BIOTECH neoregen

NICT Delivery Platform Technology

NeoRegen Biotech Co

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   - Location

NeoRegen Biotech conducts pharmaceutical and cosmetic research and development based on advanced patented NICT _ Neoregen's Intra-Cellular delivery Technology.

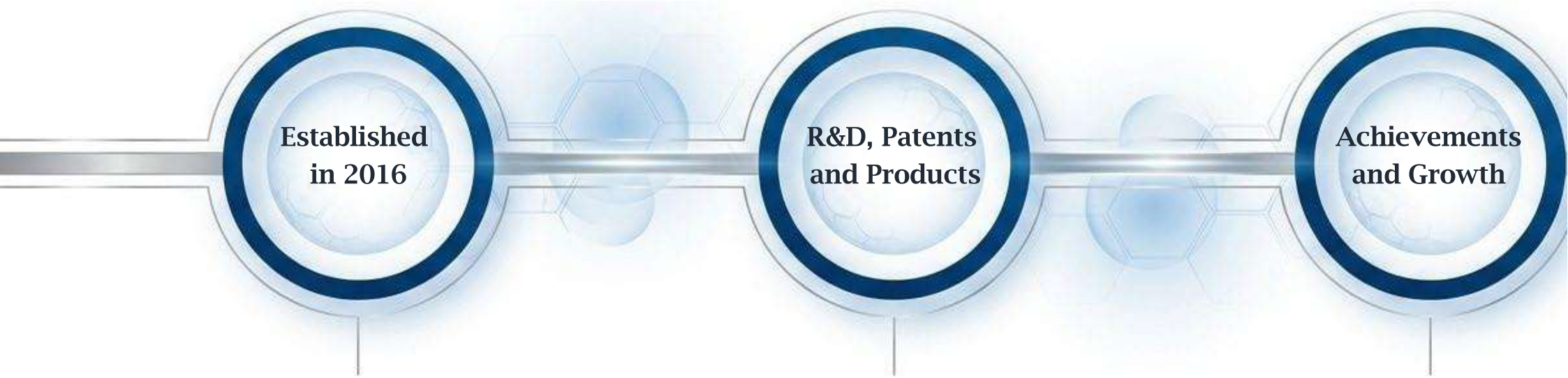


Company Name	NeoRegen Biotech Co., Ltd.
CEO	Jeong-Min Seo
Establishment Date	Feb. 2016
Field of Business	Research and Development - Cell penetrating delivery technology - Pharmaceuticals (advanced LNP etc.) - Cosmeceuticals - Microbiome Sales and Manufactures - Functional skincare products - Microbiome related products
Website	https://www.neoregenbiotech.com
Email address	jminseo@neoregenbio.com
Location	Headquater: #601, 176, Galmachi-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea Seoul Office: 4th Fl., 4, Bangbae-ro 20-gil, Seocho-gu, Seoul, Korea Factory: 6 FL, 176, Galmachi-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea Research Center: Rm 509, Building No. 86, 1 Gwanak-ro, Gwanak-gu, Seoul, Korea

Our advanced cell-penetrating technology safely delivers bioactive compounds deep into cells and skin barrier.
We specialize in R&D for next-generation pharmaceuticals and functional cosmetics.

BIOTEC neoregen





2016 ~ 2017
- Establishment of a corporate research institute
- PCT international patent for cell and skin penetration materials
- Registration of core patents for cell and skin penetration materials

2018 ~ 2020
- Launch of Generex cosmetics
- Global patent for penetration technology
- Patent for two functional probiotic strains
- Patent in multiple countries for next-generation cell and skin penetration material technology based on NICT.

2021 ~
- Domestic and international pa registrations for compositions from L14 probiotic strains
- Development of next-generati incorporating NICT penetratin surpassing conventional LNP

Dr. Jeong-Min Seo, the CEO, is a research professor at Seoul National University College of Dentistry and has ove years of expertise in Microbiome and Drug Delivery System, particularly in the field of cell penetration technolog



CEO & Founder : Dr. Jeong-Min Seo

Academic Career

- Bachelor's, Master's, and Ph.D. in Food Engineering from Seoul National University
- Postdoctoral Researcher at Seoul National University's Food Microbiology Research Lab, focusing on vaccine adjuvants and microbiome research
- Research Fellow at the University of Nebraska-Lincoln, conducting research on atheroscler and vaccines
- Research Professor at the Catholic University of Korea School of Medicine, working on viru vaccines and followed by studying stem cell regeneration as a Research Fellow
- Currently, Research Professor at Seoul National University College of Dentistry, conducting research in peptide, periodontal stem cells, and cell development regeneration

Career

- (Current) CEO of NeoRegen Biotech
- Adjunct Professor at Seoul National University, teaching courses in Microbiology and Enzym
- Senior Researcher at Bifido Co., Ltd.



Technic
Highligh

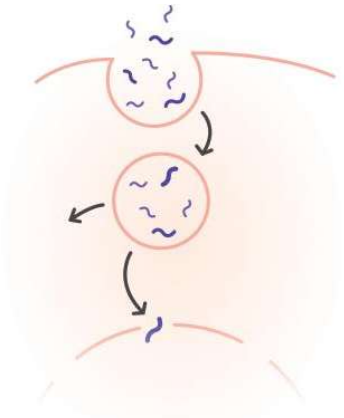
NICT Delivery Platform Technology & advanced LNP

NICT (**N**eoRegen's **I**ntra-**C**ellular **T**herapeutics) Delivery Platform Technology

NICT delivery platform exhibits the best endosomal escape efficiency compared to Entrada's penetrating peptide.

Comparison of penetration efficiency and endosome escape.

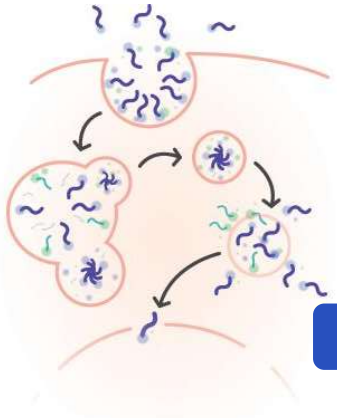
Normal PP



1~2%

- Low Cell Penetration
- Low Endosome Escape Efficiency

Entrada's PP

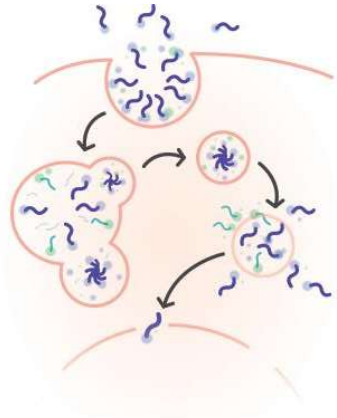


~50%

- High Cell Penetration
- Better Endosome Escape

VS

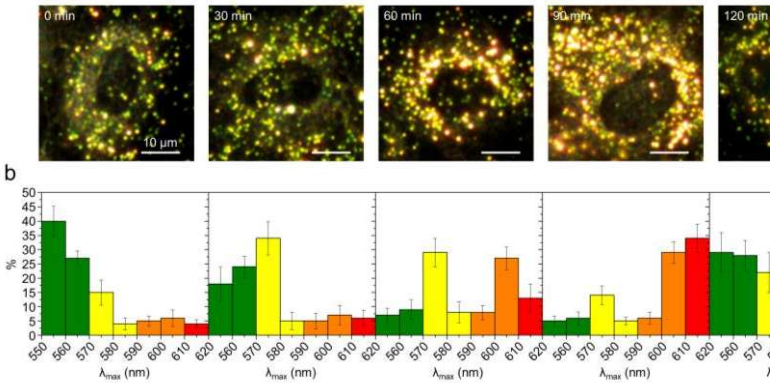
NICT (Neoregen PP)



~80%

- High Cell Penetration
- Excellent Endosome Escape

Endosome Escape Efficiency
(Gold Nano Particle)

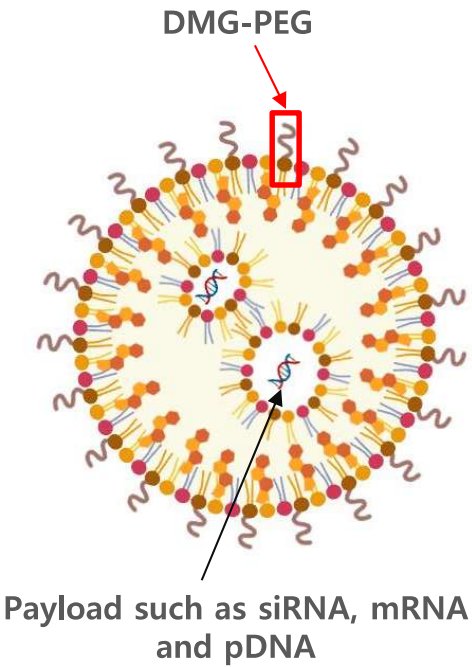


- 60min (Late Endosome)
- 90~120min (Endosome Escape)
- Excellent Endosome Escape

Development of ad-LNP to reduce side effects and enhance cell delivery efficiency, including PEG-substituted variants

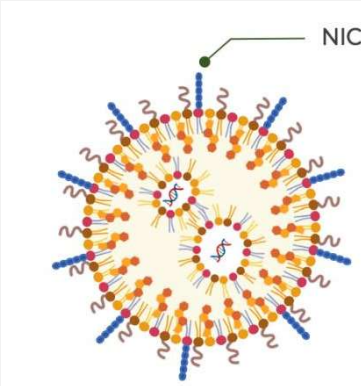
Payload-containing LNPs face several hurdles: after injection, they must reach the target or
specific cells, and function effectively within those cells through high endosome escape effi

LNP for Covid-19

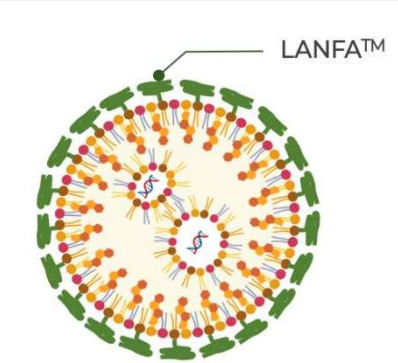


Current LNP Limitations (Unmet Needs)	Strategic Benefits
Strong **Liver Tropism** (difficulty reaching other organs)	Enables precise delivery to **Lung, Spleen, or Tur**
Low **Endosomal Escape** rate (typically <10%)	High therapeutic **potency** even at lower dosages
Difficulty in packaging large cargo like **pDNA**	Accommodates full-spectrum cargo from **siRNA**
Immunogenicity & ABC phenomenon caused by **PEG**	Ensures safety for **multi-dosing** and reduces sid

NR-LNP library



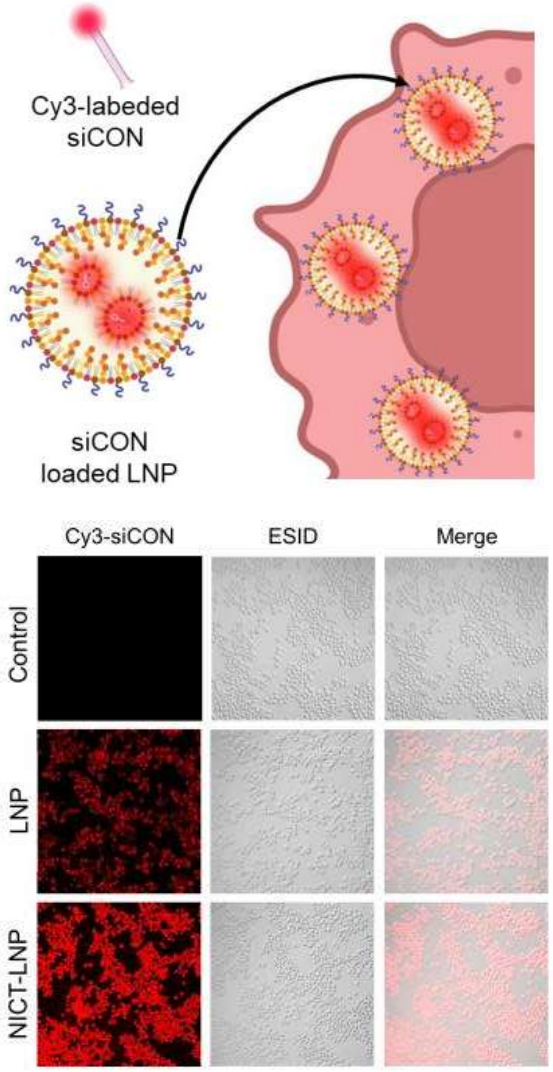
NR-LNP-012
NR-LNP-014
NR-LNP-022
NR-LNP-028
⋮



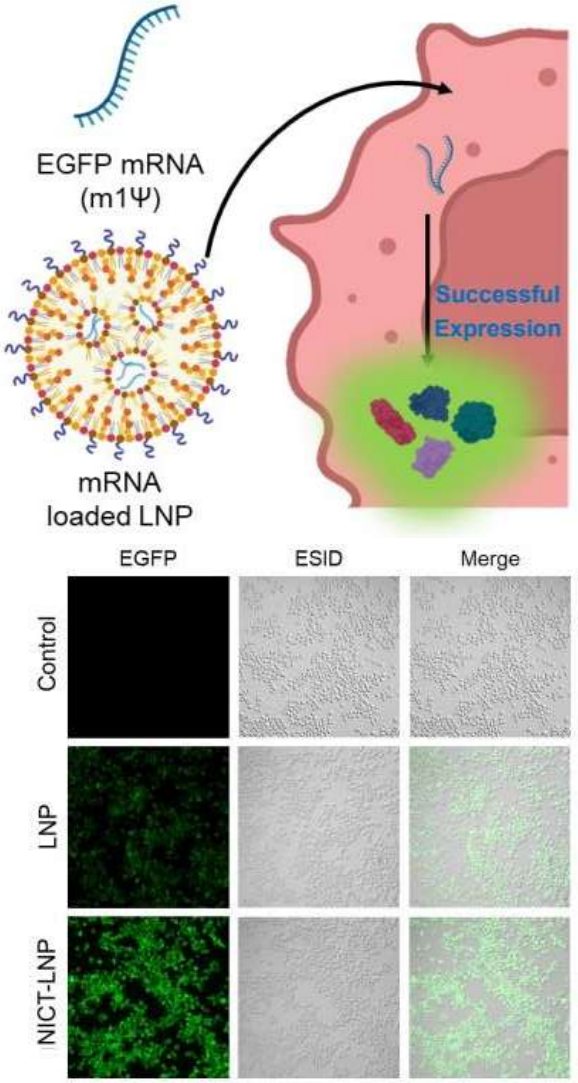
NR-LNP-
NR-LNP-
NR-LNP-
NR-LNP-
⋮

Various NICT-LNPs overcome Intra-Cellular barriers and enhance gene expression for diverse nucleic acids

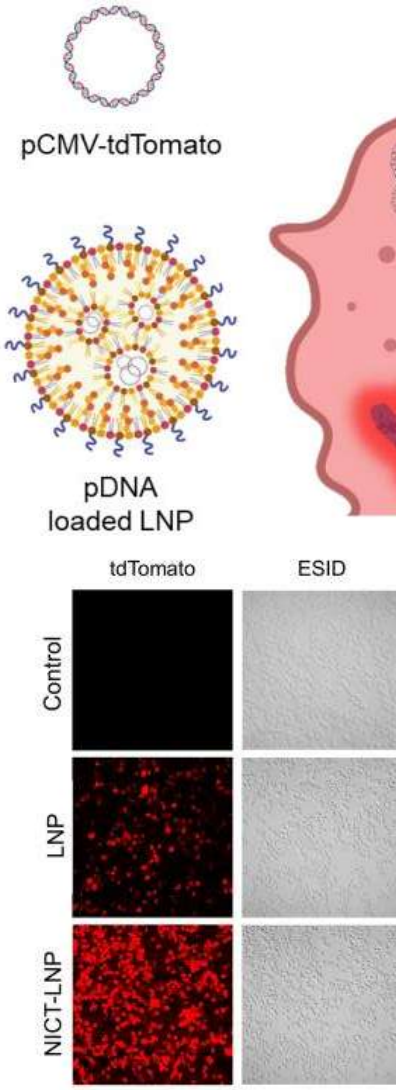
1. siRNA



2. mRNA



3. DNA

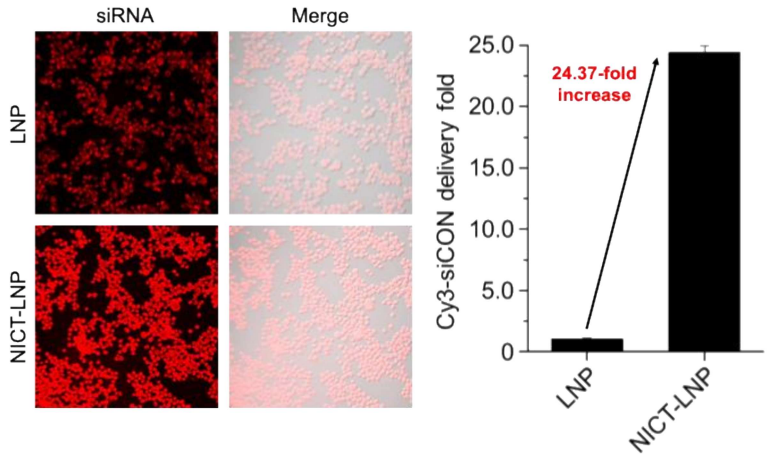


For Covid-19 vaccine

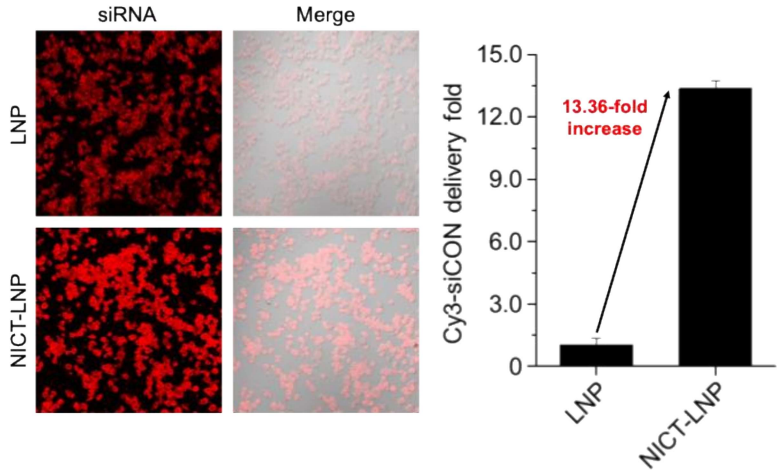
NICT-LNP enhances the delivery/expression of diverse nucleic acid payloads & induces high levels of expression across vari

siRNA

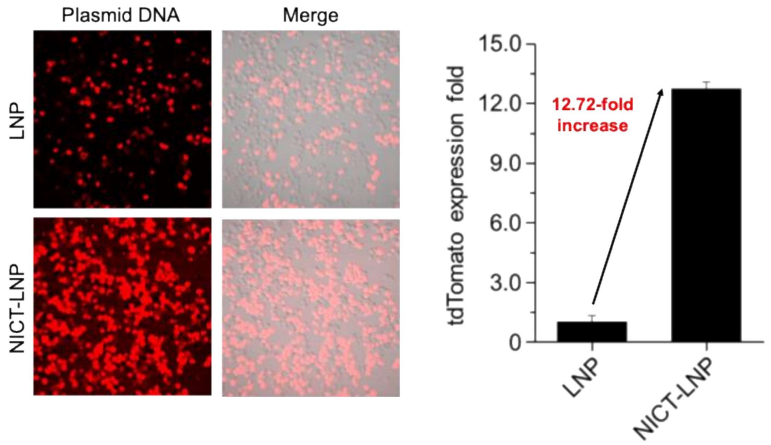
HeLa

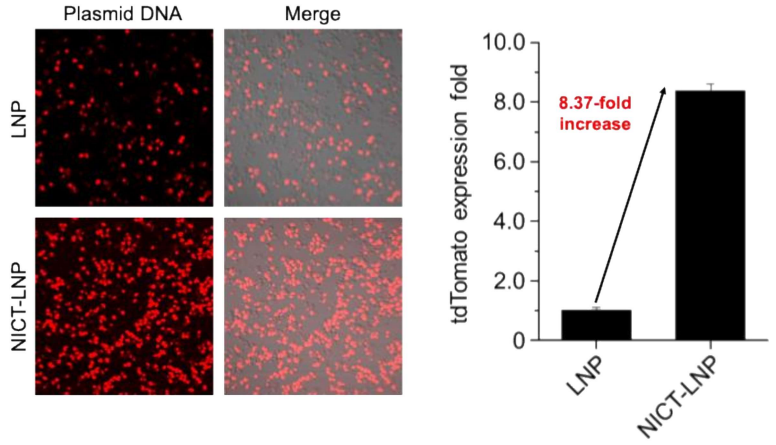


Dendritic cell

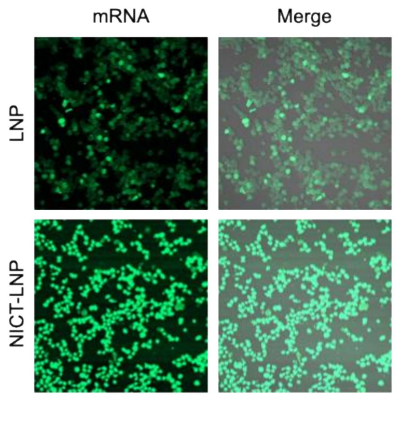


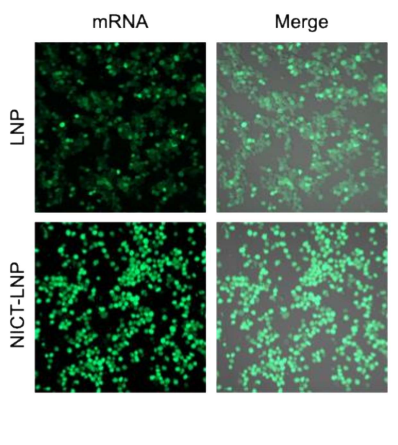
pDNA





mRI

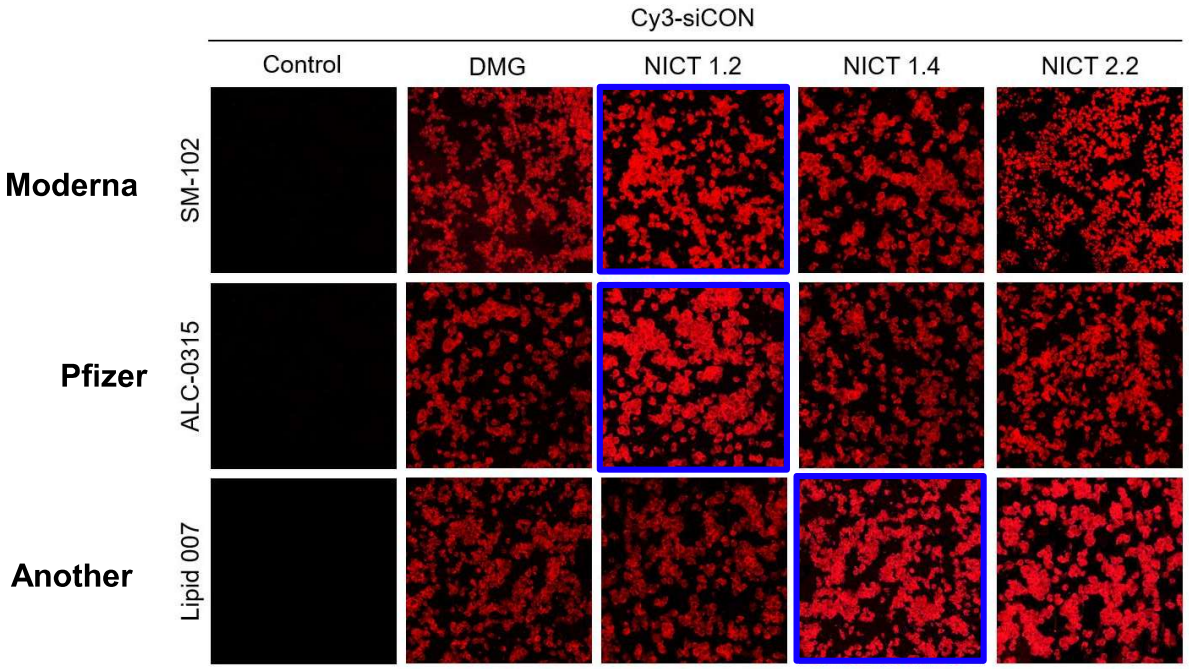




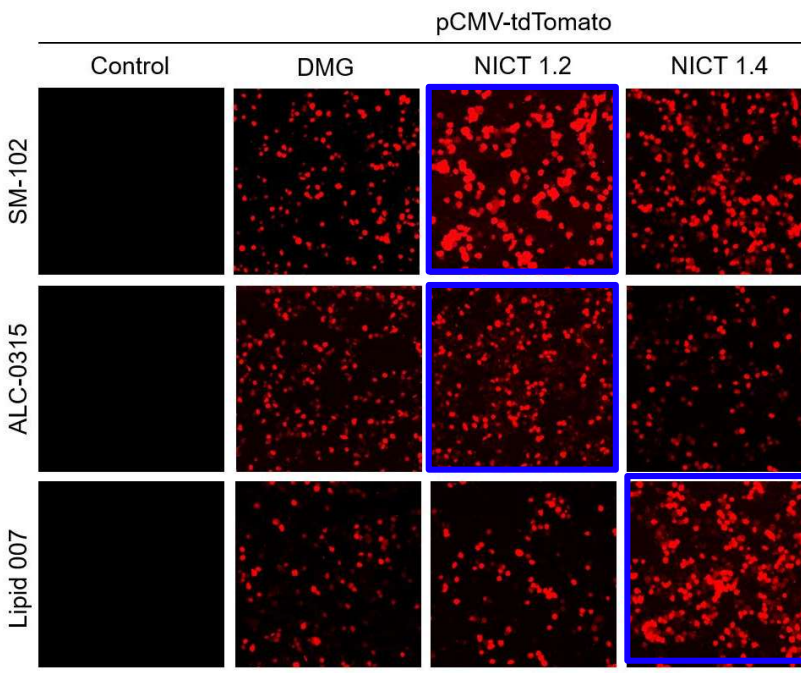
The NICT platform can be optimized for various ionizable lipids: Rapid screening & formulation optimization is possib

- Cell line : DC2.4 (6 well, 2x10^5 cells/well)
- Conc. : 0.5 ng/uL
- Treatment time : 24 h
- Ionized lipid : SM-102, ALC-0315, Lipid 007

▪ Cy3-siCON _ Cell Penetration (Internalization)



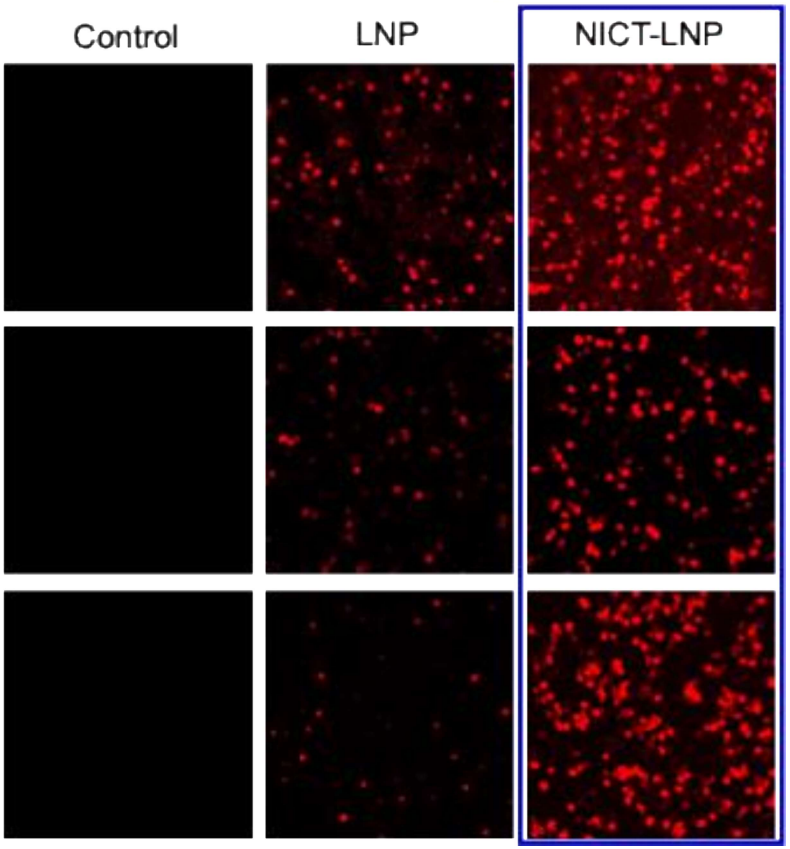
▪ tdTomato pDNA _ Endosome escape (Exp



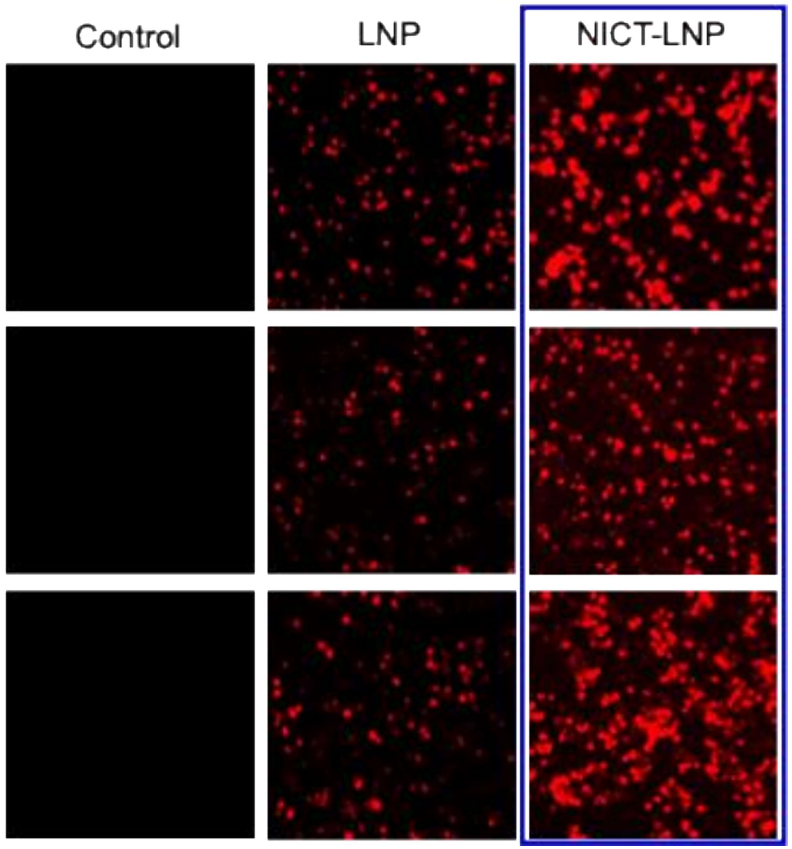
Optimized NICT-LNPs present excellent endosomal escape performance in cancer cells & immune cells, inducing high levels of pay

Ionizable lipid : SM-102 (Moderna) / ALC-0315 (Pfizer) / Lipid 007 (China) ; Cancer cells & Immune cells

Cell line : HeLa [24h]



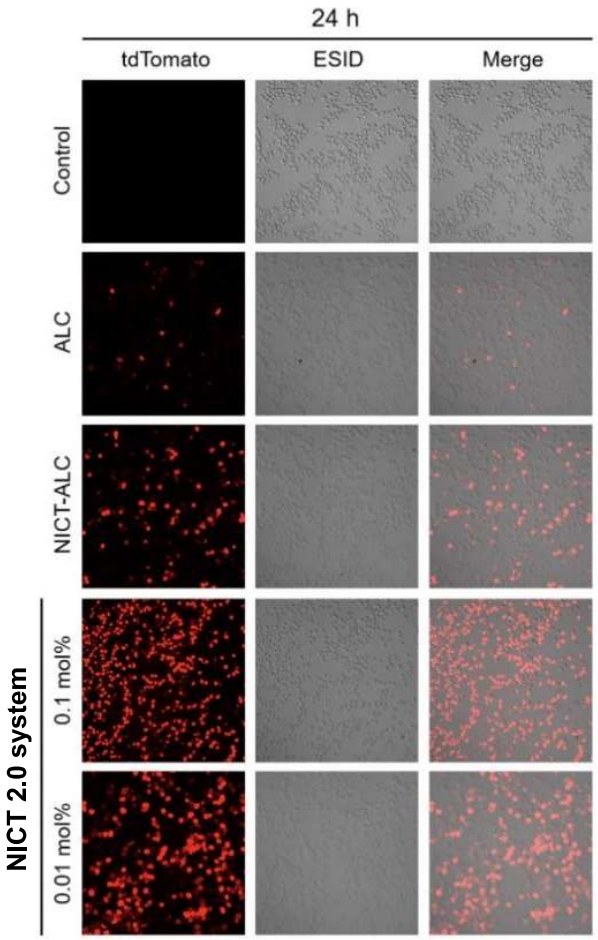
Cell line : DC2.4 (Dendritic cell) [24h]

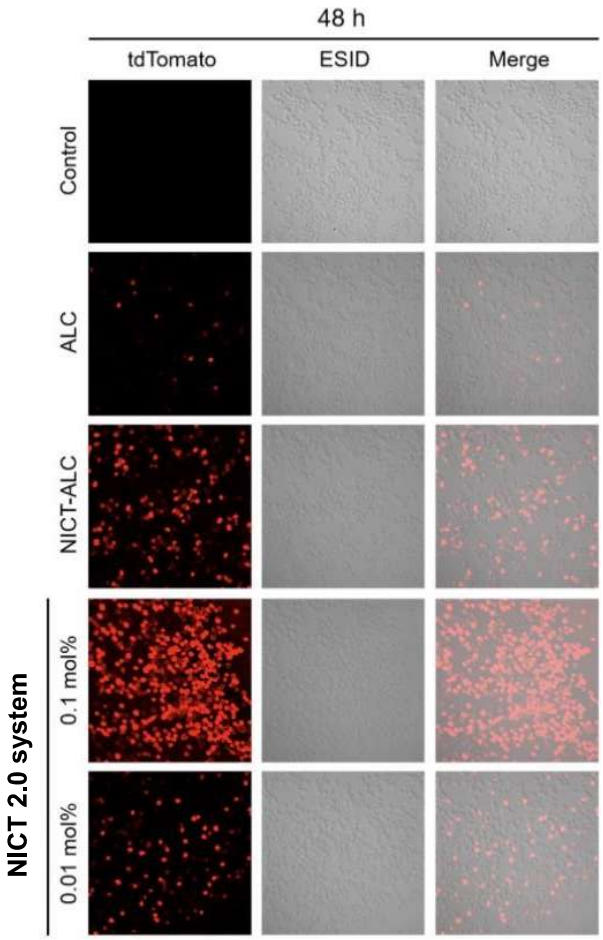


NICT-LNP 2.0 demonstrates higher expression levels than NICT-LNP 1.0, even at lower NICT concentrations.

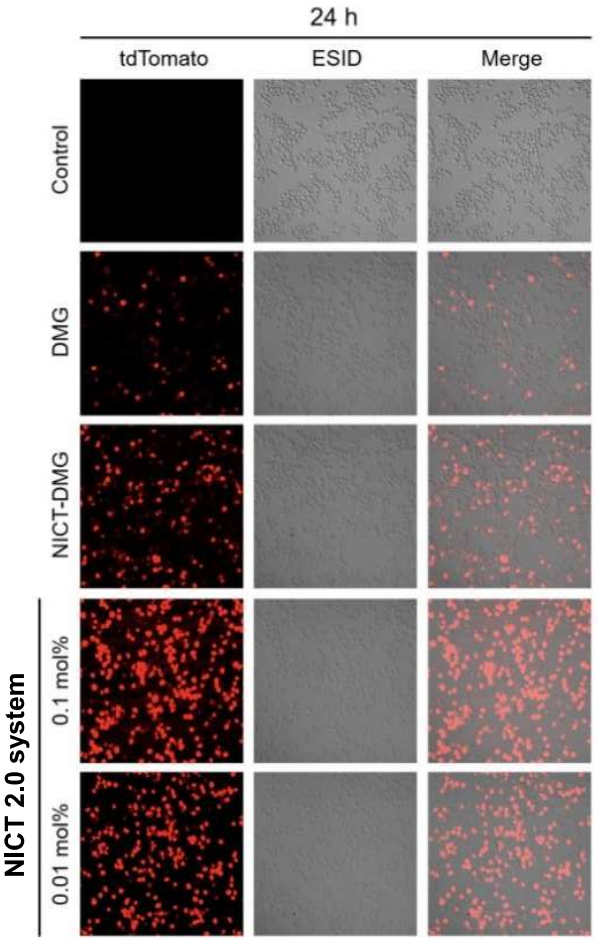
- **Cell line : HeLa cell**
- **Cargo :** pDNA (tdTomato)

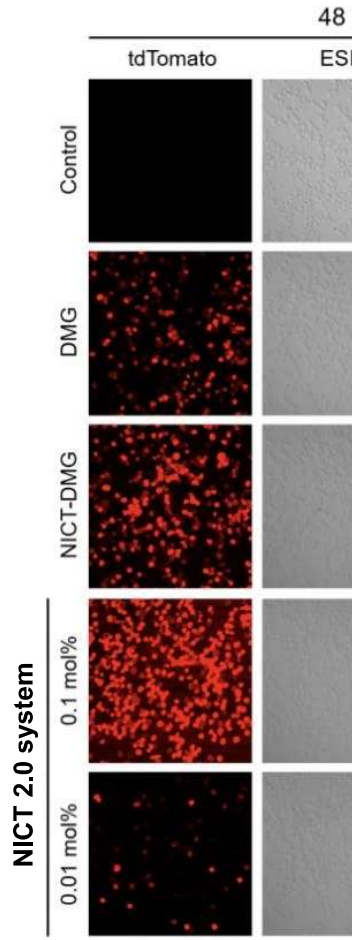
Ionized lipid : ALC-0315 (Pfizer)





Ionized lipid : SM-102 (Moderna





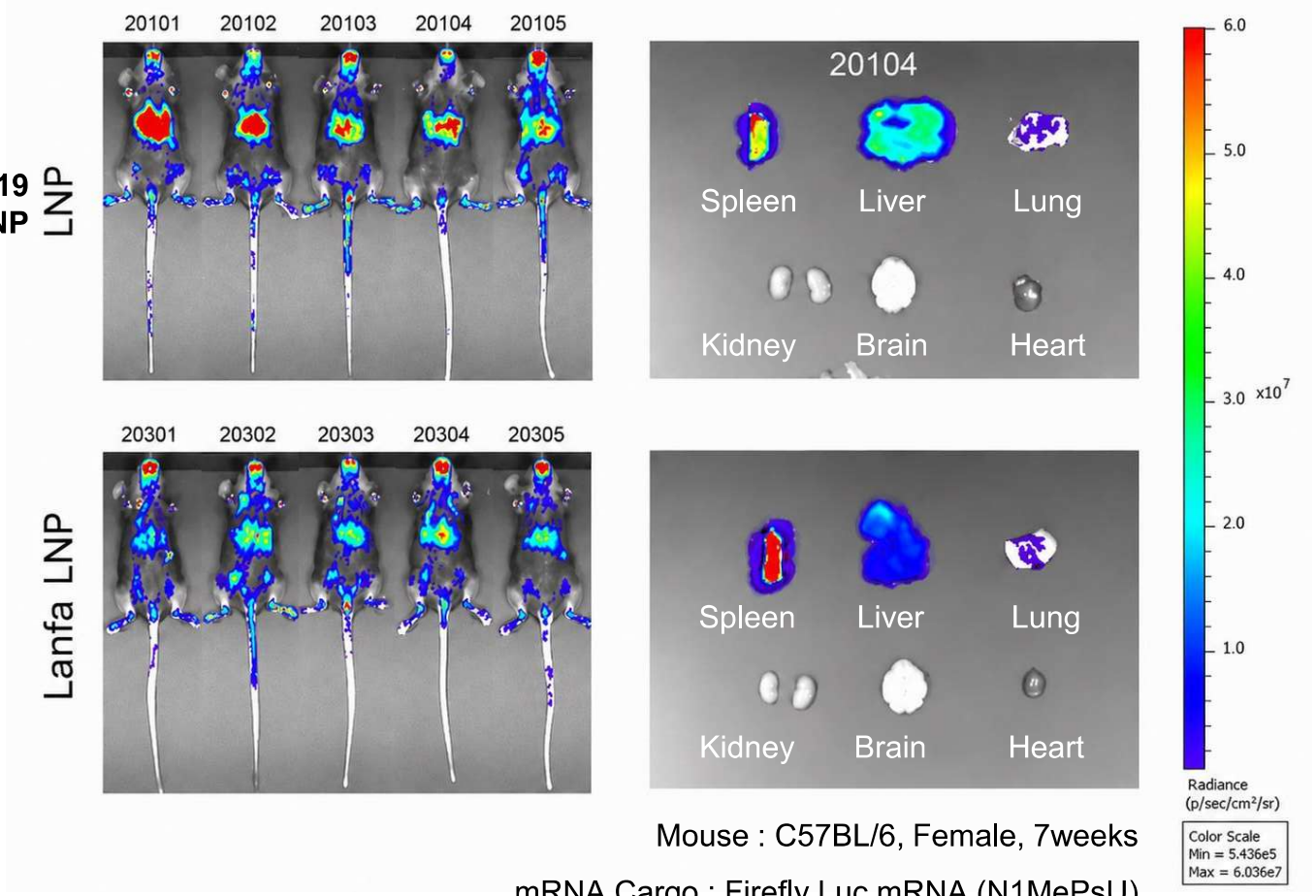


PEG-alternatives; LANFA-LNP

LANFA (**L**antern **F**amily) Lipid Nano Particle

LANFA-LNP(NR-LNP032) has the advantage of targeting the liver less and the spleen more compared to Covid-19 LNP

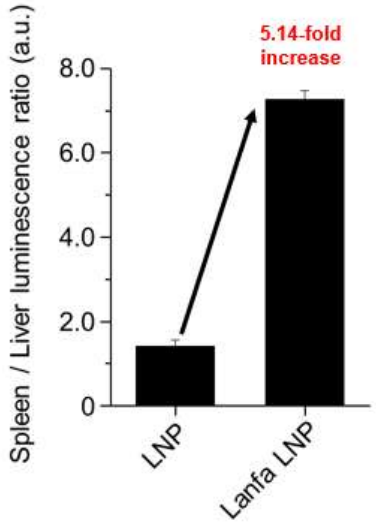
Lower hepatotoxicity and improved immune stimulation through reduced liver accumulation & enhanced splenic delivery compared to COVID-19 LNP.



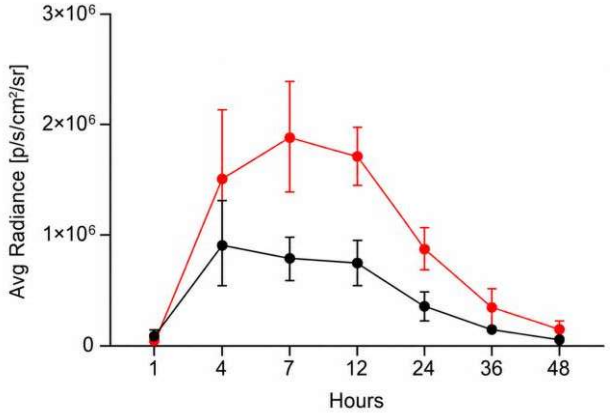
Mouse : C57BL/6, Female, 7weeks

mRNA Cargo : Firefly Luc mRNA (N1MePsU)

Higher spleen-targeting efficiency than Covid



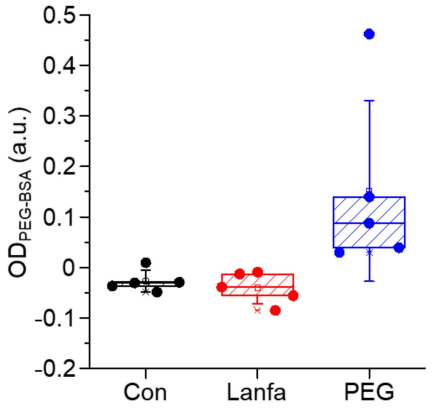
Temporal comparison of FLuc protein expres



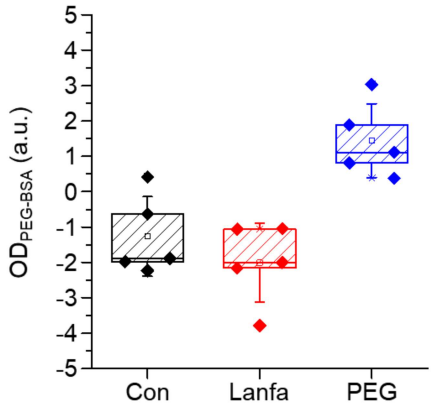
LANFA-LNP(NR-LNP032) can overcome PEG limitations (safer & more stable repeat administration by replacing PEG)

Unlike PEG, LANFA does not induce its antibody formation in the blood: enabling repeated a

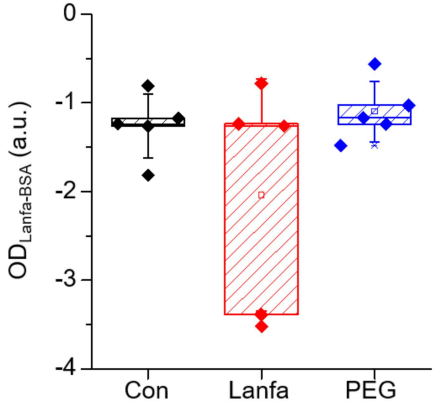
PEG-injected blood
(PEG-antibody)
[100x dilution]



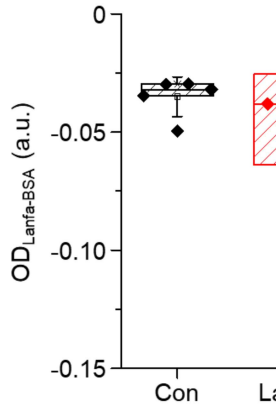
PEG-injected blood
(PEG-antibody)
[10x dilution]



Lanfa-injected blood
(Lanfa-antibody)
[100x dilution]



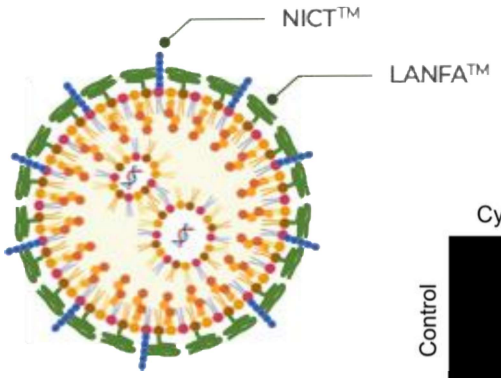
Lanfa-injecte
(Lanfa-ant
[10x dilu



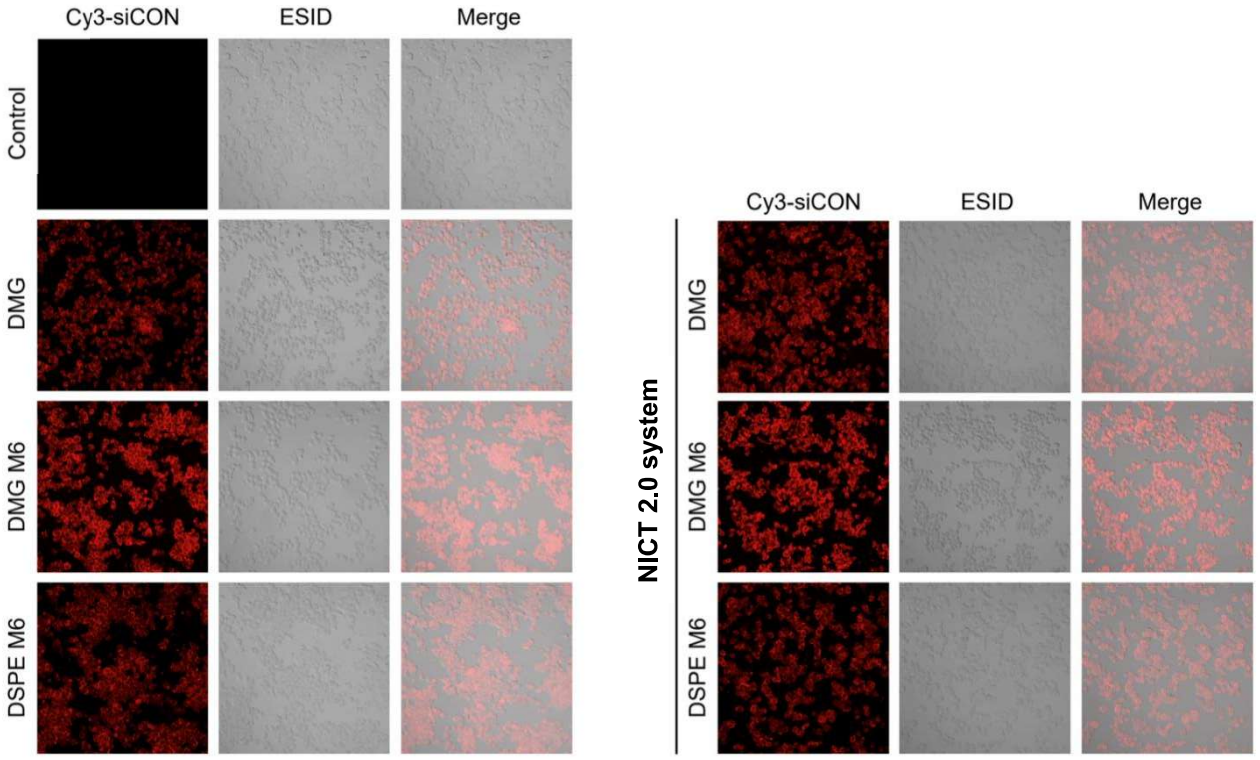
PEG is widely used in LNP vaccines to provide a stealth effect and enhance formulation stability; however, it challenges for repeat administration due to the potential for systemic inflammatory responses and anti-PEG formation. Our proprietary LANFA material can address these limitations and contribute to the developmen based vaccines suitable for safer and more stable repeat administration by replacing PEG.

NR-LNP038 (NICT & PEG alternative) can overcome PEG limitations and enhance the expression of target protein.

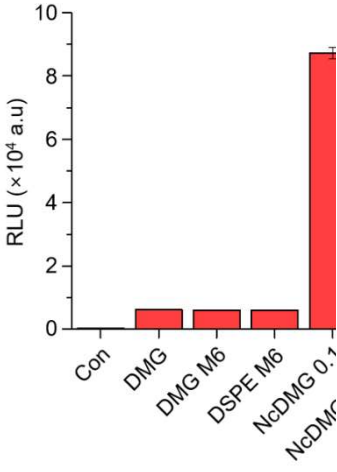
- Cell line : DC2.4
- Treatment time : 24 h
- Conc. : 0.5 ng/uL



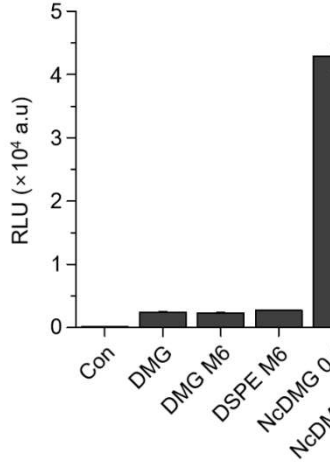
- **Cy3-siRNA**



- **Firefly Luciferas**



- **Firefly Lucifera**



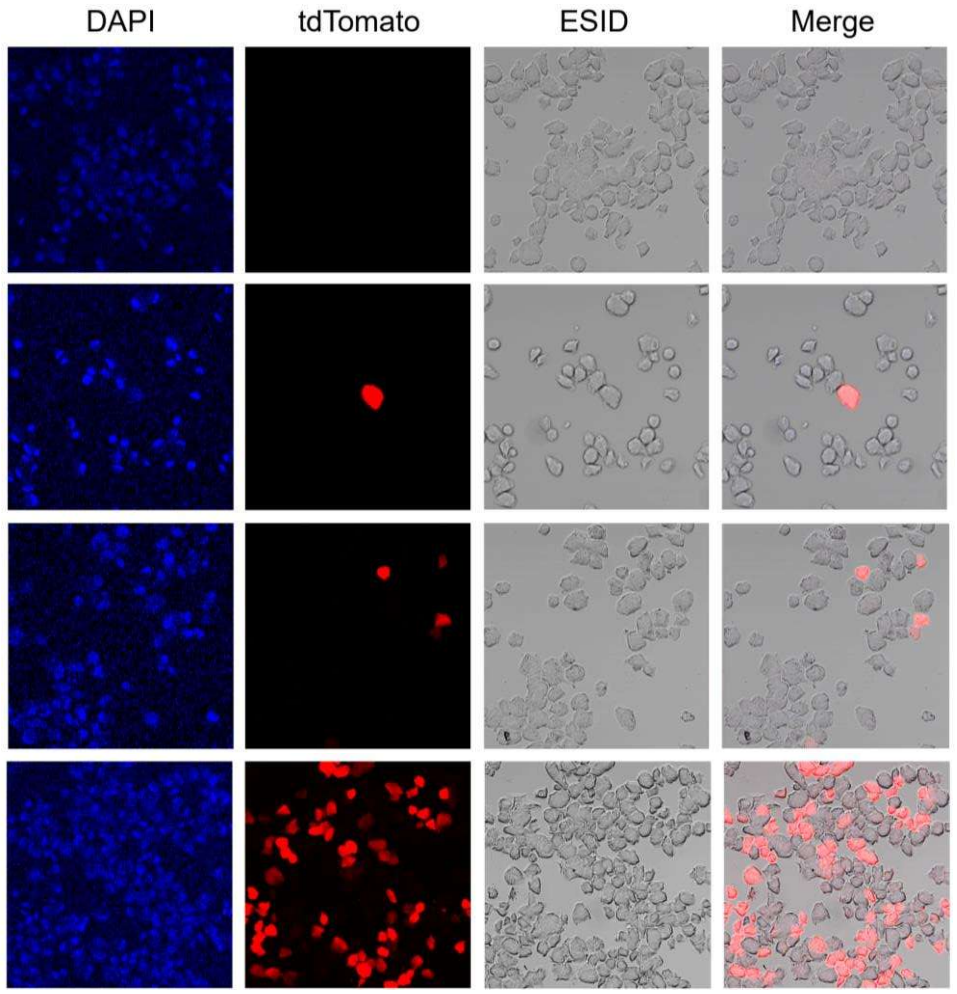


Efficient iPSC Production Strategy

NICT (**N**eoRegen's **I**ntra-**C**ellular **T**herapeutics) Delivery Platform Technology

Advanced Gene Transfer Platform enabling efficient production of iPSC (induced Pluripotent Stem Cell)

Verification using Urine primary cell (UDEC) used as a source for producing patient-derived iPS cells



Due to the high efficiency of plasmid DNA delivery into widely used urine-derived primary cells for iPSC production, the generation efficiency of iPSCs over extended periods could be dramatically enhanced.

Expression in 50% of cells enables Innovative iPSC Induction.

It is nearly impossible to commercialize patient-deri iPS cells using Lipofectami Electroporation due to hig cytotoxicity and limited pl DNA delivery efficiency.

The plasmid DNA encodes fluorescent protein; thus, r fluorescence within the cel serves as a direct indicator successful endosome escap and functional expression i cytoplasm.

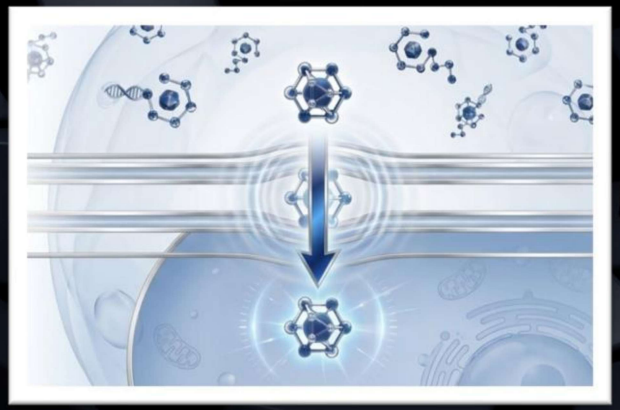


Toral Health Care Business Area

Therapeutics & Cosmeceuticals & Health Supplements

Development of Innovative Pharmaceutical Materials

Research and development of next-generation pharmaceutical materials targeting autoimmune and oncological diseases based on patented cell penetrating technology, as well as functional probiotic-derived materials.



Development and Manufacturing of Functional Cosmetics

Development and manufacturing of high-performance functional cosmetics based on pharmaceutical-grade materials by utilizing advanced technologies, including skin-penetration technology and multifunctional probiotic-derived extracts.



Development and Manu of Functional Fo

Development and manufac functional foods based on probiotics and functional e incorporating customized h solutions and specialized fo ingredients.



Therapeutics
- NICT delivery platform
- Advanced LNP

Cosmetics
NICT platform-based penetrating Growth Factors Microbiome based materials

Natural Drug or Health Supple.
- Microbiome
- 5th Meta-biotics
- Osteoporosis suppl.

GOAL

Entering a stage of full

~'22
- $1.1 million revenue
- Company valued at $13 million
- NICT delivery platform Completed through advancement

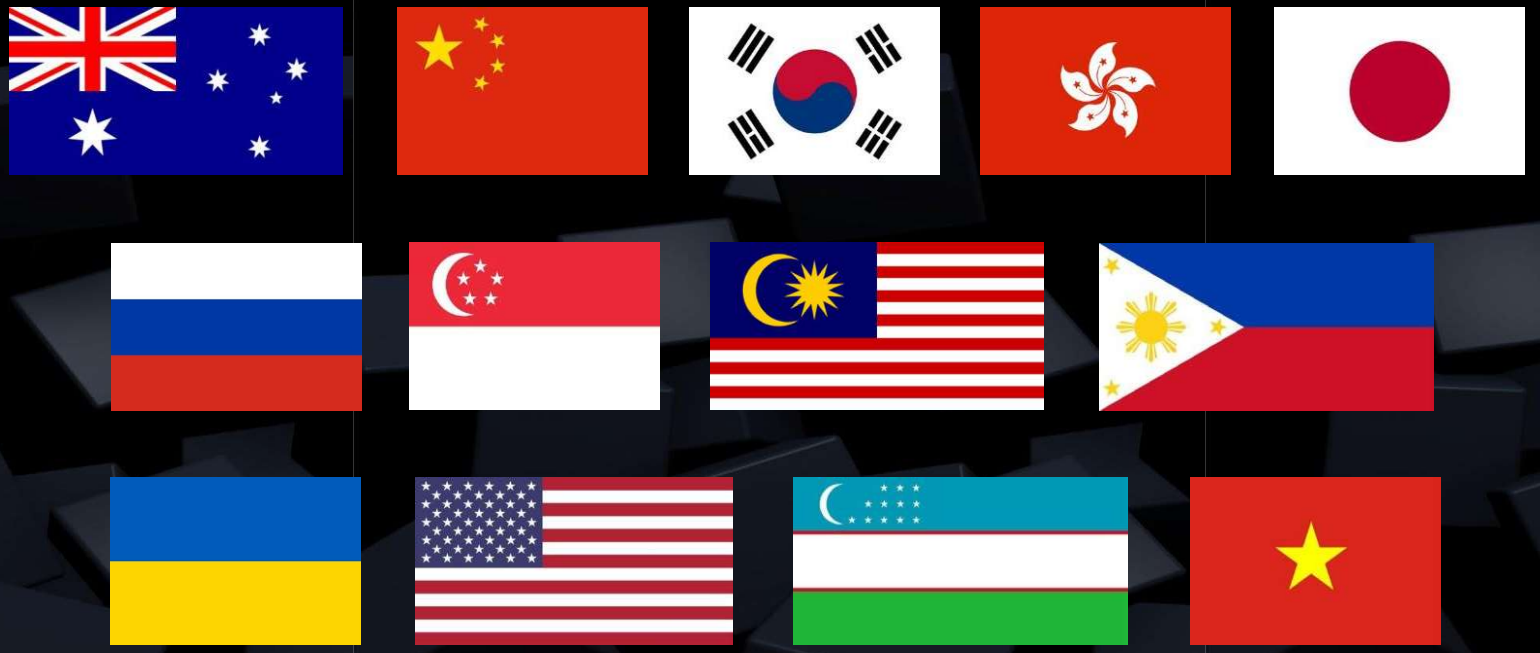
~'24
- $1.6 million revenue
- Establishment of cash cow business model
- NICT-LNP platform development

~'26
- Company valued at $21 million
- Completion of animal studies via advanced NR-LNP
- Cosmetic GMP facilities set up to produce skin boosters
- $2.1 million revenue in 2025
- LANFA(PEG-free)-LNP platform development

- Goal valu
- Prep IPO
- $20

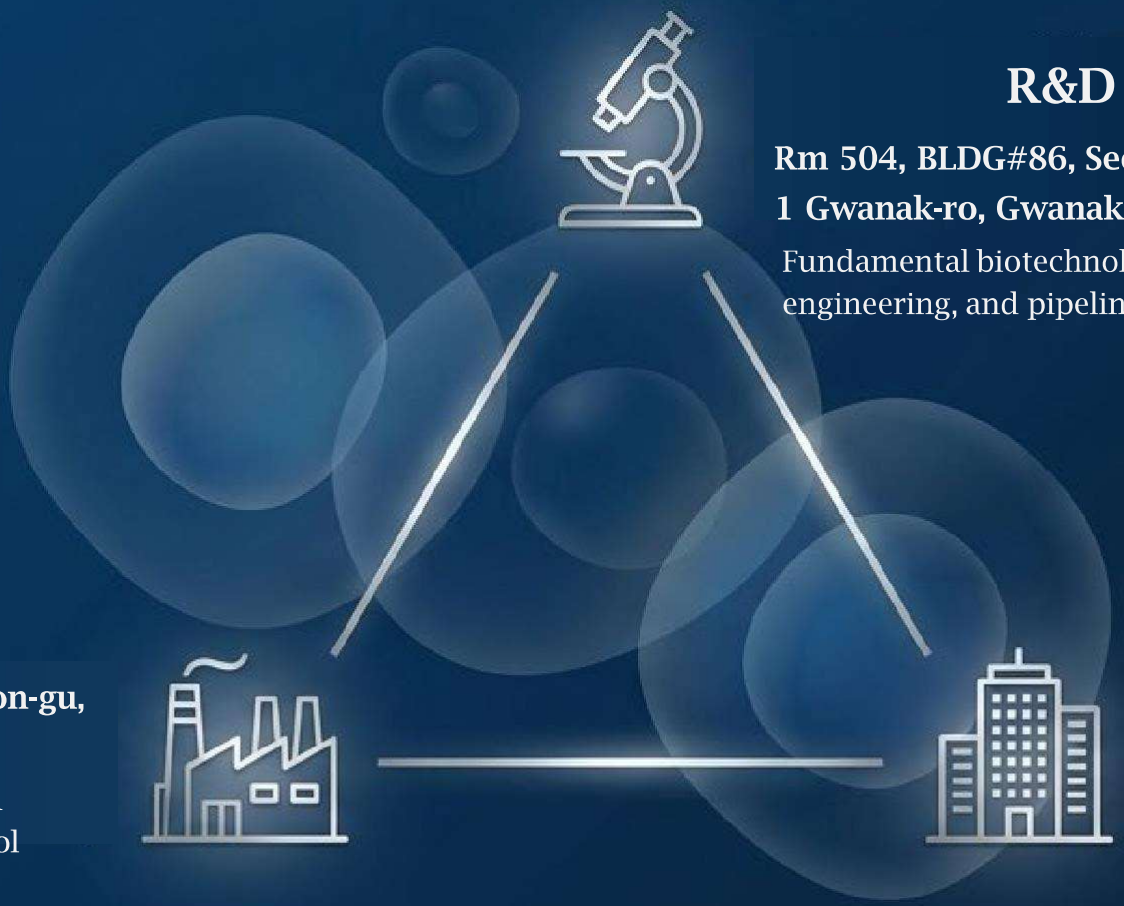
Establishing stable revenue & L/O strategy for vaccine/therapeutics, preparing for IPO

NeoRegen Biotech is currently working with partners globally or finalizing the agreement in Australia, China, Hong Kong, Japan, Philippines, Russia, Singapore, Taiwan, Ukraine, United States, Uzbekistan, Vietnam, and many other counties.



BIOTECH neoregen

Advanced Research Excellence and Strategic Business Integration



R&D Center

Rm 504, BLDG#86, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul

Fundamental biotechnology research, peptide engineering, and pipeline discovery

HQ & Factory

6 FL, 176, Galmachi-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do

Corporate leadership, commercial manufacturing, and quality control

Seoul Offi

4th Fl., 4, Bangbae-ro 20-gil, S

Global business development, management for cosmetics, an