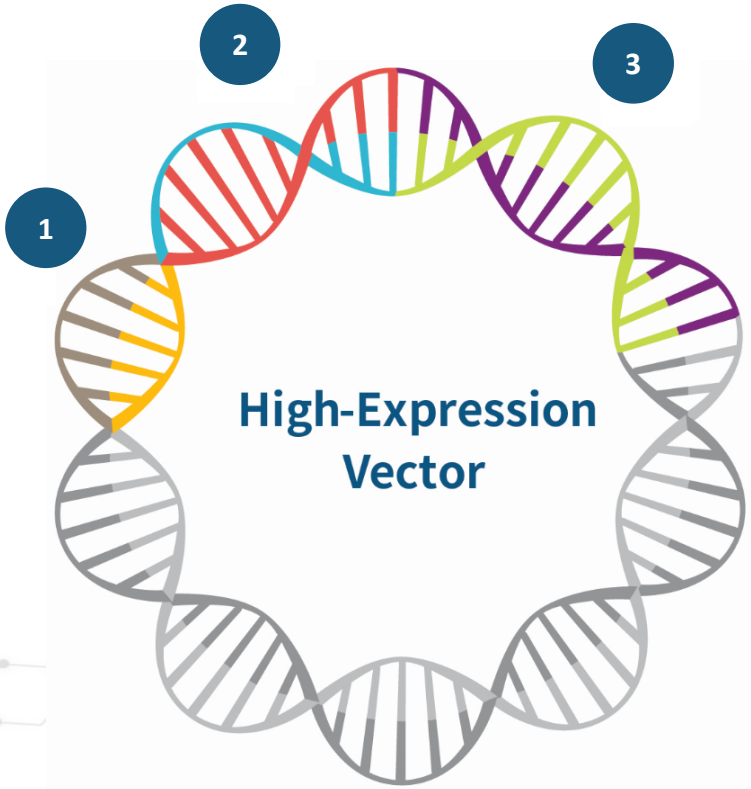
Clinical dev.	Co-dev.
2 of GX-I7	8 of GX-I7 (NIT)
GX-188E	2 of GX-I7 (imab)
GX-P1	GX-H9 adult (Handok)
GX-G8	GX-H9 children (Handok/imab)
GX-19	GX-E4(KG bio/CWB)
	GX-G3(ILKO)
	GX-G6 (Imab)
	GX-G8 (Imab)

※ 2020 GX-I7 3 clinical trials completed

COVID-19

SARS-CoV-2 preventative DNA vaccine

05 Genexine's DNA vaccine Platform technology



1 *Signal Sequence*
- *Enhanced immunogenicity*
- *Prevention of nuclear localization of antigens*

2 *DC-Targeting and Expansion*
- *Selective delivery of expressed antigens to DCs*
- *Preferential induction of antigen-specific CD8+ T cell response*

3 *Engineered Antigen*
- *Prevention of biological activities of antigens*
- *Preservation of all T cell epitopes*

✓ **Clinically demonstrated safety and efficacy!**

06 GX-188E : High efficacy and safety results (with Keytruda)

- **Interim analysis reported (KEYNOTE-567) at AACR in April 2020, Results from clinical trial phase 2 for combination with Keytruda**
  - Efficient HPV-specific immune responses induced in 78% of patient.
  - Excellent safety and tolerability (*similar side effects observed in Keytruda mono. and combination therapy).

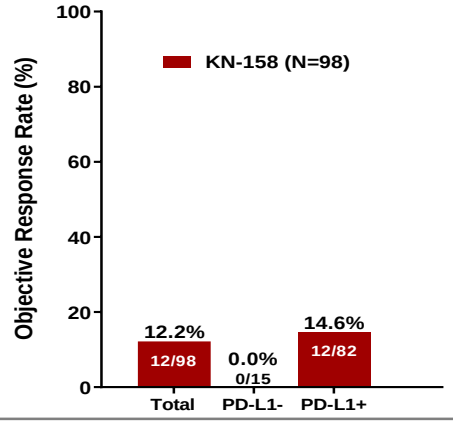
Ph2 Interim Result

ORR (%)	Efficacy set[a] (N=26)	PD-L1 status[b]		HPV type	
		Positive (N=20)	Negative (N=6)	HPV16 (N=19)	HPV18or both (N=7)
CR	4 (15.4)	4 (20.0)	0 (0.0)	4 (21.1)	0 (0.0)
PR	7(26.9)	6 (30.0)	1 (16.7)	5 (26.3)	2 (28.6)
SD	4 (15.4)	3 (15.0)	1 (16.7)	3 (15.8)	1 (14.3)
PD	11 (42.3)	7 (35.0)	4 (66.7)	7 (36.8)	4 (57.1)
ORR	11 (42.4)	10 (50.0)	1 (16.7)	9 (47.4)	2 (28.6)
DCR	15 (57.7)	13 (65.0)	2 (33.3)	12 (63.2)	3 (42.9)

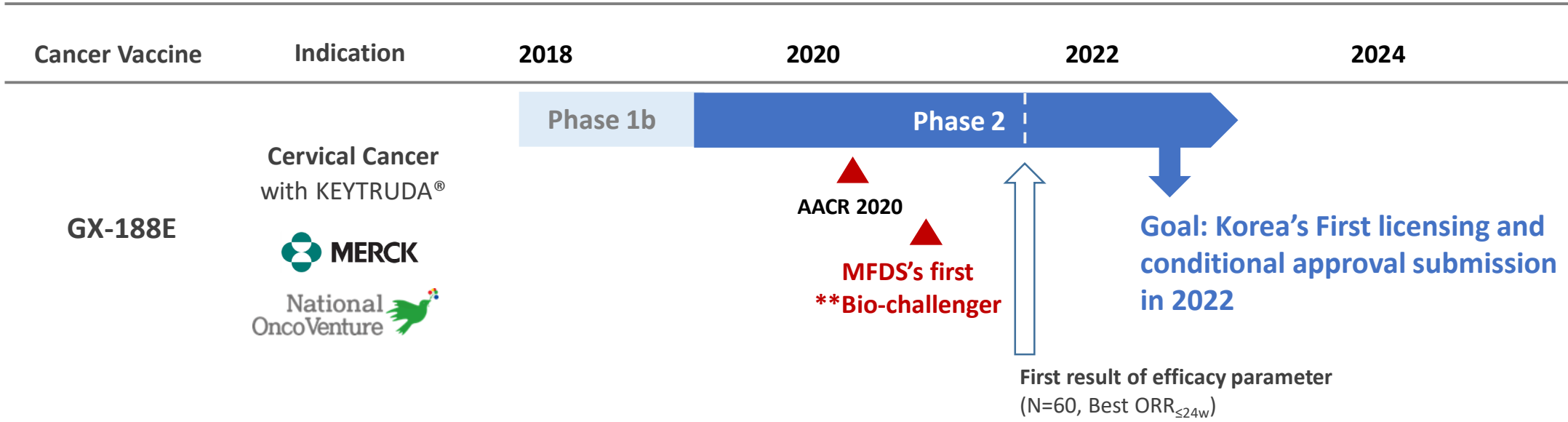
AACR 2020 Poster Presentation

Monotherapy of Keytruda (KEYNOTE-158, N=98)

- PD-L1-positive : ORR 14.6%
- PD-L1-negative: no ORR



07 GX-188E: Clinical Trial & Development Timeline



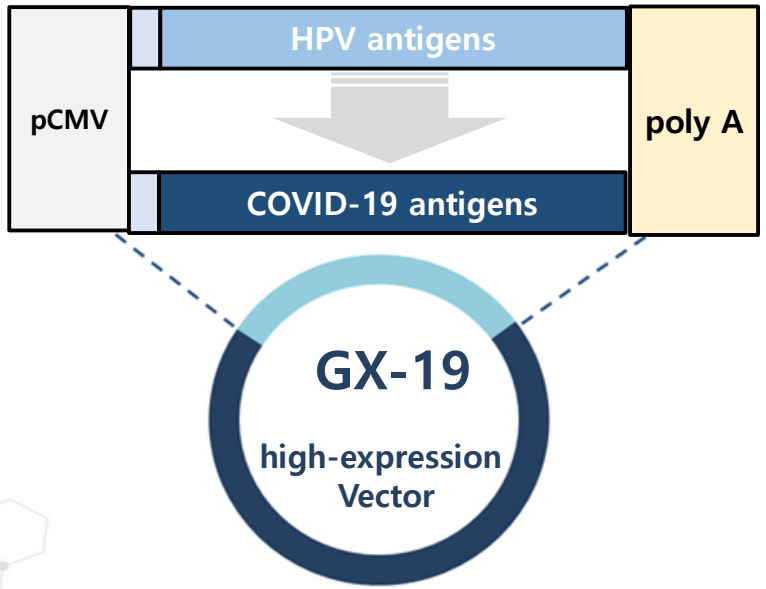
*Next Generation of HPV DNA Vaccine: semi-personalized vaccine

**Bio Challenger program

- MFDS selected Genexine's GX-188E as **the first "Bio-Challenger"** in June 2020.
- **MFDS provides overall specialized services by assigning dedicated personnel for accelerated process in registration, review, etc.**

08 COVID-19 DNA vaccine

"already acquired safety and efficacy from 300 patients"



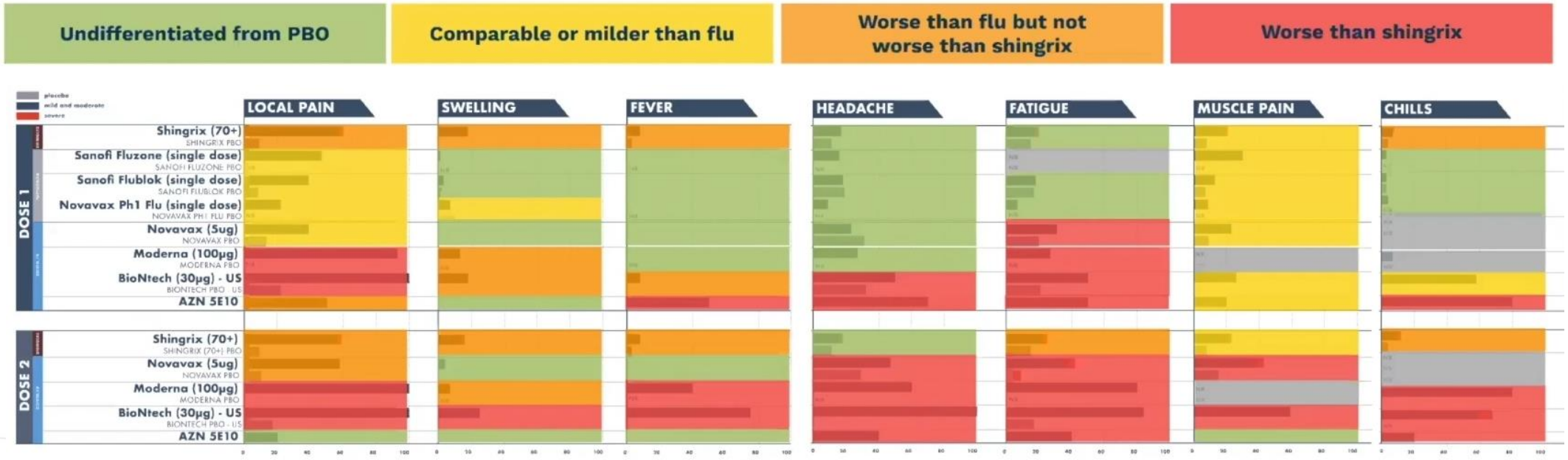
GX-19 Development Outline/Overview

Type	• DNA vaccine
Code	• GX-19-HV- 001
Number of subjects	• Phase 1 : N=60 (20 per dose group) • Phase 2a : N=150 (100/placebo 50)
Study objectives	• Evaluate the safety, tolerability, and immune response of doses
Target subjects	• Healthy adults aged 19 ~ 50
Frequency & Method	• Intramuscular injection (2 injections/4 weeks)
Delivery devices	• Electroporator, EP • Needle free injection system
Clinical sites	• 6 institutions including Severance Hospital

GX-19 Development Timeline

- Mar 2020 : Consortium formation among six institutions (Genexine, Binex, IVI, GenNBio, KAIST, POSTECH)
- June 2020 : Ph1/2a MFDS approved.
- 4Q 2020 : Ph1 completion and Ph2a start
- 3Q 2021 : Conditional approval submission

09 DNA vaccine shows good safety profile



"DOSE 2" of Novavax, Moderna, and BioNtech's vaccines induced more severe AE than "DOSE 1"

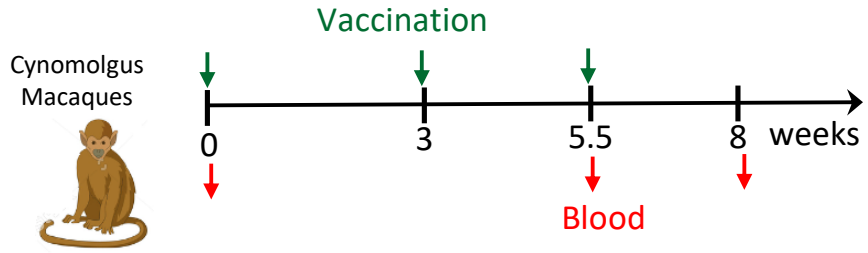
Source : RA Capital

DNA Vaccine (Multiple dose)

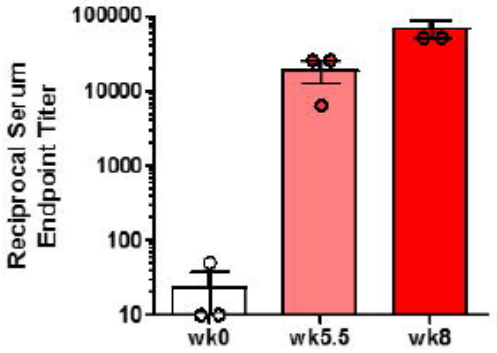
Pain by injection but transient

10 Immunogencity of GX-19 in macaques

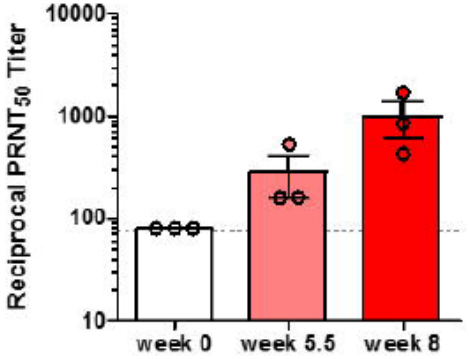
- **S-specific Ab & neutralizing Ab were induced in macaques**
- **IFN-g ELISPOT & CD4+/CD8+ T cell responses were induced**



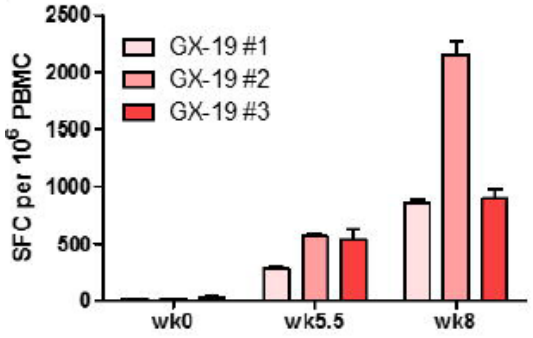
A. S-specific binding Ab



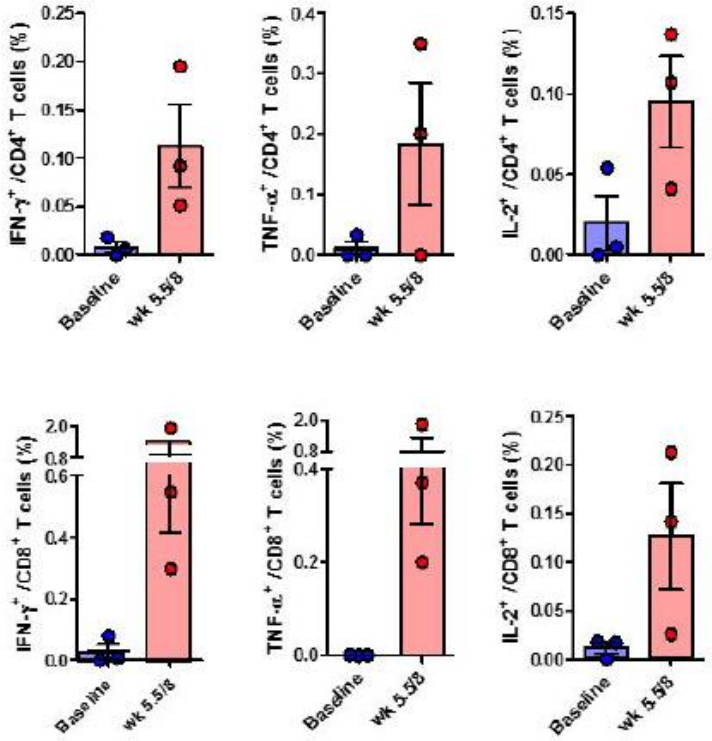
B. nAb to live SARS-CoV-2



C. IFN-γ ELISPOT responses

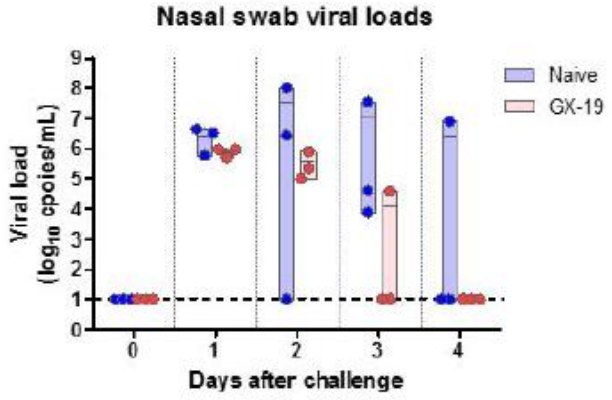


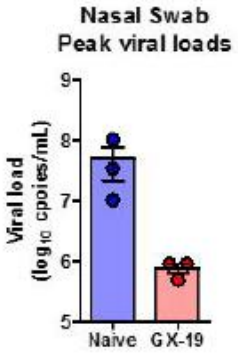
D. Th1 cytokine-secreting CD4+/ CD8+ T cells

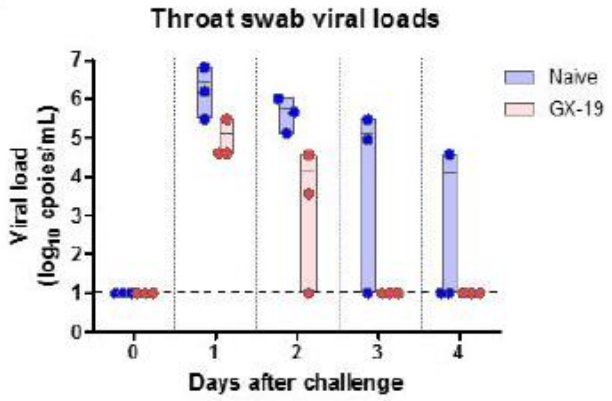


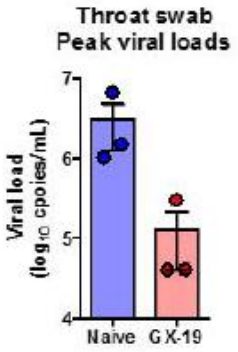
11 Protection against SARS-CoV-2 challenge : Viral loads

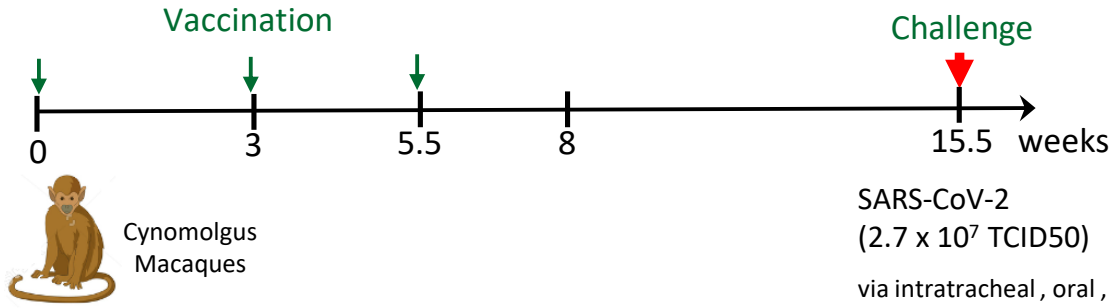
- **Ten weeks after the final immunization, macaques were challenge with SARS-CoV-2 via combined route**
- **GX-19-immunized macaques showed reduced peak viral loads and early clearance of the virus**







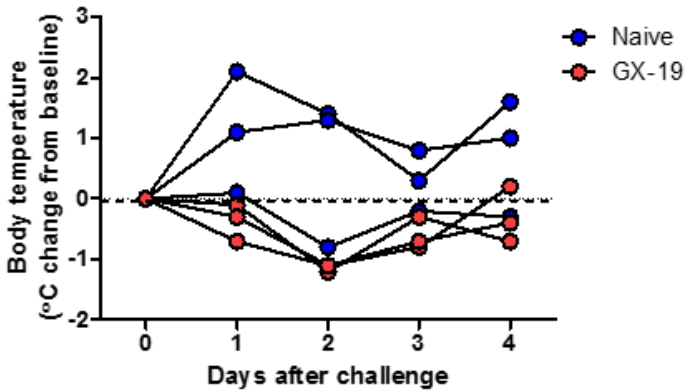


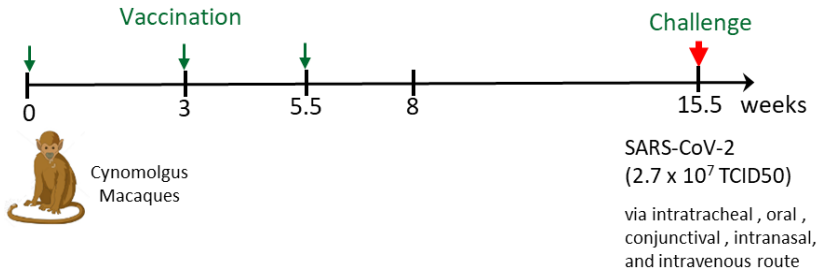


12 Protection against SARS-CoV-2 challenge : Symptoms & Infectious virus

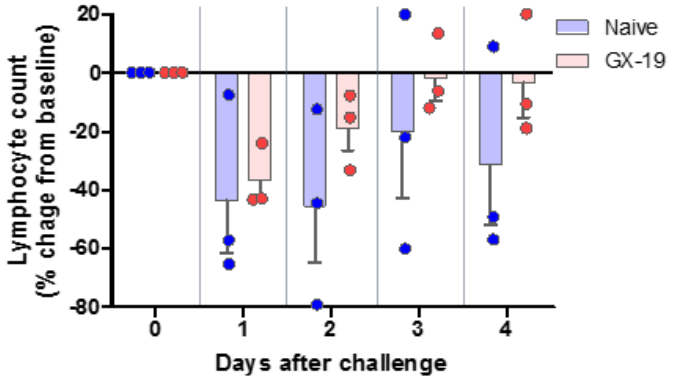
- **GX-19-immunized macaques did not have a fever after challenge**
- **Infectious SARS-CoV-2 was not detected at 2~4 days post challenge in vaccinated macaques**

A. Body Temperature

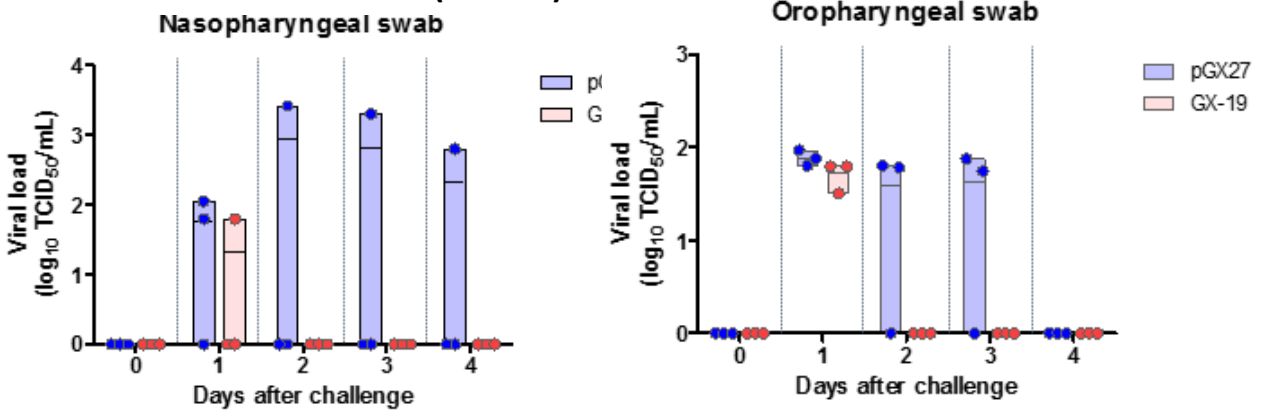




B. Blood Lymphocyte Counts

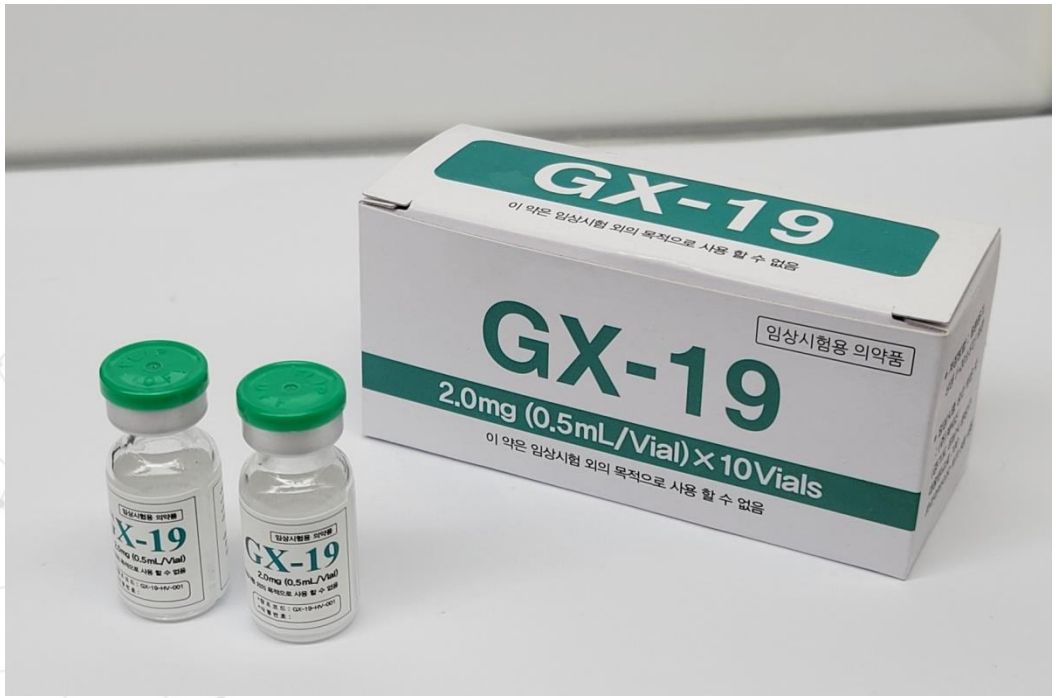


C. Infectious virus Titer (TCID50)



13 GX-19, COVID-19 DNA vaccine

- **GX-19, 2 mg liquid vial containing plasmid DNA encoding SARS-CoV-2 Spike protein gene**
- **Route : Intramuscular injection using EP or needle-free jet injector**
- **Development stage : Ph1/2a approved by KFDA, currently Ph1 ongoing**



14 GX-19: Clinical Stage COVID-19 DNA Vaccine Candidate

Genexine, Korea's 1st and global 15th approval for clinical studies

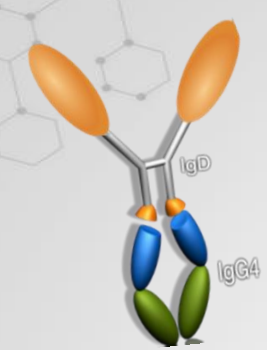
DNA Vaccine characteristics

Fast development of the candidates – Manufacturing process is simple & fast

Over 460 clinical studies proved Safety, simultaneous responses of neutralizing antibody (Th1-biased) cellular immune responses

comparison	RNA vaccine	DNA vaccine
Manufacturing	in vitro (no host cell)	Cultivation of E.coli as host
Expression of antigen per nucleic acid molecule	High	In theory single DNA can produce more RNA, therefore it generates more antigens.
Risk in inserting into chromosome	None	Possible in theory but does not happen in real
Conditions in order to express antigen within a cell	Must exile from endosome	Needs to penetrate into nucleus
Optimization of deliveration	Need to be resolved (several methods are in trial)	Need to be resolved (several methods are developed)
Toxicology	Needs to proven from more studies	Safety confirmed from various clinical studies
Storage	Deep freeze (–70 °C)	Room temp. or refrigeration(4°C ~ 25°C)

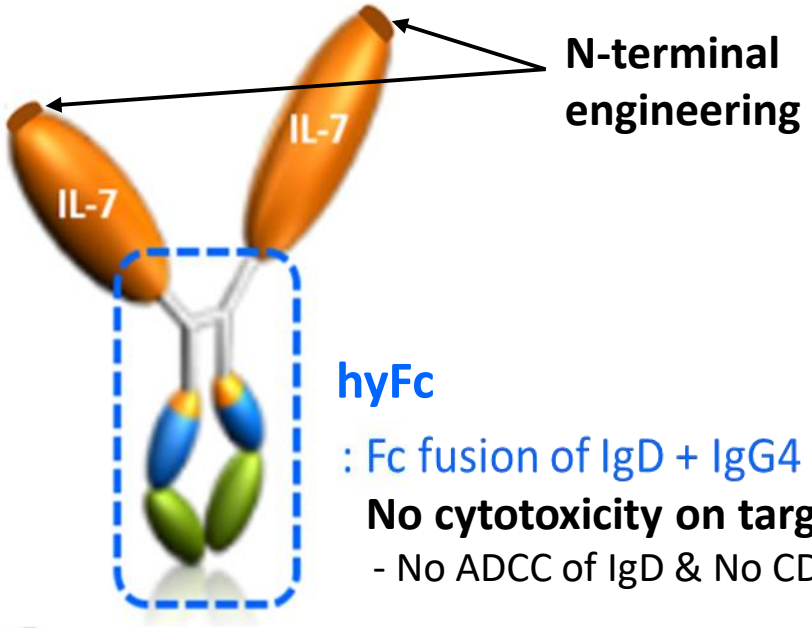
Others						
	Virus-vector Vaccine	• AstraZeneca(Oxford) : Ph3 • CanSino(Tianjin) : Ph3	**Subunit Vaccine**	• Novavax Pfizer : Ph3 • SK Bioscience	**Inactivated Vaccine**	• SinoPharm(Wuhan) : Ph3 • SinoVac(Beijing) : Ph3



hyFc™

Therapeutics Medicine For COVID-19 GX-I7 (IL-7-hyFc)

15 Long-acting Interleukin-7 (IL-7-hyFc)



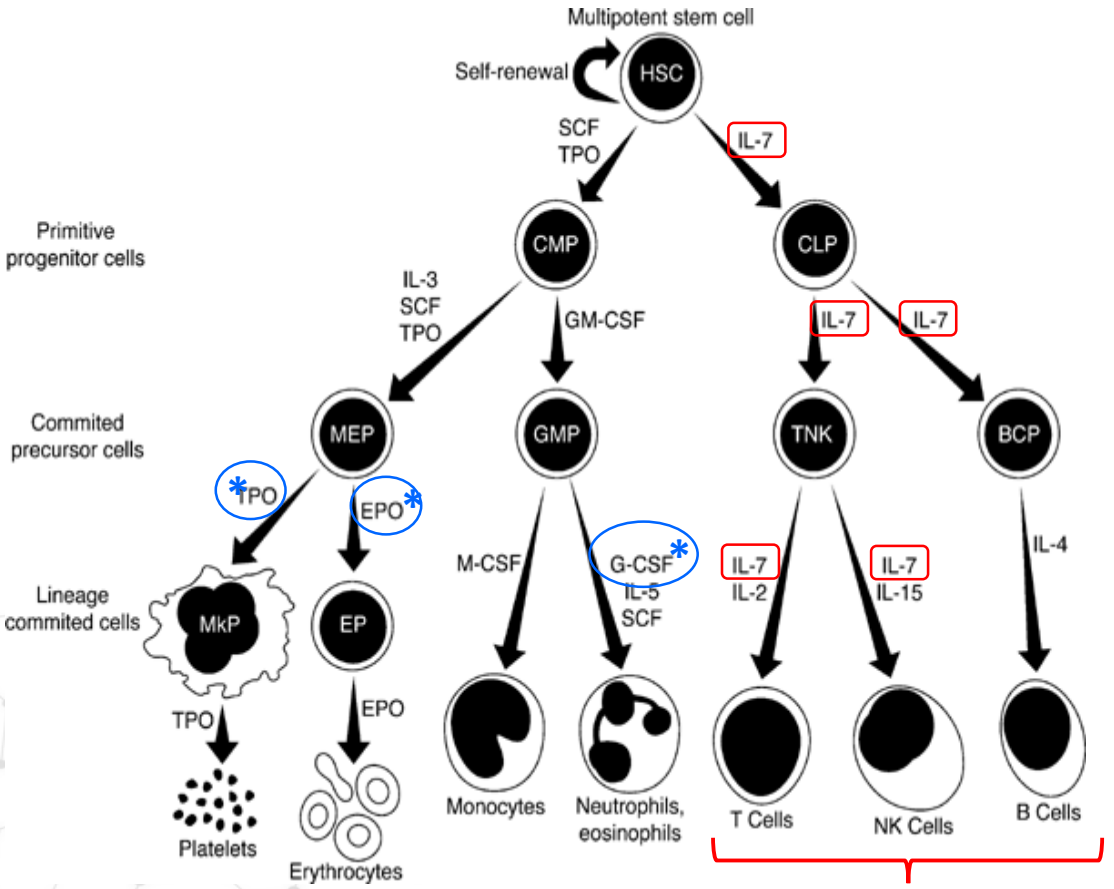
Comparison of Hyleuki-7 with rIL-7 protein

- ✓ **Higher protein stability** due to N-terminal engineering
- ✓ **Higher productivity⁺ than rhIL-7 protein** by hyFc fusion
- ✓ **Longer in vivo half-life than rhIL-7 protein** due to FcRn-mediated recycling of IgG4 & reduced renal clearance.

16 GX-I7 : Mechanism of Action (MoA)

Genexine

IL-7 Stimulates Differentiation of Multi-potent HSCs into CLP cells



*** blockbuster products**

Baker SJ et al. Oncogene. 2007;15;26(47):6724-37

*CLP; Common Lymphoid Progenitor

Anemia	Thrombo-cytopenia	Neutropenia	Lymphopenia
EPO	TPO	G-CSF	IL-7
ERYTHROCYTES	PLATELETS	NEUTROPHILS	LYMPHOCYTES
Amgen J&J Roche	Genentech Kirin Amgen	Amgen	Genexine/NIT
Global Market $ 7.4 B. (2016) $ 17.4 B*. (2025)	Global Market $ 1.3 B. (2016) $ 2.5 B*. (2025)	Global Market $ 7.7 B (2016) $ 12.6 B* (2025)	Global Market

17 GX-I7 : Developing as COVID-19 Therapeutics

Genexine

The only Korean biotech developing both vaccine and therpeutic medicine for Covid-19

Genexine COVID-19 therapeutic medicine

	MoA	Clinical Phase	Remark
IL-7-hyFc (GX-I7)	Immunotherapy (T cell amplifier)	KOREA: Phase 1b	
		US: Phase 1	Co-development with NIH

※ Collaboration with Y-biologics for developing antibody therapy (virus neutralization) nAb

Development timeline

- **2020, 2Q, IND approval by US FDA (NeoImmuneTech)**
- **2020, 3Q, IND approval by Korea MFDS (Genexine)**
- **2020, 4Q, Patient injection start (Multi-national)**
- **2021, 1Q, Clinical Ph1/2 Interim result**
- **2021, 2Q, Ph3 IND submission**

Clinical development overview (Korea)

candidate	• GX-I7
Number of subjects	• 40 (32 + 8 placebo)
Study objectives	• safety, efficacy(increase lymphocytes %)
Target subjects	• Moderate patients
Frequency & Method	• Single dose within 7 days after infection

18 Lymphopenia in COVID-19: Worsening symptoms & mortality

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected P

Dawei Wang, MD; Bo Hu, MD; Chang Hu, MD; Fangfang Zhu, MD; Xing Liu, MD; Jing
Zhenshun Cheng, MD; Yong Xiong, MD; Yan Zhao, MD; Yirong Li, MD; Xinghuan Wa

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

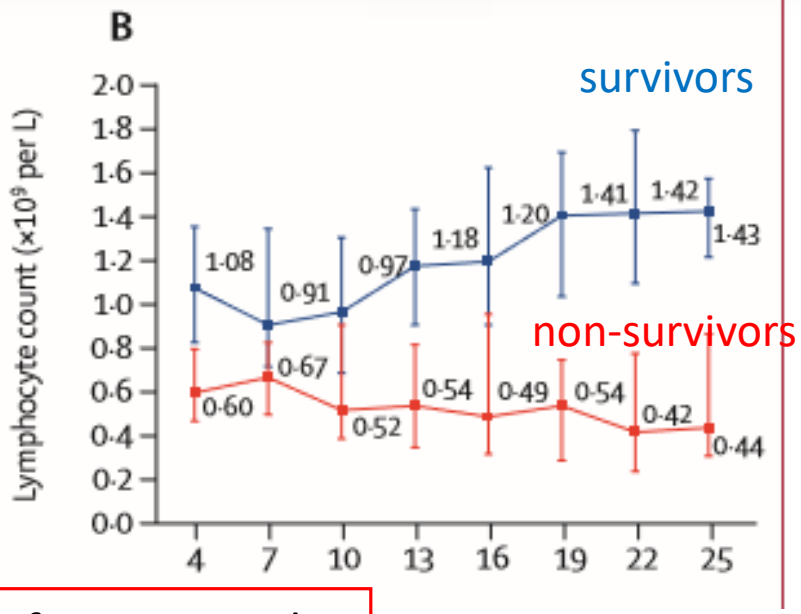
Clinical Characteristics of Coronavirus Disease 2019 in China

Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study

Fei Zhou, Ting Yu*, Ronghui Du*, Guohui Fan*, Ying Liu*, Zhibo Liu*, Jie Xiang*, Yeming Wang, Bin Song, Xiaoying Gu, Lulu Guan, Yuan Wei, Hui Li, Xudong Wu, Jiuyang Xu, Shengjin Tu, Yi Zhang, Hua Chen, Bin Cao*

Lancet On line March 9th 2020

- **Moderate to severe COVID-19 patients develop severe lymphopenia that is associated with greatly increased mortality.**
- **Lymphopenia** may impair the ability of the patient to eradicate the virus and be more susceptible to **secondary bacterial infections.**
- **IL-7 is effective in reversing lymphopenia** in patients with bacterial sepsis and has also demonstrated efficacy in viral infections
- IL-7 has been used in >500 patients and has been well tolerated with a **minimal side effect** profile.
- **Elderly patients have highest mortality** and this is likely due to **immune senescence**; which is improved by IL-7.



" Theses abnormalities suggest that 2019-nCoV infection may be associated with cellular immune deficiency"

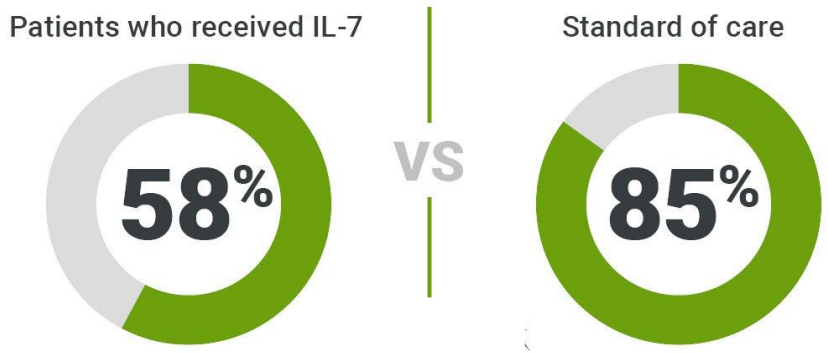
D.Wang *et al.*

19 Prevention and treatment of lymphopenia in COVID-19 by IL-7

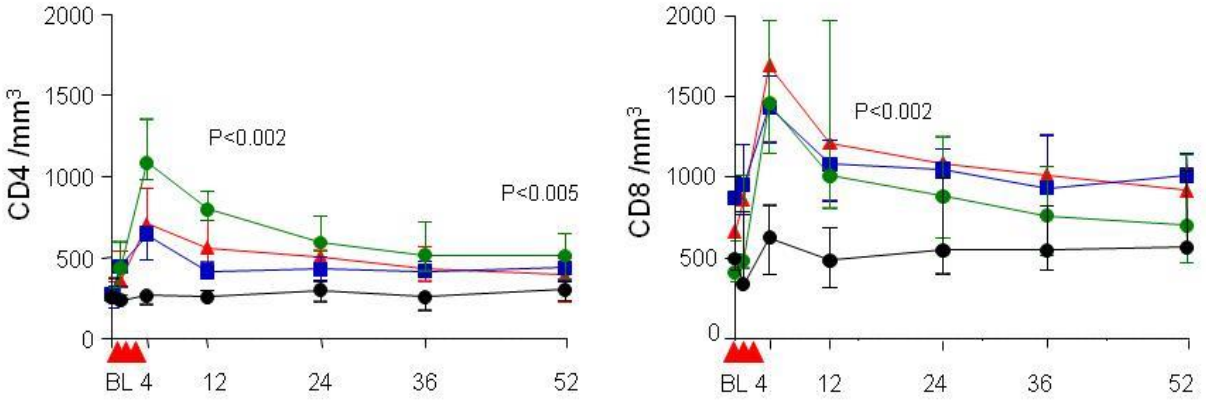
- **Patients infected with SARS-CoV-2 shows lymphopenia. Can be developed to fatal stage depending on severity of lymphopenia.**
- **Severe lymphopenia may significantly impair the ability of the patient to combat COVID-19** and contribute to increased (make him more) susceptibility to lethal secondary hospital-acquired infections.

- **Secondary infections occurred in 58% who received IL-7, compared with 85% of those in the control group**.
- **IL-7 can be safely administered to critically ill patients with COVID-19 without exacerbating inflammation or pulmonary** injury. P. Lattere *et al. 2020 JAMA Network*

Percent of patients critically ill with COVID-19 who developed a secondary infection by day 30:



- **IL-7 prevents viral and bacterial pathogen induced lymphocyte apoptosis** by increasing anti-apoptotic Bcl-2
- **IL-7 increases CD4 and CD8 T cell numbers** by stimulating cell proliferation



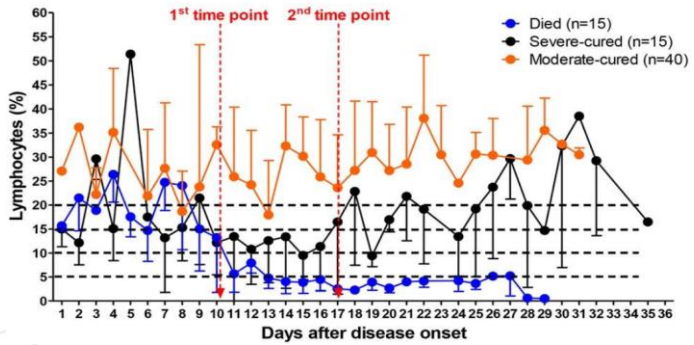
Cytheris' short acting IL-7

3 injections of IL-7 caused significant increase in CD4 and CD8 T cells Levy et al. *Clin. Infect. Dis. 55:291; 2012*

20 Lymphopenia correction is key to the COVID-19 treatment

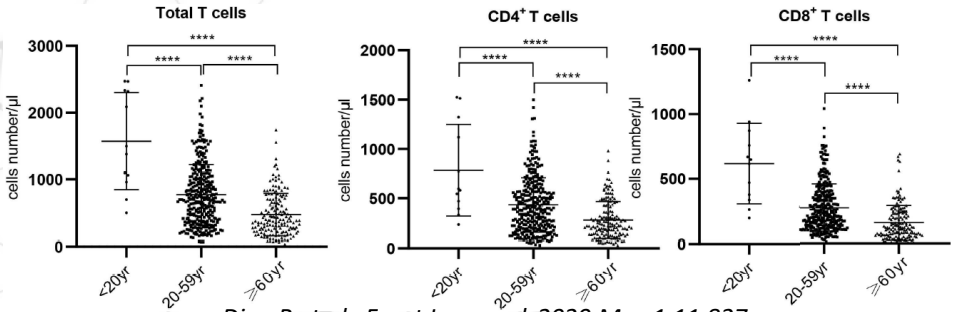
Interleukin-7 restores lymphocytes from the lymphopenia induced by COVID-19 infection

Level of T cell counts: survivors vs. non-survivors



Li Tan et al., Signal Transduct Target Ther. 2020 Apr 29;5:61.

Lower T cell counts in elderly



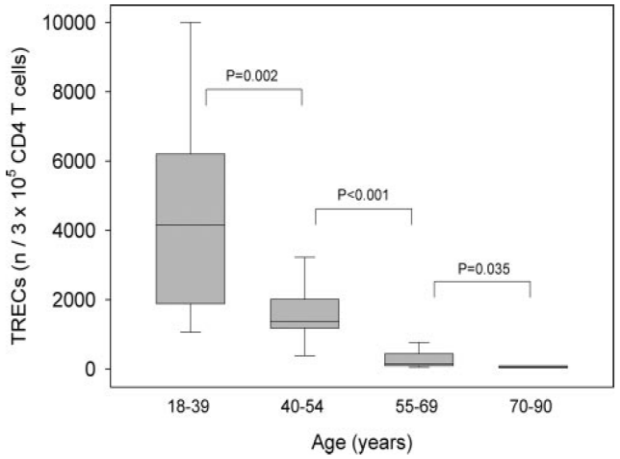
Diao B et al., Front Immunol. 2020 May 1;11:827.

Age over 80 fatality rate (25.3%) due to immune senescence.

- **Elders have thymic involution** which will cause decrease in T cell's proliferation and diversity decrease.

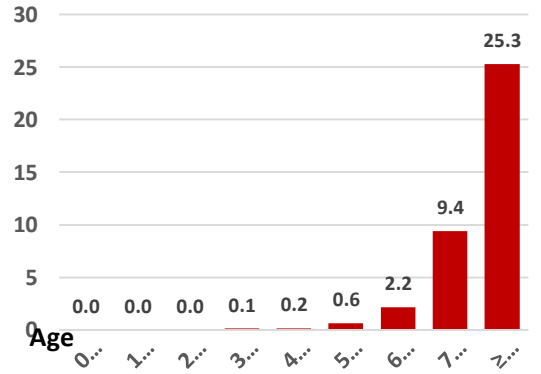
  → **Exposure to additional viral infection** due to compromised immune system which later can be develop to viral sepsis

T cell count by age



(Ref. Naylor K. et al, J Immunol, 2005, 174: 7446–7452.)

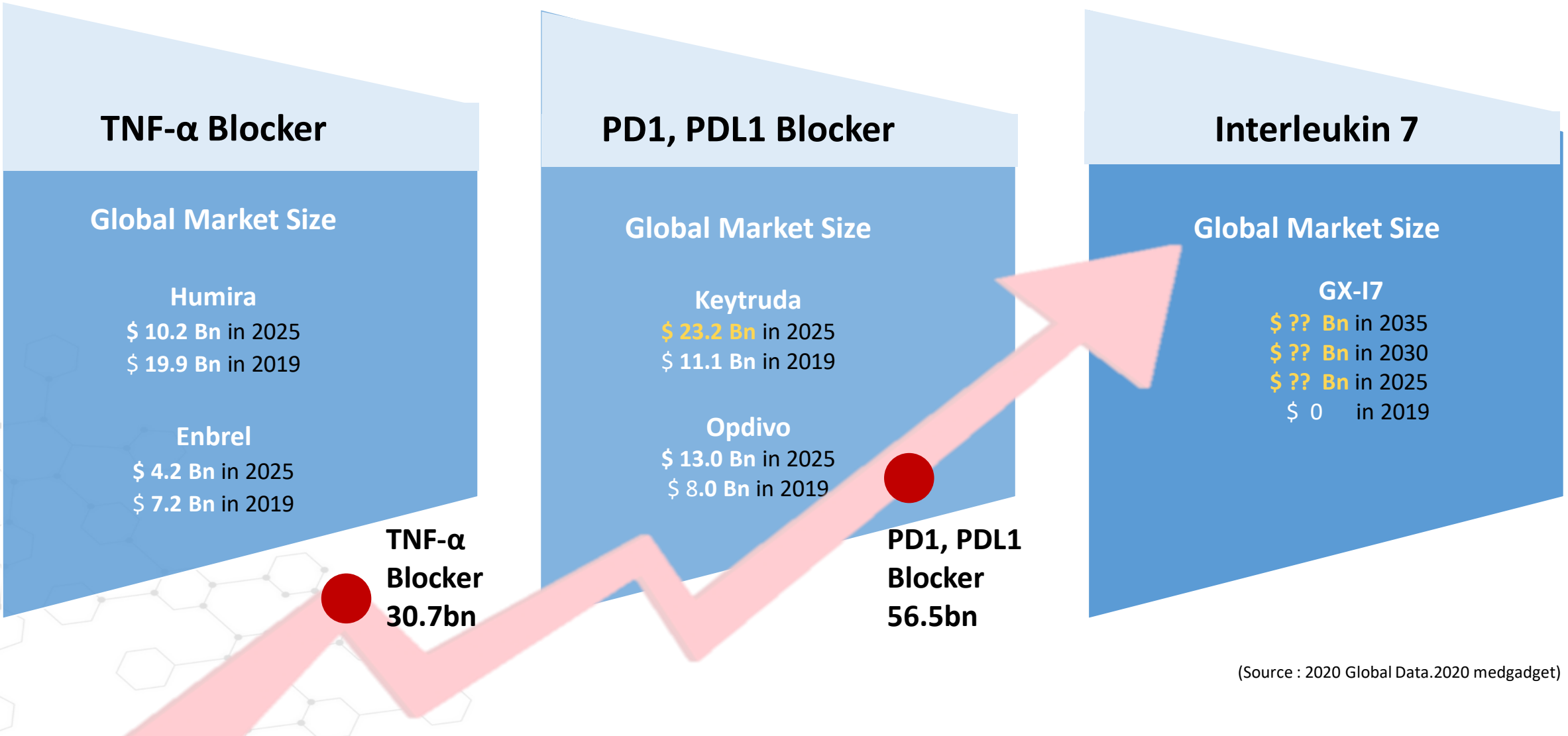
fatality rate by age (%)



(Ref. https://coronaboard.kr/en/ 8 August 2020)

21 What will be after Keytruda?

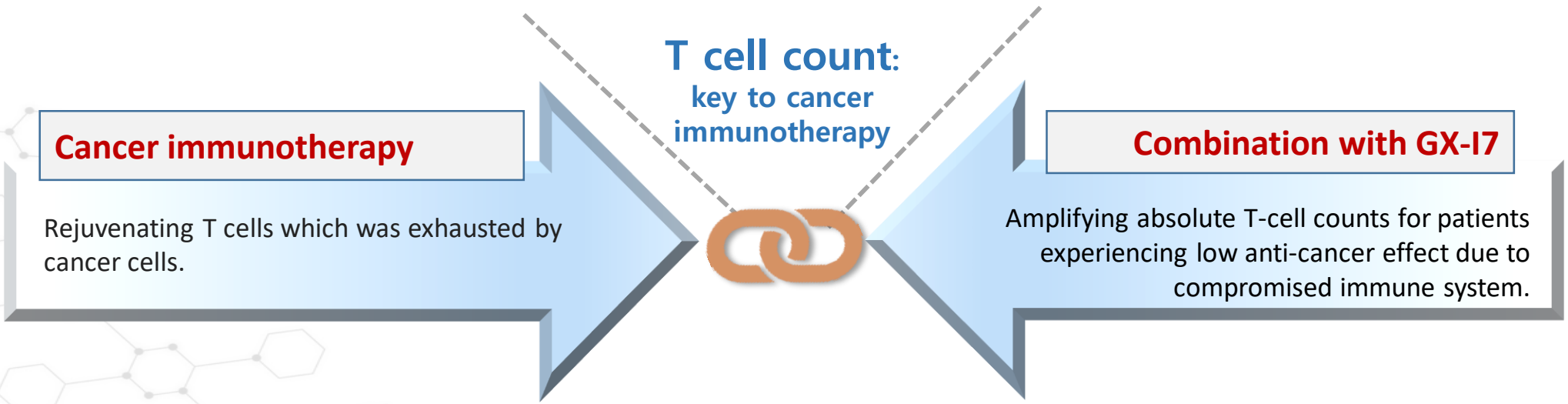
Bio Blockbusters



(Source : 2020 Global Data.2020 medgadget)

22 GX-I7: The only stable and long-acting IL-7 agent

T-cell amplifier	Universal use immuno-oncology therapeutic medicine	Long-acting IL-7 agent
Increases # of T lymphocytes First-in-class drug ever developed for lymphopenia	Combination therapy with radio/chemo, targeted, immunotherapy and cell therapy.	IL-7 + hyFc = Potential blockbuster long-acting protein drugs



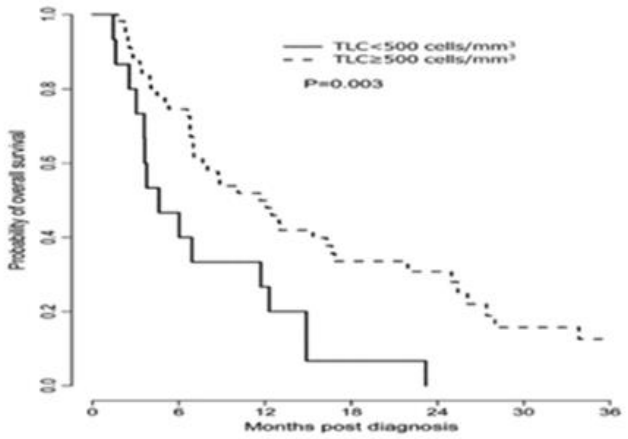
23 The Higher T cell # in Blood, The Better Overall Survival

- **Low anticancer efficacy on low lymphocyte count patient**

→ Increased lymphocyte count will benefit higher anti-cancer effect

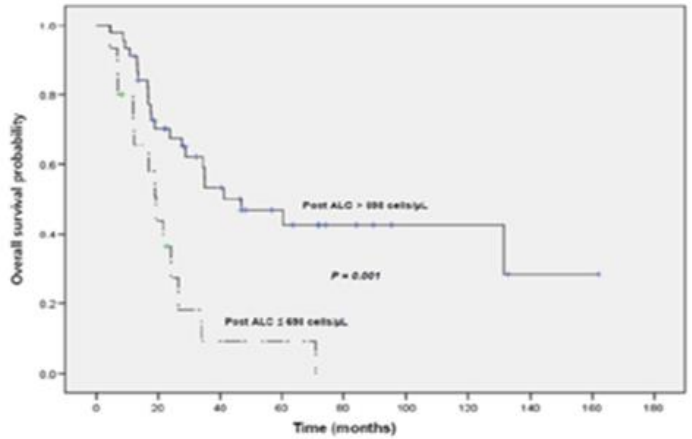
Chemo/Radiotherapy

GBM, New/Elderly	
mOS	4.6m vs 11.6m



Mendez J. et. Al. J Neurooncol. 2016 Apr;127(2):329-335.

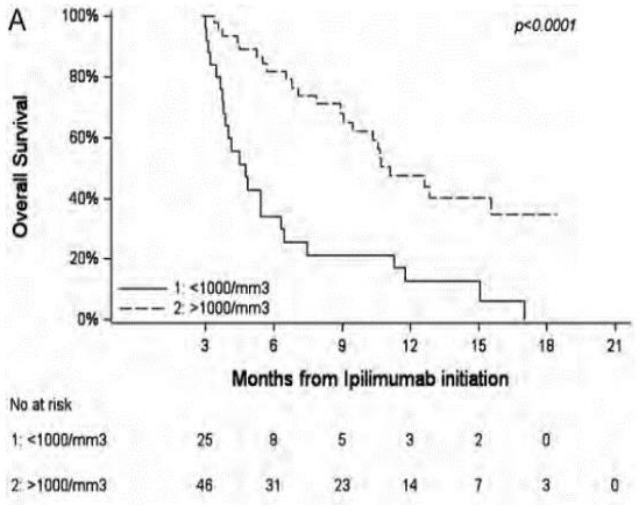
SCLC, Limited	
mOS	12.2m vs 35.3m



Cho O et al., Tumour Biol. 2016 Jan;37(1):971-8

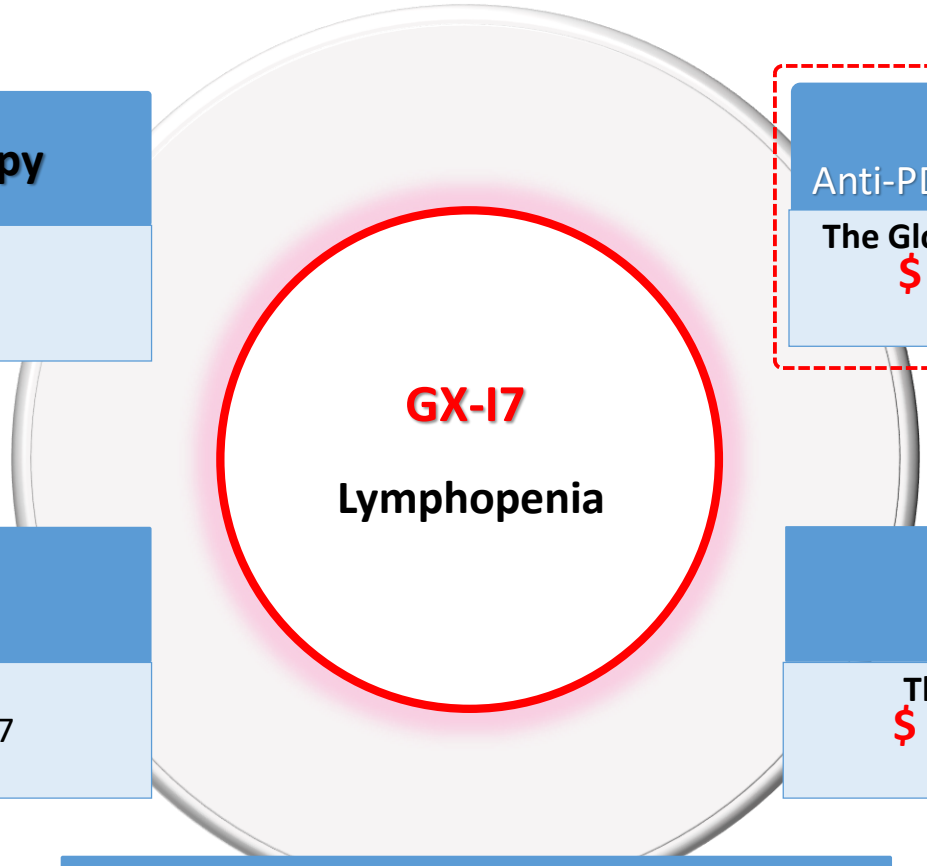
anti-PD-1/PD-L1

Melanoma (ALC < 1000/mm3)
Stage III and IV, receiving 4 courses of ipilimumab q3w



Delyon et al. Annals of Oncology, 2013

24 GX-I7: Unlimited potential with Combination Therapies



Chemotherapy & Radiotherapy

The Global Chemotherapy Market
$ 33 B in 2020

Checkpoint Inhibitor

Anti-PD-1, Anti-PD-L1, Anti-TIM3, Anti-LAG3…

The Global Immune Checkpoint Inhibitors Market
$ 56.5 B in 2025 from $ 10.5 B in 2017
CAGR of 20.1%

Cancer Vaccines

DNA, RNA Peptide, Viral

The Global Cancer Vaccine Market
$ 12 B in 2025 from $ 3.3 B in 2017
CAGR of 17.28%

Cell Therapy

CAR-T / TCR-T

The Global CAR -T cell Therapy Market
$ 8.71 B in 2025 from $ 0.34 B in 2018
CAGR of 58.52%

Infectious Disease Therapy

The Global infectious disease therapy market
$ 59.3 Bn in 2026 from $ 47.6 B in 2020
CAGR of 3.7%

(Source : EvaluatePharma World Preview 2020, Mckinsey&Company, , MarketWatch 2020)

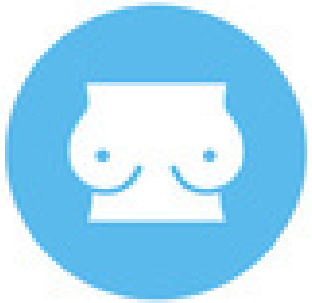
25 GX-I7 (NT-I7/ TJ-107): Clinical Trial & Development Timeline

Field	Type	Treatment	Indication	Preclinical	Phase 1	Phase 2	Phase 3	Conducting company	Partner
Oncology	Co	KEYTRUDA®	TNBC	Phase 1b/2				Genexine	MERCK NEOIMMUNETECH
	Co	Avastin	Recurrent GBM	Preclinical				Genexine	
	Co	Temozolomide	GBM	Phase 2				I-MAB	
	Mono		Solid Tumor	Phase 2a				I-MAB	
	Mono	-	GBM	Phase 1/2				NeoImmuneTech	JOHNS HOPKINS UNIVERSITY
	Co	Temozolomide	GBM	Phase 1/2				NeoImmuneTech	Washington University in St. Louis School of Medicine
	Co	Tecentriq®	High risk skin cancer	Phase 1b/2a				NeoImmuneTech	Roche cancer immunotherapy trials network
	Co	KEYTRUDA®	TNBC, Lung, Pancreatic, Colorectal cancer	Phase 1b/2a				NeoImmuneTech	MERCK
	Co	Opdivo®	Gastric, GEJ, and Esophageal Adenocarcinomas	Phase 2				NeoImmuneTech	Bristol Myers Squibb™
	Co	Kymriah®	Diffuse large B-cell lymphoma	Phase 1b				NeoImmuneTech	
Infectious Disease	Mono	-	Idiopathic $CD4^+$ T Lymphopenia	Under IND submission				NeoImmuneTech	
	Co	Vaccine	Preventative vaccine (Elderly cancer survivors)	Phase 1/1b				NeoImmuneTech	NIH NATIONAL CANCER INSTITUTE
	Mono	Standard treatment	COVID-19 infected patients	Phase 1b				Genexine	
	Mono	Standard treatment	COVID-19 infected patients	Phase 1				NeoImmuneTech	NIH NATIONAL CANCER INSTITUTE

Business Strategy

26 Commercialization Plan

Expected: 7 products' BLA submission within 5 years

2021/22	2022/23			2023/23		2024/25
GX-19 (conditional approval)	**GX-I7** (NT-I7) +Keytruda® (conditional approval)	**GX-188E** +Keytruda® (conditional approval)	**GX-I7** (conditional approval)	**GX-E4**	**GX-H9**	**GX-I7**(NT-I7,TJ107) +Temozolimide
						
Covid 19 DNA Vaccine	TNBC	Cervical cancer	Covid 19	CKD-induced Anemia	Growth Hormone Deficiency	GBM
Current clinical phase						
Phase I/IIa (Korea)	**Phase Ib/II (Korea)**	**Phase II (Korea)**	**Phase Ib (Korea)**	**Phase III (SE Asia)**	**Phase III (China)**	**Phase II (China)**

27 Global Partnership

Joint Venture

Equity Investment

Clinical Research Collaboration

28 Investment Highlights

Corporate IPO Strategy & Status

Company Name	Listing Date (Predicted)	IPO Market (Country)	Share	Market cap.
I-MAB Biopharma (CN)	**Listed (2020. 01)**	Nasdaq (US)	7.4%	$ 2.68 B
Rezolute (US)	**2020.11**	Nasdaq (US)	31.1%	
NeoImmuneTech (US)	**2021**	Kosdaq (KR)	25.4%	
CoImmune (US)	2023	Nasdaq (US)	33.0%	
KG BIO (Indonesia)	2024	Hong Kong (CN)	40.0%	

29 Investment Highlights: “It’s just beginning…”

Genexine, from K-Bio representative company to Global biotech leader

- Successful L/O records and progress with First-in-Class pipelines based on innovative platform technologies to global partners.
- Global Open Innovation R&D strategies and Win-Win developments for expansion of pipelines.

The innovative immunotherapy anticancer GX-I7 with explosive potential

- Clinical co-development with the three biggest immune checkpoint blockade companies (MSD, Roche, BMS).
- Continuous expansion of indications: mTNBC, High risk skin cancer, GBM etc,

The world’s first commercial DNA vaccine

- Aim for commercialization of the first DNA vaccine for human in the world.
- Development of COVID-19 vaccine as the first from Korea, and the best from the world.

THANK YOU

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