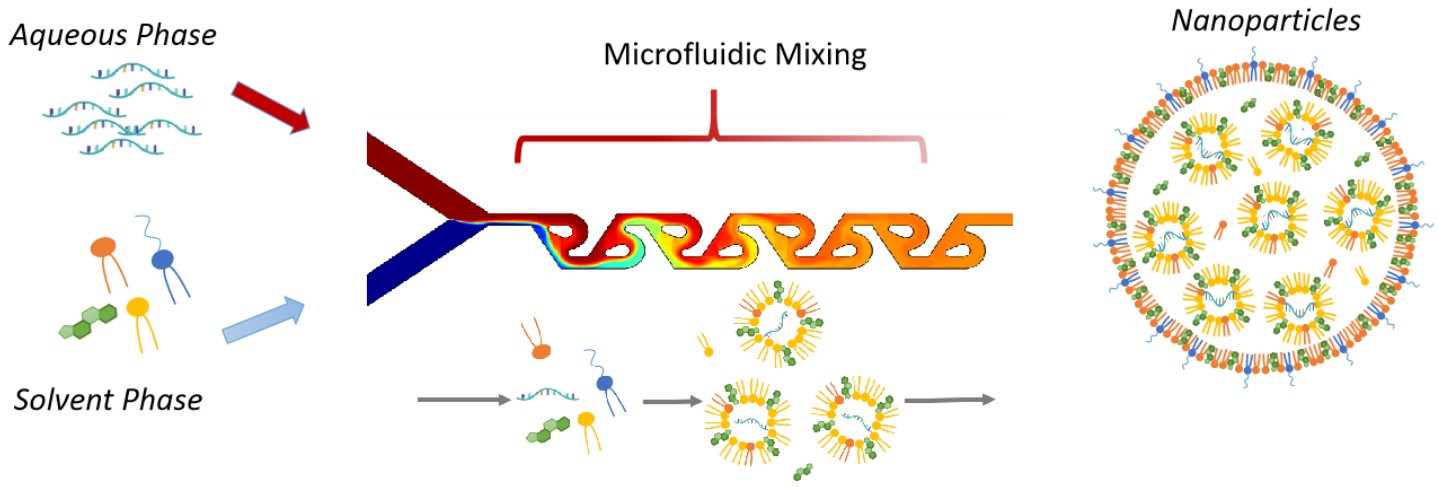
# NanoGenerator® Nanoparticle Synthesis System and LipidFlex™ Formulation

PreciGenome

Jan 2025

# What are Lipid Nanoparticles?

Lipid nanoparticles (LNP) are self-assembling structures of natural or synthetic lipids in aqueous environment.




Cationic/ionizable lipid

Structural lipid

Cholesterol

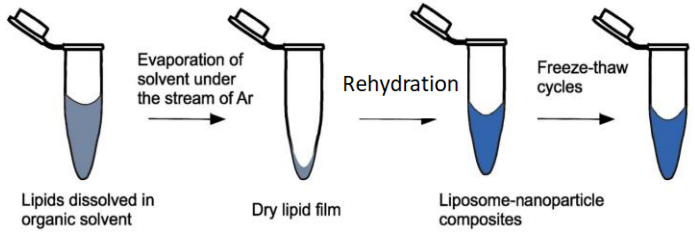
PEGylated lipid

Nucleic acid payload

# Lipid Nanoparticle Synthesis Methods

## Conventional Methods

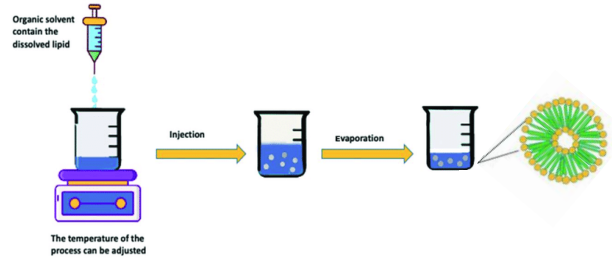
**A** Film hydration




- Established method
- Understood method

- High consuming of the organic solvent
- High PDI
- Lack of reproducibility
- Need for additional downsizing step
- Difficulties in scaling-up

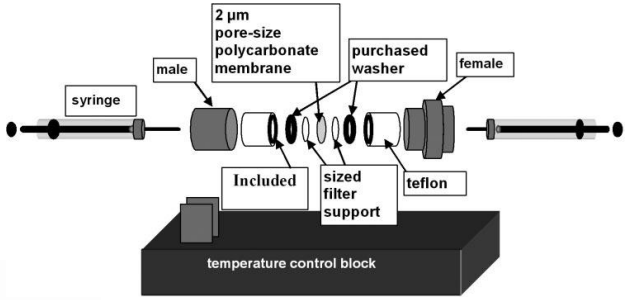
**B** Solvent injection




- Simple and fast
- Scaling-up possibility

- Exposing to organic solvent
- High PDI
- Stability problem

**C** Extrusion



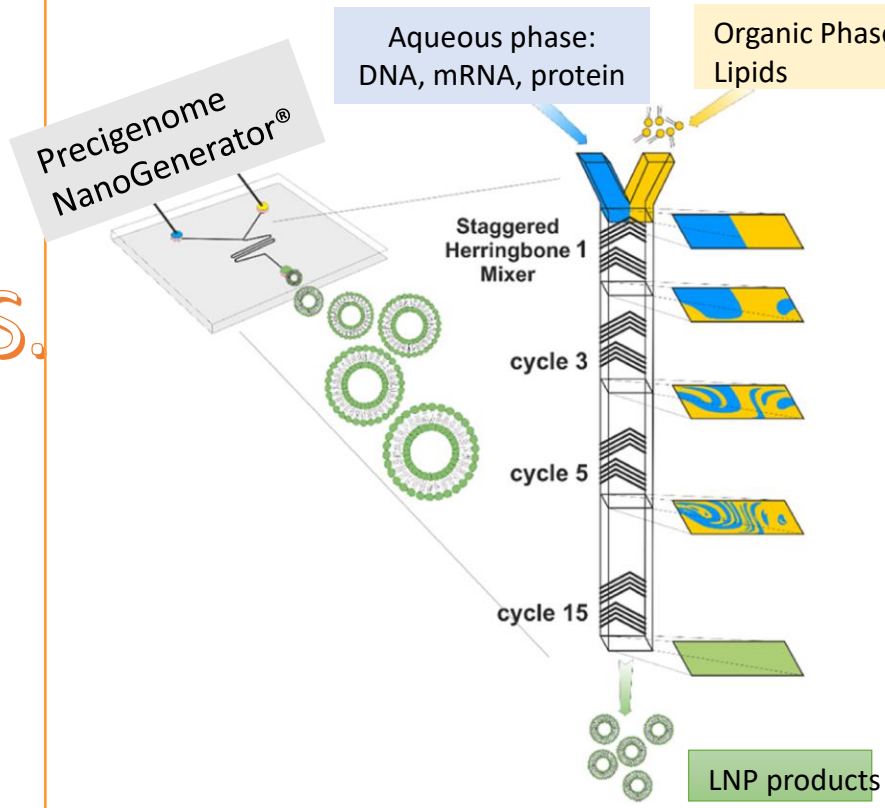

- Uniform and homogenous formulation

- Possible clogging of the membrane pores
- Difficulties in scaling up

Nanomaterials, Volume 11, 2021, 3440

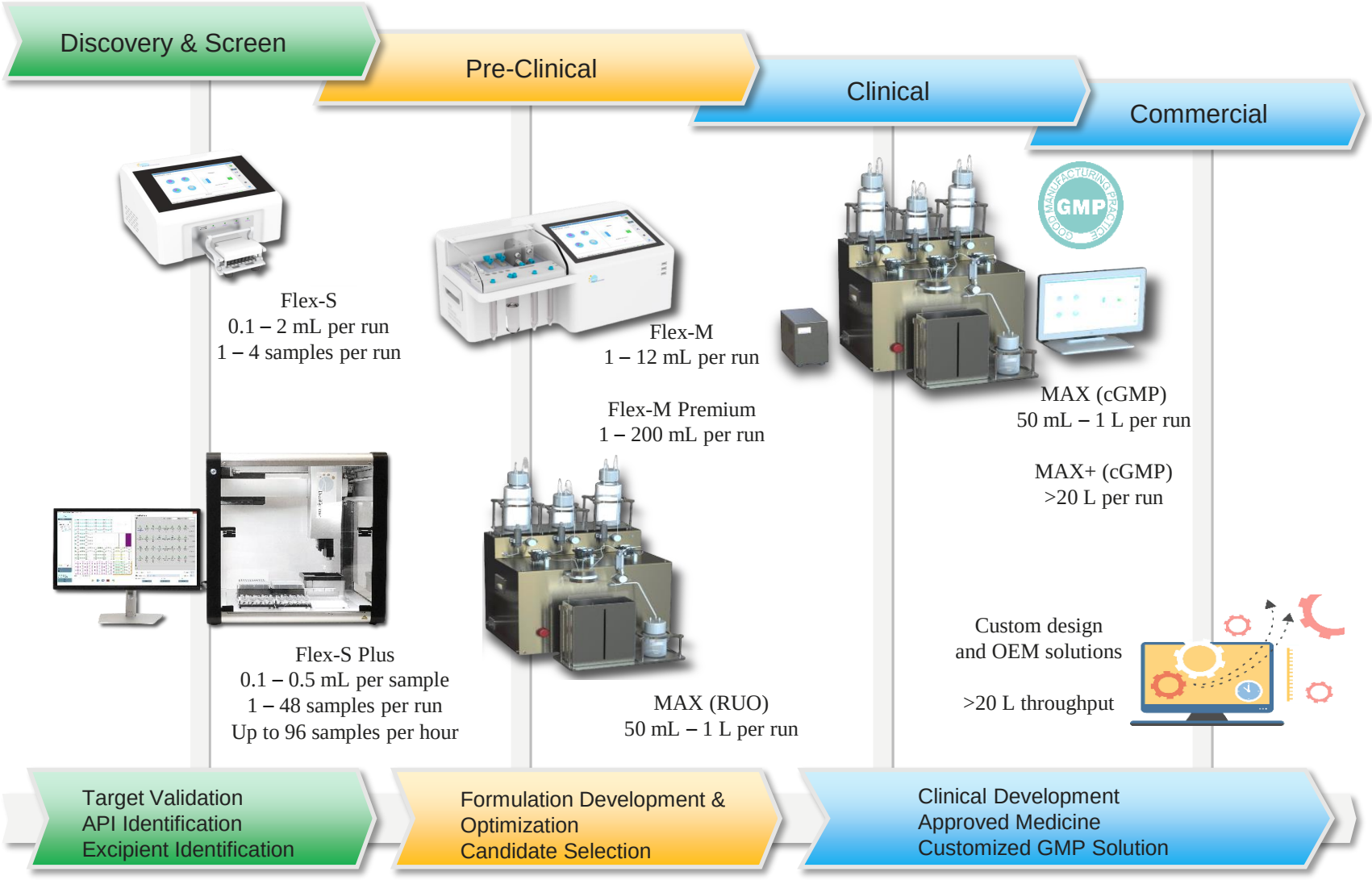
VS.

## Microfluidic Mixer

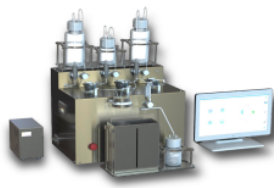



Reference: Scientific Reports volume 10, Article number: 5595 (2020)

# NanoGenerator® - Nanoparticle Synthesis System







| BASIC FEATURES | Flex-S | Flex-S Plus | Flex-M | Flex-M Premium | MAX | MAX (40L/H) |
|---|---|---|---|---|---|---|
| Product Model Number | PG-SYN-FS | PG-SYN-SP | PG-SYN-FM | PG-SYN-FM | PG-SYN-G | PG-SYN-G |
| R&D Stage | Screening & Discovery | Screening & Discovery | Screening & Discovery | Discovery &Preclinical Studies | Preclinical Studies & Development | Clinical Development & Production |
| Throughput | 0.1 to 2 ml | 0.1 to 0.5 ml | 1 to 12 ml | 1 to 200 ml | 50 ml to 1 L | >20L |
| Multiple Samples Per Run | ✓ | ✓ | ✗ | | ✗ | ✗ |
| Max Flow Rate | 3 or 4 ml/min | 3 or 4 ml/min | 24 ml/min | 24 ml/min | 4.8 L/h | 40L/h |
| Flow Rate Ratio | 3:1 | 3:1 | 1:1 to 5:1 | 1:1 to 10:1 | 1:1 to 9:1 | 1:1 to 5:1 |
| Tunable Flow Rate | Custom design | Custom design | ✓ | | ✓ | ✓ |
| Intuitive & Easy To Use | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Inline Monitoring | Pressure | Pressure | Pressure & flow rate | | Pressure & flow rate | Pressure & flow rate |
| Consumable Cost Per Run | $ | $ | $ | | $$ | $$$ |

# Scalable LNP Production

NanoGenerator®
Flex-S/Flex-S Plus

Early Screening

0.1 – 2 ml (Flex-S)
0.1 – 0.5 ml (Flex-S Plus)

NanoGenerator®
Flex-M/Flex-M Premium

Small/Medium
Production

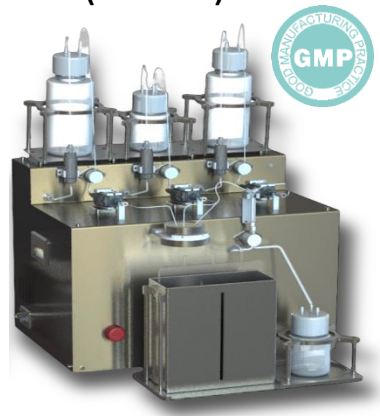
1 – 12 ml (Flex-M)
1 – 200 ml (Flex-M Premium)

NanoGenerator®
MAX (RUO)

Large production

50 ml – 1 L
Custom design for larger volume

NanoGenerator®
Max (cGMP)




Commercial Production

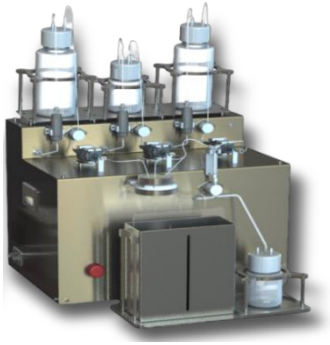
50 ml – 1 L (MAX 4.8L/h);
> 20 L (MAX 40L/h)

# NanoGenerator® Scaling Up

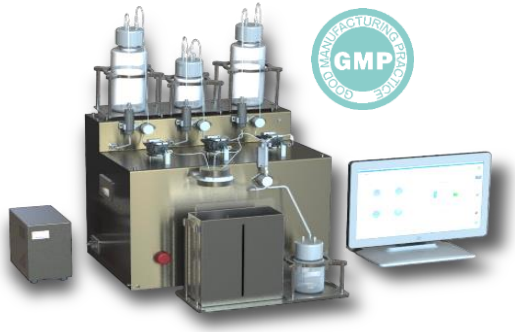
- Transferable results from early screening (Flex-S, 0.1mL) to pre-clinical development (Flex-M/M Premium, 12ml/200mL), then commercial production (Max: 1L, MAX 40L/h: >20L)

Flex-S: 0.1 – 2 ml
Flex-S Plus: 0.1 – 0.5 ml

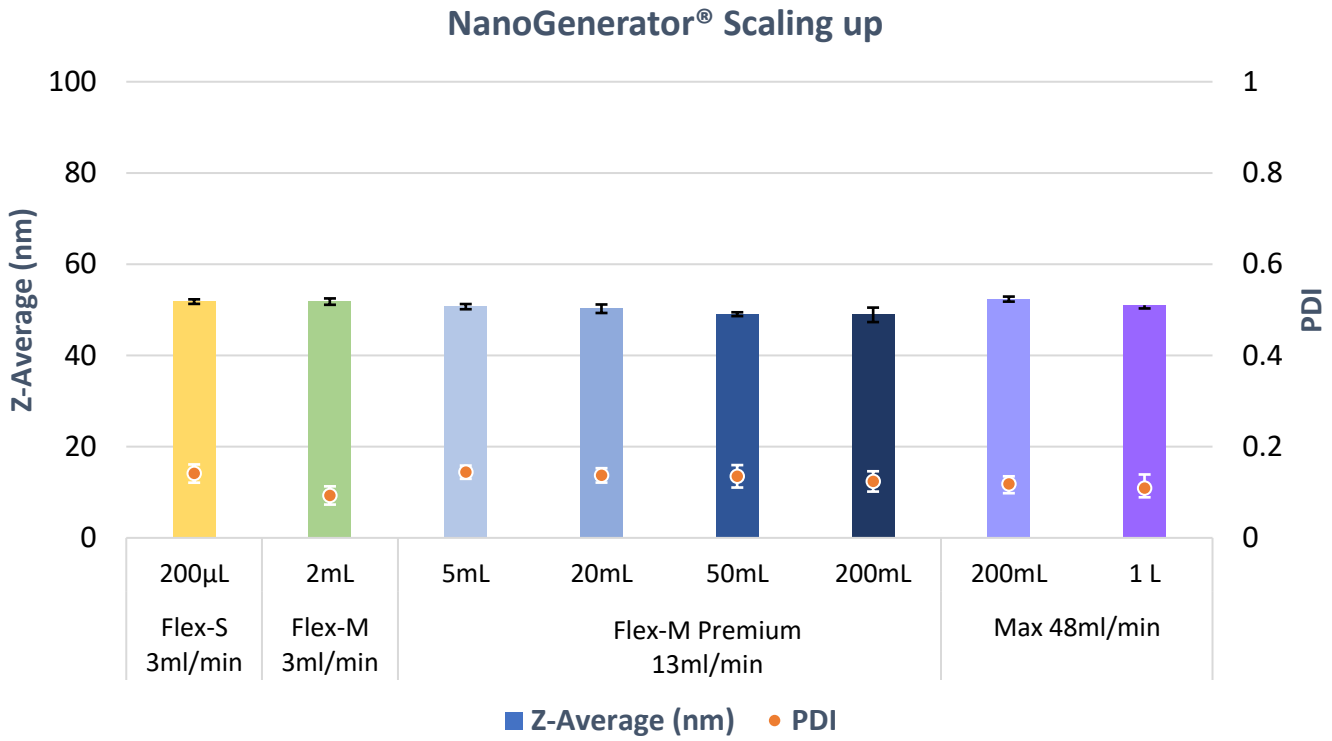
Flex-M: 1 – 12 ml
Flex-M Premium: 1 – 200 ml



MAX RUO : 50 ml – 1 L

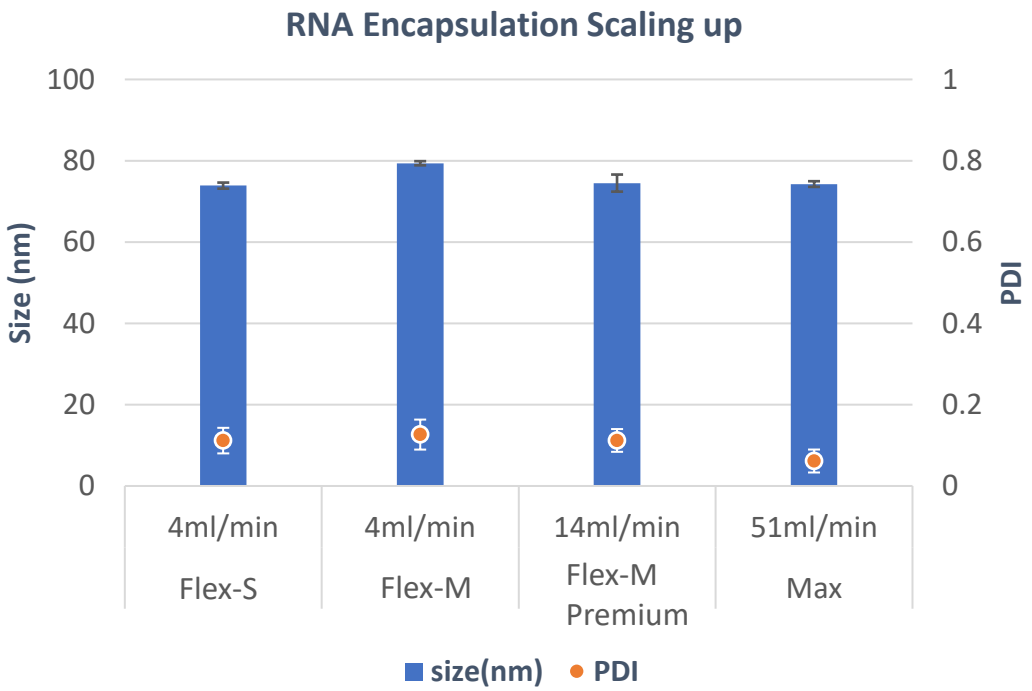


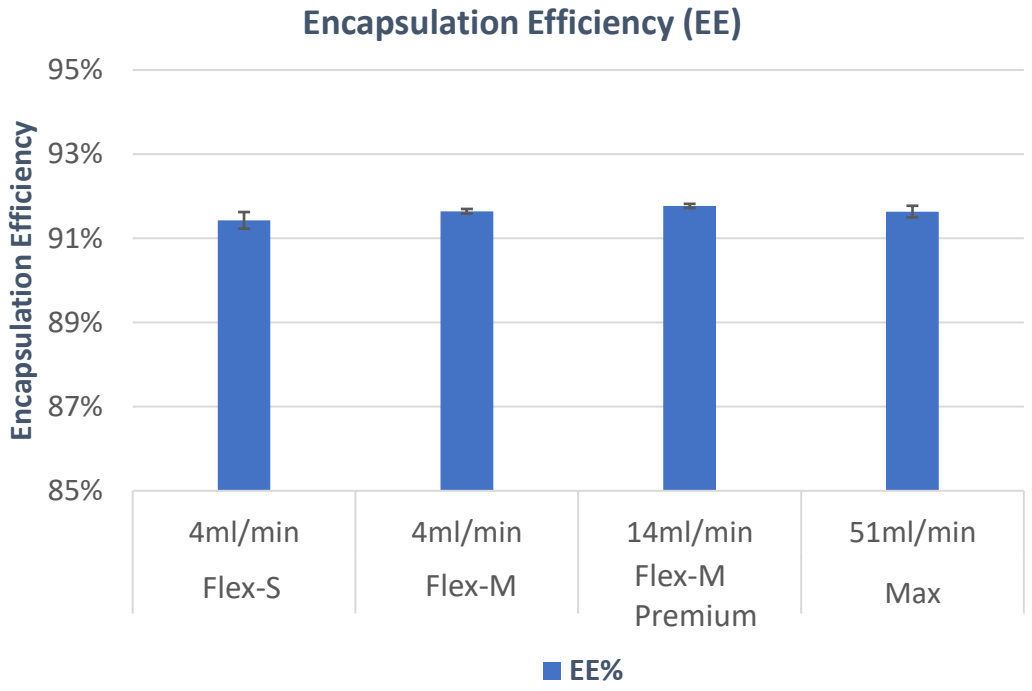

MAX cGMP (4.8L/h) : 50 ml – 1 L
MAX cGMP (40L/h): > 20 L




| Reagents | |
|---|---|
| Aqueous phase | Sodium acetate buffer (100mM, pH5.2) |
| Solvent phase | LipidFlex, 15mM in ethanol |

# NanoGenerator® — Scale Up




| | Reagents |
|---|---|
| Aqueous phase | Sodium acetate buffer (100mM, pH5.2) |
| Payload | RNA (~600 nt) |
| Solvent phase | LipidFlex RNA-LNP kit |

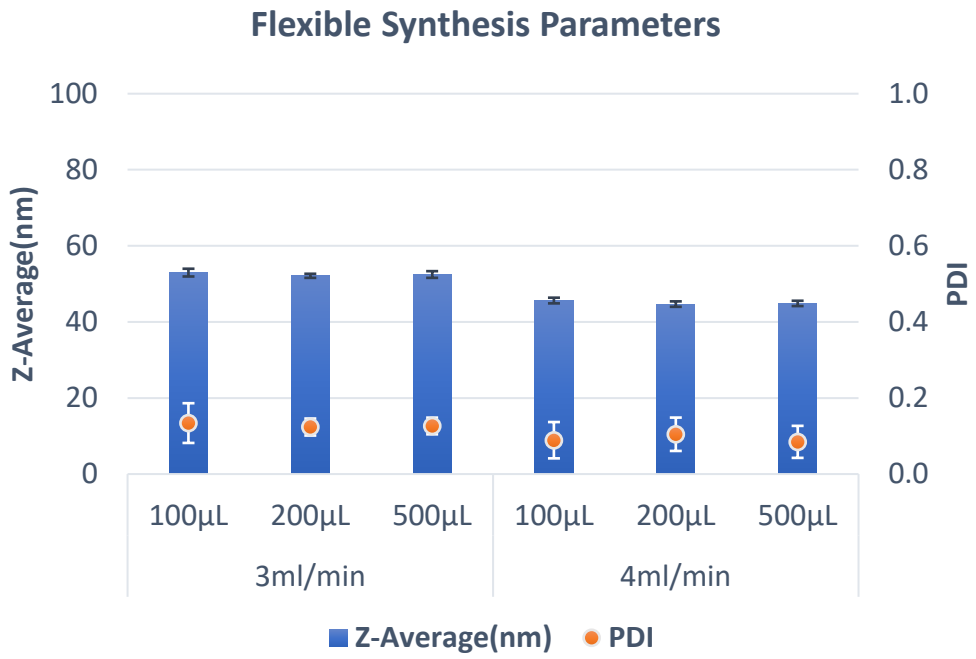
# NanoGenerator® Flex-S

- 0.1 – 2mL synthesis volume per batch
- Tunable total flow rate (3ml/min & 4ml/min)
- Customized total flow rate & flow rate ratio available
- Multiple sample synthesis per run available
- Disposable consumables

NanoGenerator® Flex-S

| | NanoGenerator Flex-S | Syringe Pump Systems | Tubing Connection Systems |
|---|---|---|---|
| Dead volume per sample | < 20 µl | 0.5 mL | 0.5 - 1 mL |
| Source of dead volume | Micro-channel in the mixing Chip | Syringe, connector, and/or mixing chip | Tubing, connector, and mixing chip |
| Typical production volume | 0.1 – 0.5 mL | 1 – 10 mL | 1 – 10 mL |
| Minimum input volume<br><br>(Aqueous :Lipid = 3:1) | Aqueous : 75ul<br><br>Lipid: 25ul | Aqueous: 1 mL<br><br>Lipid: 0.5 mL | Aqueous: 1 mL<br><br>Lipid: 0.5 mL |
| Estimated minimum mRNA cost | $50 | $660 | $660 |

# NanoGenerator® Flex-S

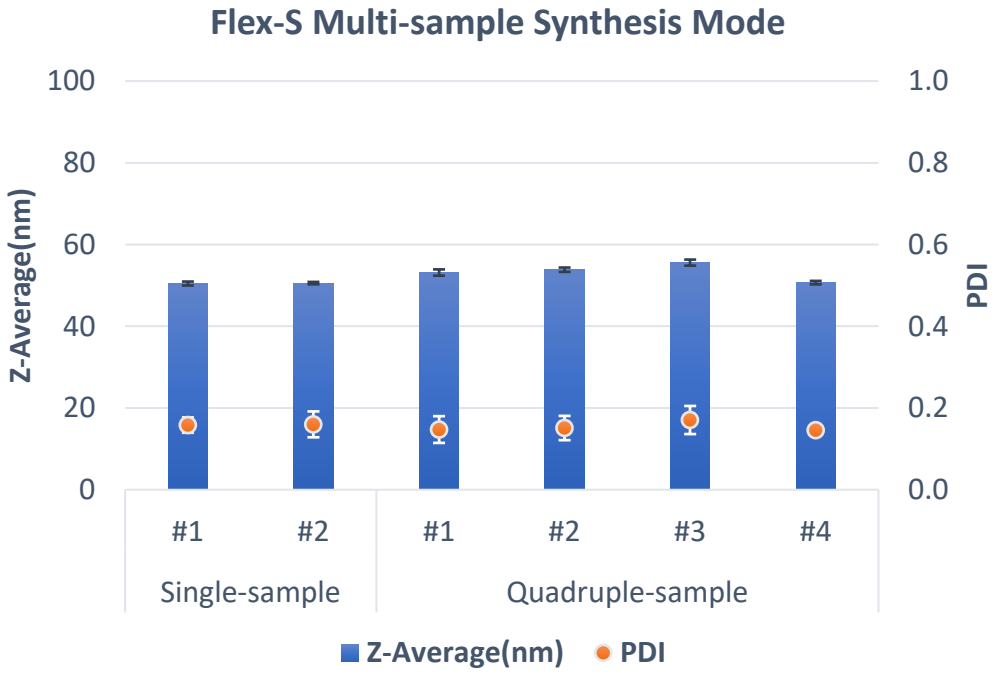



| Model | Flex-S |
|---|---|
| Aqueous phase | Sodium acetate buffer, 100mM, pH5.2 |
| Solvent phase | Lipidflex, 15mM in ethanol |

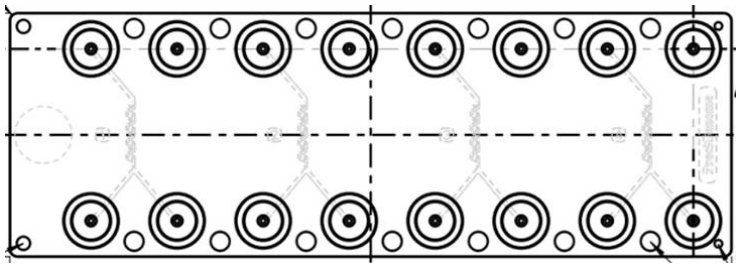
NanoGenerator® Flex-S

- **More total flow rate setting options.**
  - Users can choose **3ml/min** or **4ml/min** to conduct LNP synthesis.
  - Higher flow rate setting generates LNPs of smaller particle size.
- **Low synthesis volume limit (100 – 500 μL) per sample**
  - Minimum aqueous sample input volume: 75 μL
  - Minimum Lipid formulation input volume: 25 μL
- **Excellent batch-to-batch consistency**

# NanoGenerator® Flex-S




| Model | Flex-S |
|---|---|
| Aqueous phase | Sodium acetate buffer, 100mM, pH5.2 |
| Solvent phase | Lipidflex, 15mM in ethanol |



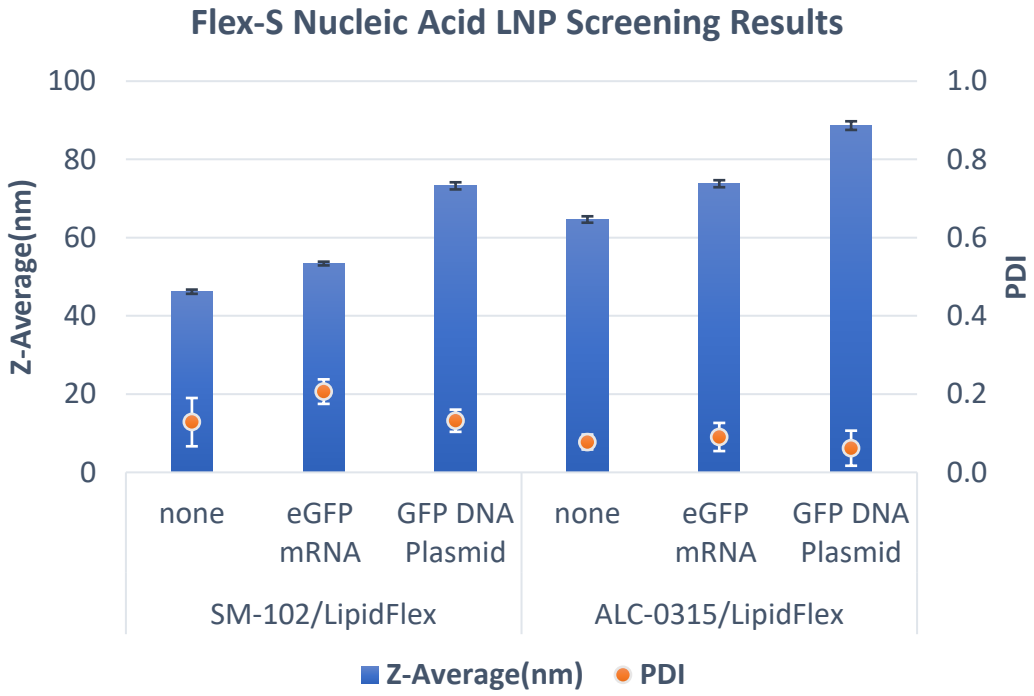
CHP-MIX-4

**Multi-sample Synthesis by NanoGenerator® Flex-S:**

- **10 seconds, 4 samples!** Users can choose multi-sample synthesis mode to conduct formulation screening. The screening time is as low as 10 seconds

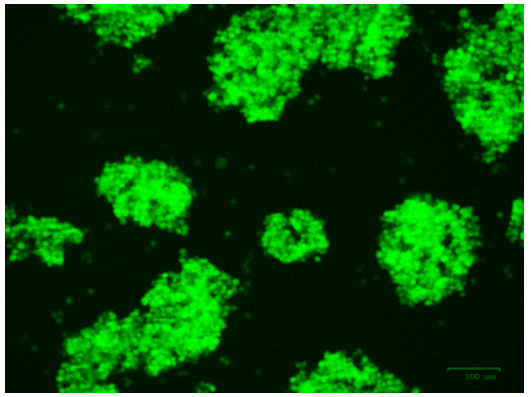
- **Reliable screening results.** Using PreciGenome's advanced air-flow control technology, users can obtain reliable LNP results on both single- or multi-sample synthesis modes.

# NanoGenerator® Flex-S




| Model | Flex-S |
|---|---|
| Aqueous phase | 100 µg/mL eGFP mRNA (CATUG) or GFP DNA (ALDEVRON) in sodium acetate buffer ( 100mM, pH5.2) |
| Solvent phase | Ionizable lipid/Lipidflex, 40/60, 12.5mM in ethanol |

**eGFP mRNA LNP Delivery to Jurkat Cells**



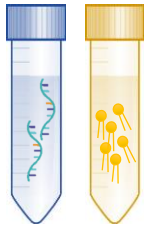
**Jurkat Cells transfected with eGFP mRNA LNP. Green fluorescence image at 48 hours post transfection.**

- **Robust Formulation Screening.**
  Using NanoGenerator® Flex-S, users can conduct formulation screening using minimum reagent consumption, which saves lots of cost.

- LNP size and PDI depend on the payload and formulation choice.

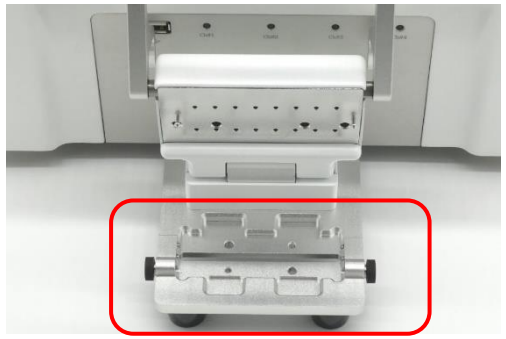
# Flex-S workflow

## Step 1: Preparation

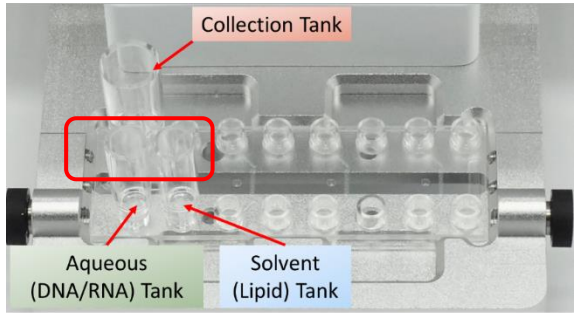


Aqueous: DNA, mRNA in buffer
Solvent: lipid mix in ethanol
(Lipid-Flex formulation)

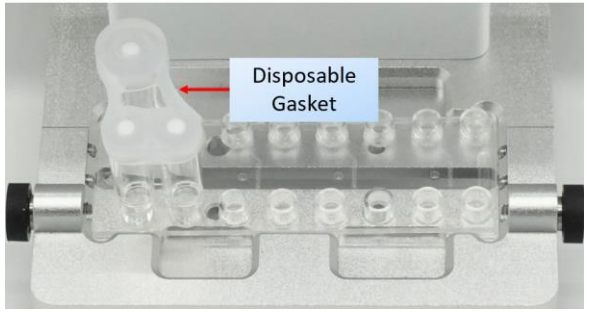
## Step 2: Load chip



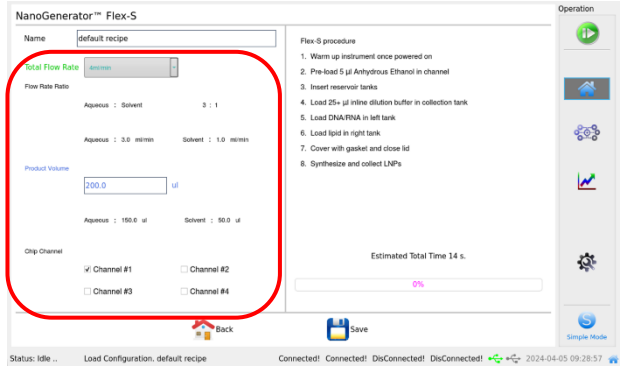
## Step 3: Load samples



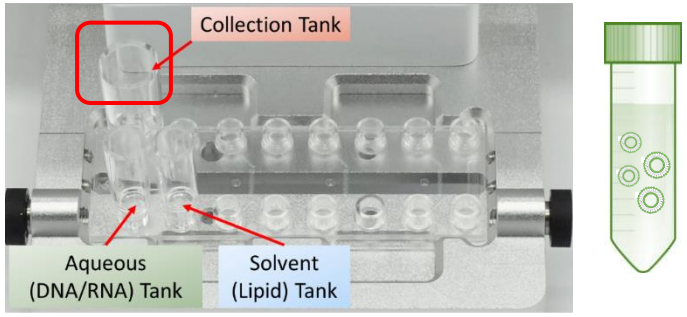

## Step4: Put on Gasket




## Step 5: Set Parameters and Run




## Step 6: Collect LNPs in seconds

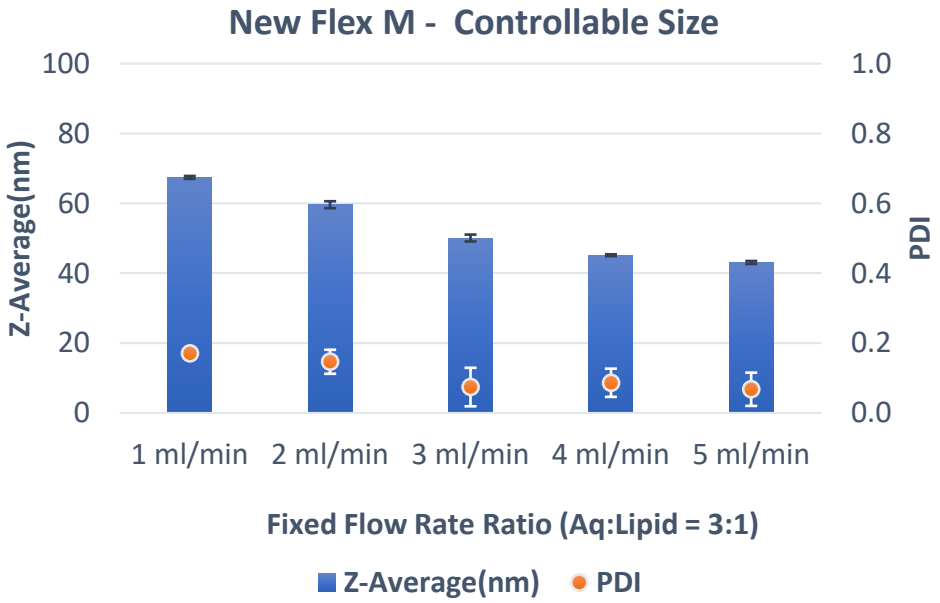


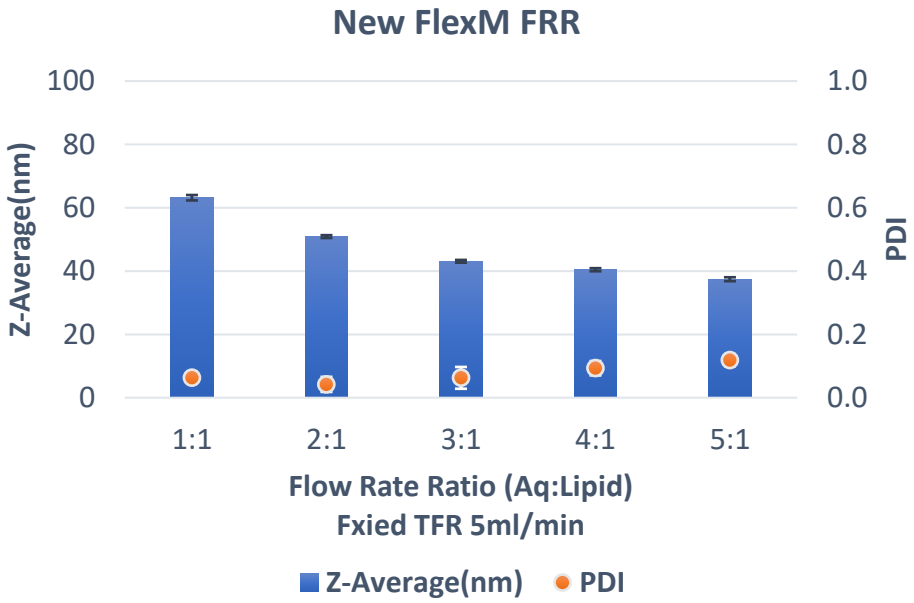

Demo video: [PreciGenome Lipid Nanoparticle Synthesis System NanoGenerator (3gen) Flex-S Demo and Introduction (youtube.com)]
Demo video (muti-channel synthesis): [4 Samples per run for Lipid Nanoparticle Synthesis, NanoGenerator (3gen) Flex-S Demo (youtube.com)]

# NanoGenerator® Flex-M

- 1 – 12mL synthesis volume per batch
- Tunable total flow rate (TFR, 1 – 5 ml/min) and flow rate ratio (FRR, 2:1 to 5:1) in Flex-M

NanoGenerator®
Flex-M/Flex-M Premium



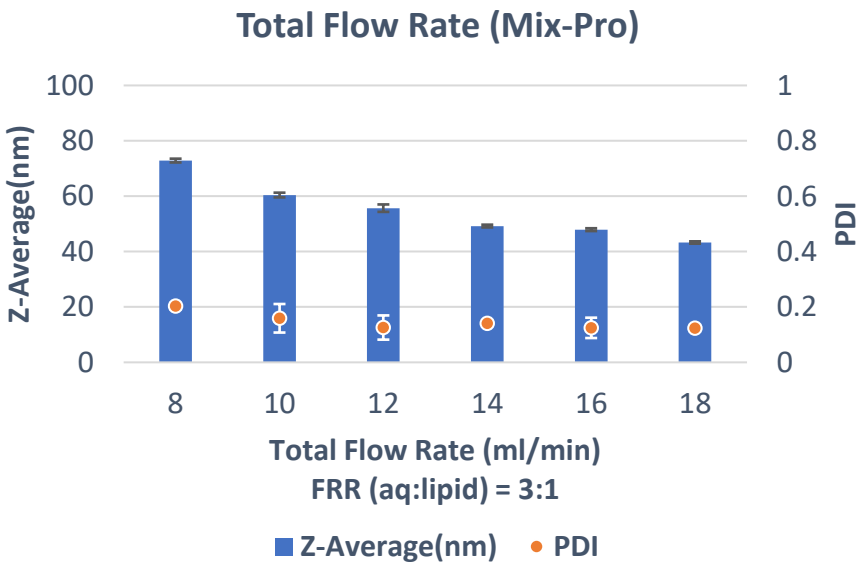



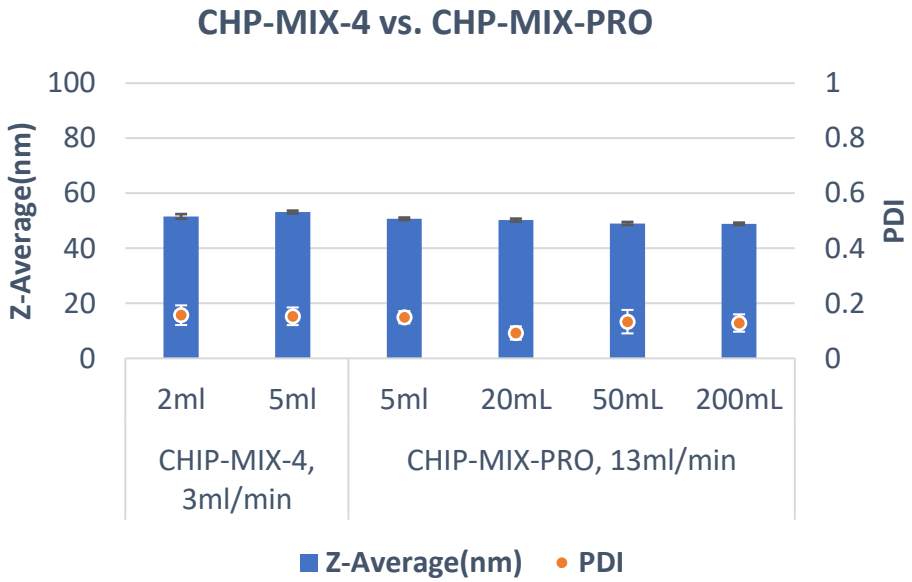

| Model | Flex-M |
|---|---|
| Aqueous phase | Sodium acetate buffer, 100mM, pH5.2 |
| Solvent phase | Lipidflex, 15mM in ethanol |

# Upgrade Flex-M to Flex-M Premium

- Extend to 200mL synthesis volume per batch
- Tunable total flow rate (TFR, 1 – 5 ml/min) and flow rate ratio (FRR, 2:1 to 10:1) in Flex-M
- Compatible with CHP-MIX-PRO Chip (up to 24 ml/min)

NanoGenerator®
Flex-M/Flex-M Premium





**CHP-MIX-PRO**

- Total flow rate: up to 24 ml/min
- Through put: 5-200 ml

| Model | Flex-M/Flex-M Premium |
|---|---|
| Aqueous phase | Sodium acetate buffer, 100mM, pH5.2 |
| Solvent phase | Lipidflex, 15mM in ethanol |

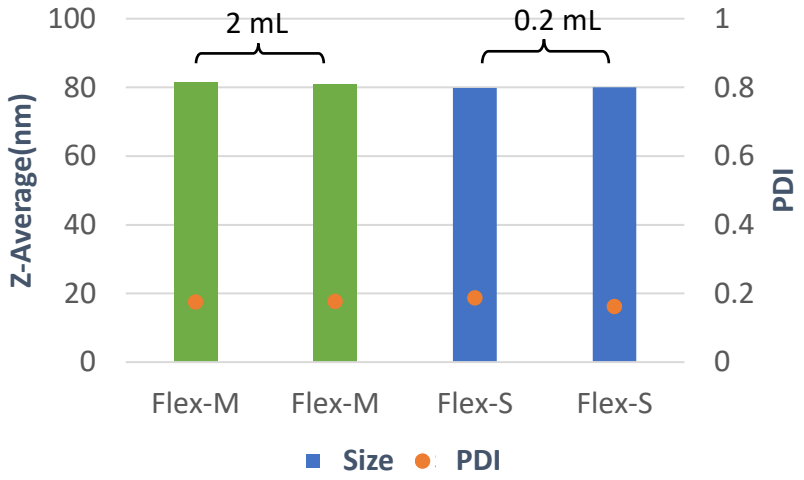
# Transferable results between Flex-S/M

- The mixing chip (CHP-MIX-4) is compatible for both Flex-S and Flex-M models.
- Customer can transfer their early screening results to later stage production seamlessly.

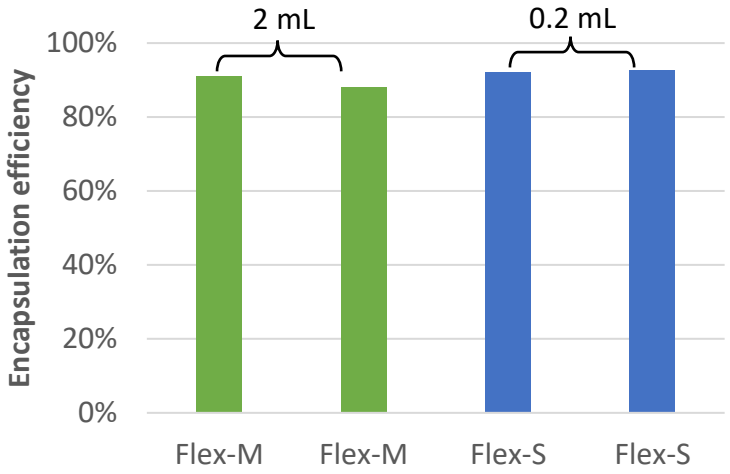
NanoGenerator® Flex-S

NanoGenerator®
Flex-M/Flex-M Premium

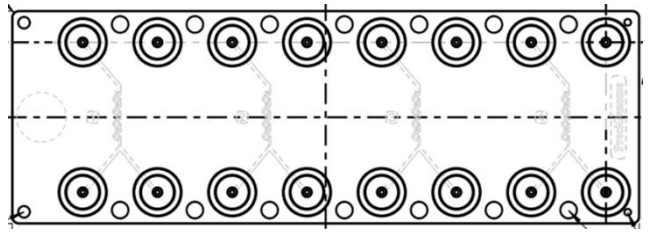
**DNA LNP Synthesis**




**High Encapsulation Efficiency**



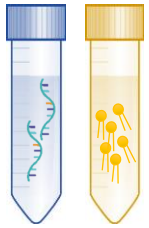

| Model | Flex-S/M |
|---|---|
| Aqueous phase | GFP DNA plasmid (100ug/mL) in sodium acetate buffer(100mM, pH5.2) |
| Solvent phase | SM102/Lipidflex (40/60 mol%, 12.5mM total lipid concentration) in ethanol |
| N/P ratio | 6 |



CHP-MIX-4

# Flex-M/Flex-M Premium workflow

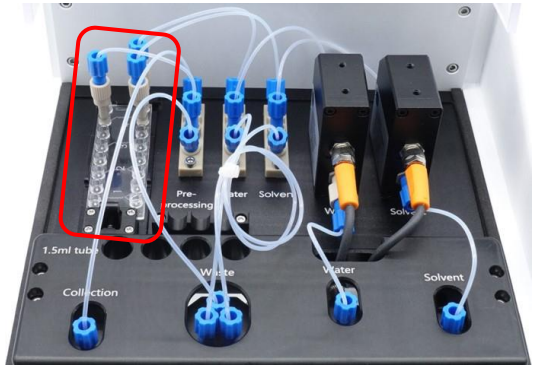
## Step 1: Preparation



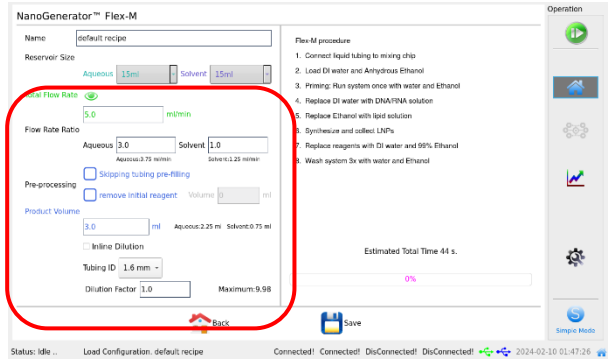
Aqueous: DNA, mRNA in buffer
Solvent: lipid mix in ethanol
(Lipid-Flex formulation)

## Step 2: Load sample tubes and collection tube

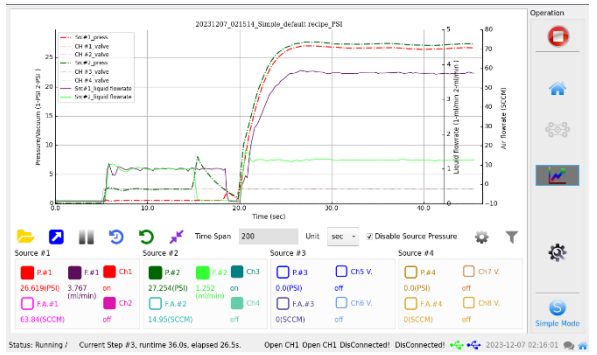
## Step 3: Load chip




## Step 4: Set parameters and Run




## Step 5: Monitor flow rates




## Step 6: Collect LNPs in seconds

Demo video: [NanoGenerator Flex-M(3Gen) Demo for Lipid Nanoparticles LNP, liposome synthesis (youtube.com)]

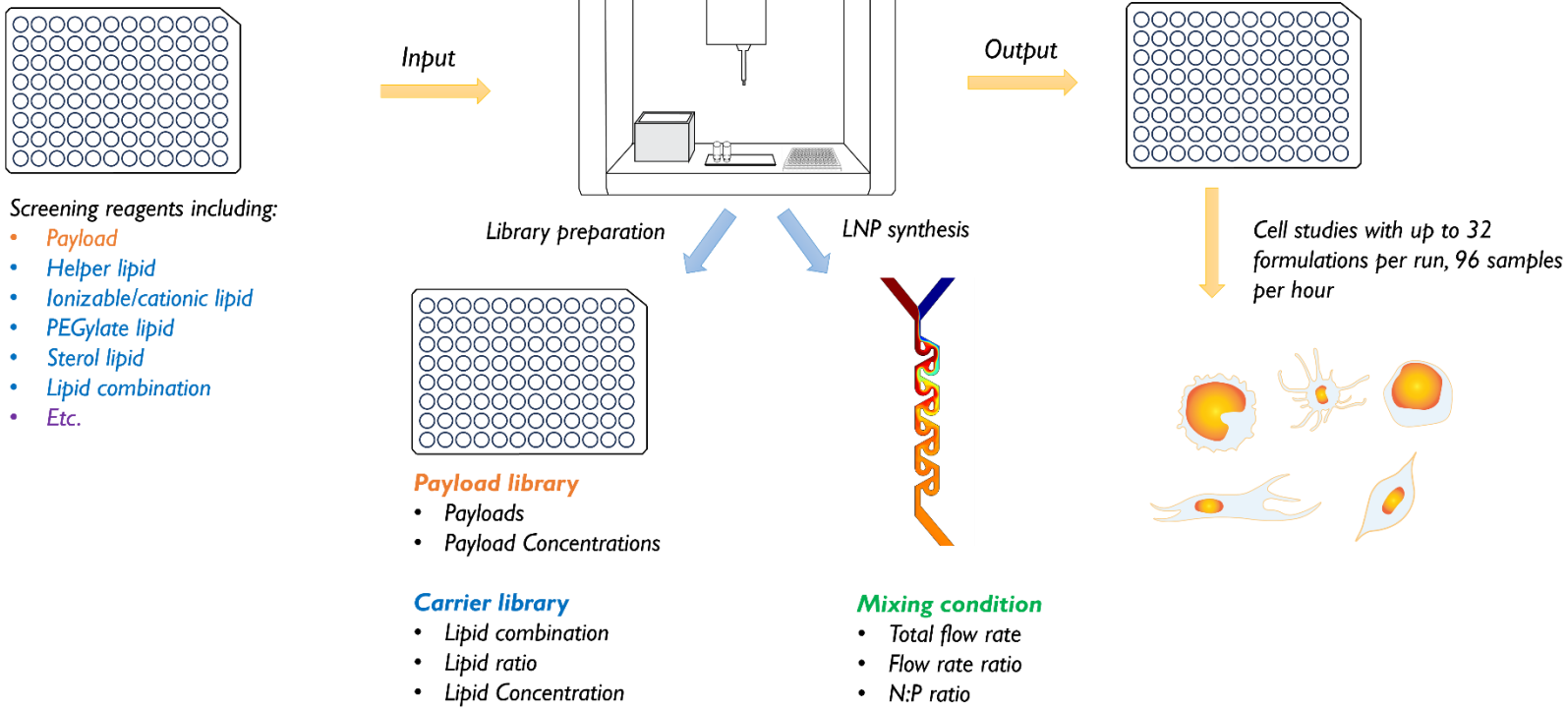
# NanoGenerator® Flex-S Plus for screening

NanoGenerator®
Flex-S Plus

- Rapid screening of LNP formulations
- Rapid screening of mRNA/siRNA
- 48 samples per run
- 96 samples within one hour
- Disposable consumables

| Model | Flex-S | Flex-S Plus |
|---|---|---|
| Multi-sample per run | 1 – 4 | (1 – 12) × 4 per run<br>Up to 96 samples per hour |
| Full automation | N/A | Yes |
| Library preparation | N/A | Optional |
| Throughput | 0.1 – 0.5 ml per sample | 0.1 – 0.5 ml per sample |
| Total flow rate | 3 ml/min, 4 ml/min | 3 ml/min |
| Flow rate ratio | 3:1 | 3:1 |
| Custom design flow rate | Yes | Yes |
| Size range | 40 – 200 nm | 40 – 200 nm |
| PDI | 0.05 – 0.2 | 0.05 – 0.2 |
| Encapsulation efficiency | Up to 99% | Up to 99% |
| Payload | DNA, mRNA, siRNA, Protein, small molecules, etc. | DNA, mRNA, siRNA, Protein, small molecules, etc. |
| Dimension | 320 mm × 400 mm × 210 mm | 630 mm × 570 mm × 660 mm |
| Weight | 8.1 kg | 50 kg |

# NanoGenerator® Flex-S Plus for screening

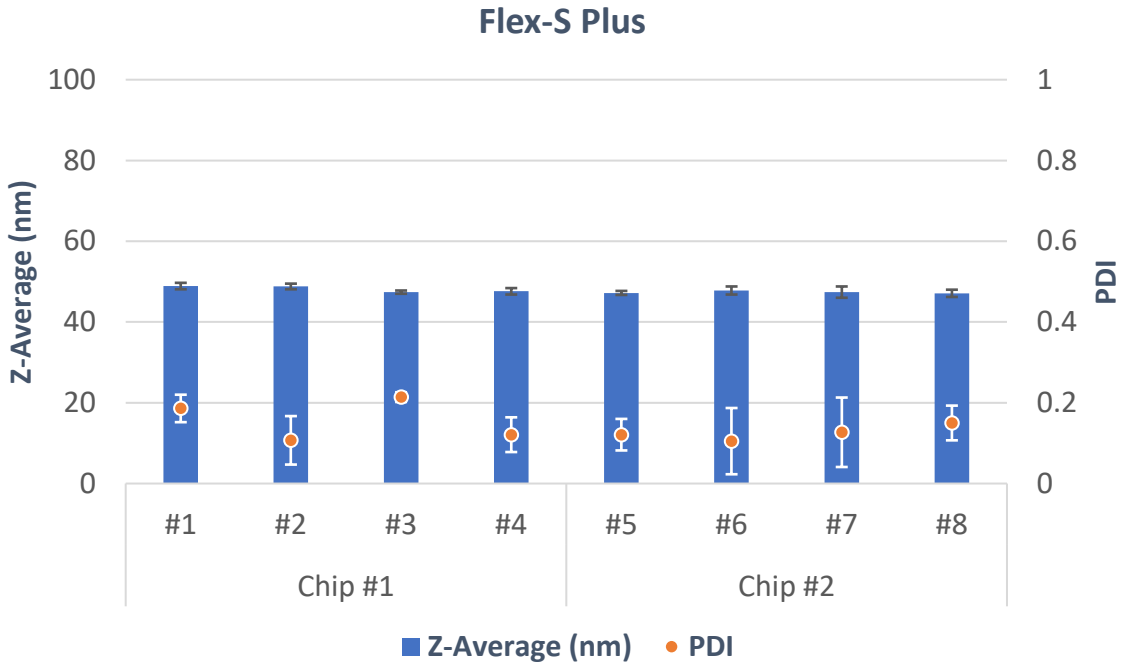



## Sample Workflow:

1. Load samples in 96 well plates;
2. Seal the 96 well plate (optional);
3. Put consumables on the deck: Chips, 96 well plates, pipette tips, and Gaskets;
4. Set parameters in the software and run the program;
5. Collect samples in 96 well plate;
6. Discard/Change consumable.

Demo video: [Demo of NanoGenerator® Flex-S Plus Platform, Automated High-throughput LNP Preparation & formulation]

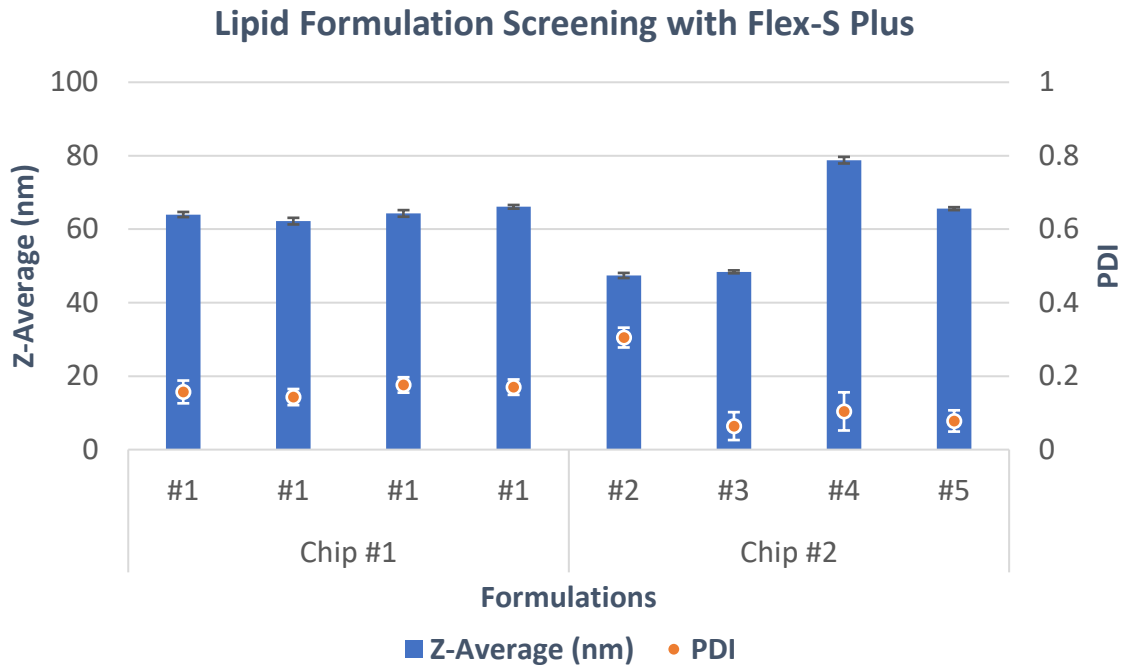
# NanoGenerator® Flex-S Plus for screening




- Robust multi-sample synthesis
- Reliable performance
- Consistent results

| Model | Flex-S Plus |
|---|---|
| Aqueous phase | Sodium acetate buffer, 100mM, pH5.2 |
| Solvent phase | Lipidflex, 15mM in ethanol |
| Parameters | 3ml/min, FRR 3:1, 200µL |

# NanoGenerator® Flex-S Plus for screening




- Lipid formulation screening
- 96 samples < 1hour
- 96-well Plate format

| Model | Flex-S Plus |
|---|---|
| Aqueous phase | RNA in Sodium acetate buffer, 100mM, pH5.2 |
| Solvent phase | Different lipid formulation |

# NanoGenerator® Flex-S Plus

Size (nm)

| | | | |
|---|---|---|---|
| 54.9 | 45.4 | 45.5 | 55.5 |
| 54.4 | 47.6 | 45 | 46.2 |
| 54.7 | 46.5 | 47.4 | 62.3 |
| 54.4 | 48.2 | 51.9 | 57.3 |
| 42.6 | 47.8 | 44.8 | 51.2 |
| 41.1 | 50 | 46.9 | 48.2 |
| 62.8 | 48.5 | 46.7 | 74 |
| 56.6 | 50.7 | 52.1 | 59.2 |

40 80

PDI

| | | | |
|---|---|---|---|
| 0.216 | 0.13 | 0.126 | 0.473 |
| 0.175 | 0.107 | 0.092 | 0.08 |
| 0.185 | 0.09 | 0.104 | 0.113 |
| 0.16 | 0.1 | 0.137 | 0.107 |
| 0.306 | 0.121 | 0.101 | 0.403 |
| 0.063 | 0.129 | 0.128 | 0.124 |
| 0.118 | 0.066 | 0.148 | 0.109 |
| 0.041 | 0.099 | 0.163 | 0.113 |

0.02 0.50

- 32 sample screening (formulation & N:P ratio screening)
- 96 samples < 1hour
- 96-well Plate format

| Model | Flex-S Plus |
|---|---|
| Aqueous phase | RNA in Sodium acetate buffer, 100mM, pH5.2 |
| Solvent phase | Different lipid formulation |

# Case Study: mRNA LNP for T cell Transfection

## eGFP mRNA Lipid Nanoparticles by Flex-S

Z-Average Diameter: 67.3 nm

PDI: 0.106

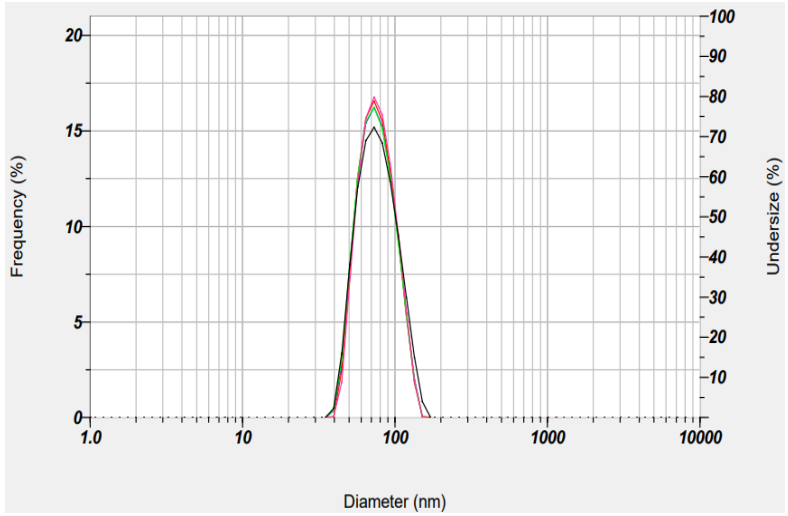



**Figure 1.** mRNA(eGFP)-LNP Synthesized by NanoGenerator® Flex-S. Average diameter is 67.3 nm. PDI is 0.106. Encapsulation efficiency is 94.5% (Ribo Green RNA Quantification Kit).

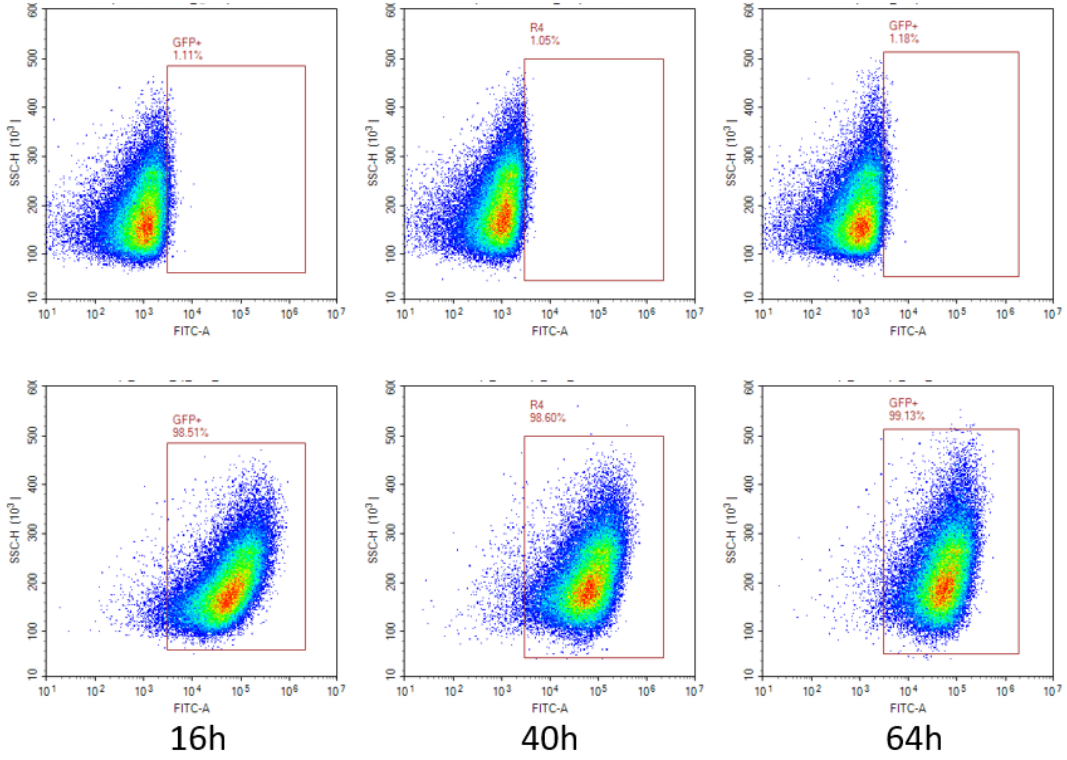


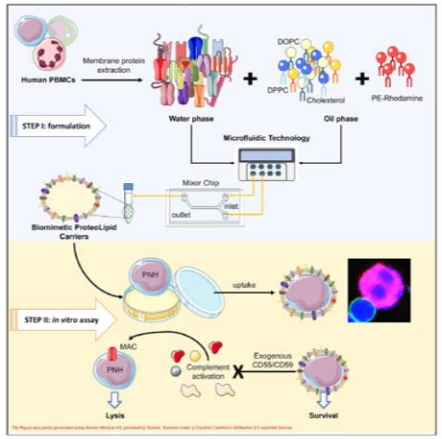

**Figure 2.** GFP(+) positive population of control (non-treat) and EGFP mRNA LNP treated primary T cells at 16, 40 and 64 hours. Cells were stained (1:50) using Biolegend 7-AAD Viability Staining for 10 minutes. Gating: First select for individual cells (excluding doublets). Then select for the healthy cell population. Then select for viable cells by excluding cells which are positive for 7-AAD. Gate for FitC-A channel (GFP)

# Recent Publications

iScience
CellPress OPEN ACCESS

Article

Biomimetic proteolipid vesicles for reverting GPI deficiency in paroxysmal nocturnal hemoglobinuria




Valentina Giudice, Pasqualina Scala, Erwin P. Lamparelli, ..., Francesca Picone, Giovanna Della Porta, Carmine Selleri

Highlights

Microfluidic technology allows formulation of biomimetic proteolipid vesicles

Biomimetic vesicles can be functionalized with human GPI-anchored proteins

Biomimetic functionalized vesicles can deliver GPI-linked proteins to cells

Treated PNH cells have increased resistance to complement-mediated lysis

nature biotechnology

Article

https://doi.org/10.1038/s41587-024-02437-3

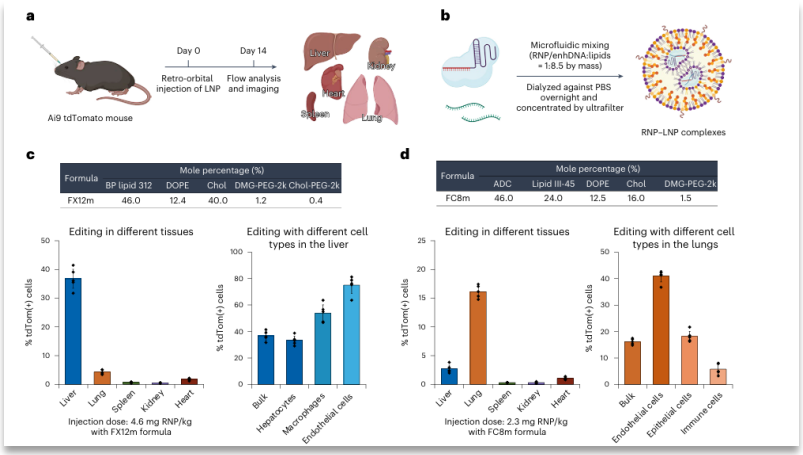
## Lung and liver editing by lipid nanoparticle delivery of a stable CRISPR–Cas9 ribonucleoprotein

Received: 23 October 2023

Accepted: 18 September 2024

Published online: 16 October 2024

Kai Chen[1,2,10], Hesong Han[2,3,10], Sheng Zhao[2,3], Bryant Xu[1,2], Boyan Yin[2,3], Atip Lawanprasert[2,3], Marena Trinidad[1,2,4], Benjamin W. Burgstone[2,3], Niren Murthy[2,3] & Jennifer A. Doudna[1,2,4,5,6,7,8,9]




vaccines
MDPI

Article

## Microfluidic Synthesis of Scalable Layer-by-Layer Multiple Antigen Nano-Delivery Platform for SARS-CoV-2 Vaccines

Yang Xu [1,*], Kazuya Masuda [2], Christine Groso [2], Rick Hassan [1], Ziyou Zhou [1], Kelsey Broderick [1], Moriya Tsuji [2] and Christopher Tison [1]

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[2] Aaron Diamond AIDS Research Center, Division of Infectious Diseases, Department of Medicine, Columbia University Irving Medical Center, New York, NY 10032, USA; km3466@cumc.columbia.edu (K.M.); cg3487@cumc.columbia.edu (C.G.)

cancers
MDPI

Article

## mRNA-Lipid Nanoparticle (LNP) Delivery of Humanized EpCAM-CD3 Bispecific Antibody Significantly Blocks Colorectal Cancer Tumor Growth

Vita Golubovskaya [1,*], John Sienkiewicz [1], Jinying Sun [1], Yanwei Huang [1], Liang Hu [1], Hua Zhou [1], Hizkia Harto [1], Shirley Xu [1], Robert Berahovich [1], Walter Bodmer [2] and Lijun Wu [1,3,*]

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[2] Cancer & Immunogenetics Laboratory, Weatherall Institute of Molecular Medicine, John Radcliffe Hospital, Oxford OX3 9DS, UK
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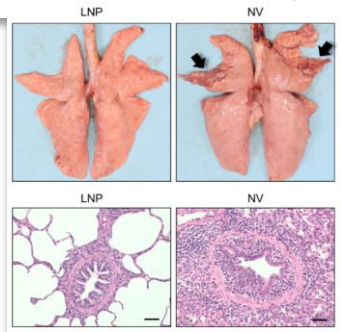
AMERICAN SOCIETY FOR MICROBIOLOGY | mSphere®

RESEARCH ARTICLE
August 2024 Volume 9 Issue 8 e00283-24
https://doi.org/10.1128/msphere.00283-24

## Lipid nanoparticle-encapsulated DNA vaccine confers protection against swine and human-origin H1N1 influenza viruses

The N. Nguyen[1,2], Danh C. Lai[1,2], Sarah Sillman[2], Erika Petro-Turnquist[1,3], Eric A. Weaver[1,3], Hiep L. X. Vu[1,4]




JEM Journal of Experimental Medicine

BRIEF DEFINITIVE REPORT

## Regenerating murine CD8⁺ lung tissue resident memory T cells after targeted radiation exposure

Mariah Hassert[1], Lecia L. Pewe[1], Rui He[2], Mohammad Heidarian[1,3], Pornpoj Phruttiwanichakun[2], Stephanie van de Wall[1], Madison R. Mix[1,4,5], Aliasger K. Salem[2,4], Vladimir P. Badovinac[1,3,4]* and John T. Harty[1,3,4]*

Contents lists available at ScienceDirect

International Journal of Pharmaceutics

journal homepage: www.elsevier.com/locate/ijpharm

ELSEVIER

## Lipid nano-vesicles for thyroid hormone encapsulation: A comparison between different fabrication technologies, drug loading, and an *in vitro* delivery to human tendon stem/progenitor cells in 2D and 3D culture

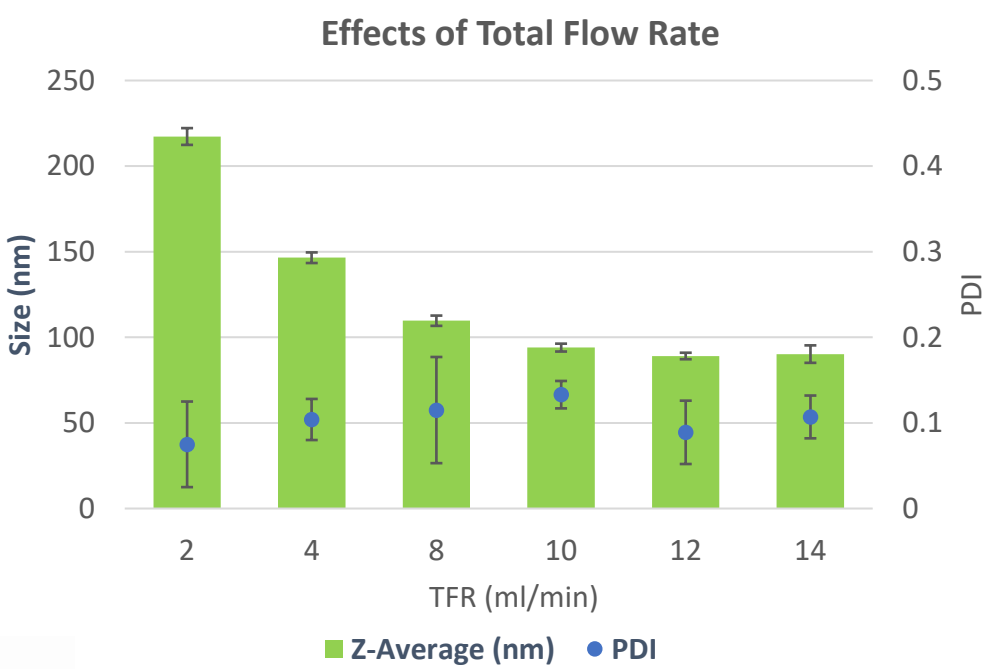
E.P. Lamparelli [a], M.C. Ciardulli [a], P. Scala [a], M. Scognamiglio [b], B. Charlier [a], P. Di Pietro [a], V. Izzo [a], C. Vecchione [a,c], N. Maffulli [a], G. Della Porta [a,b,d,*]

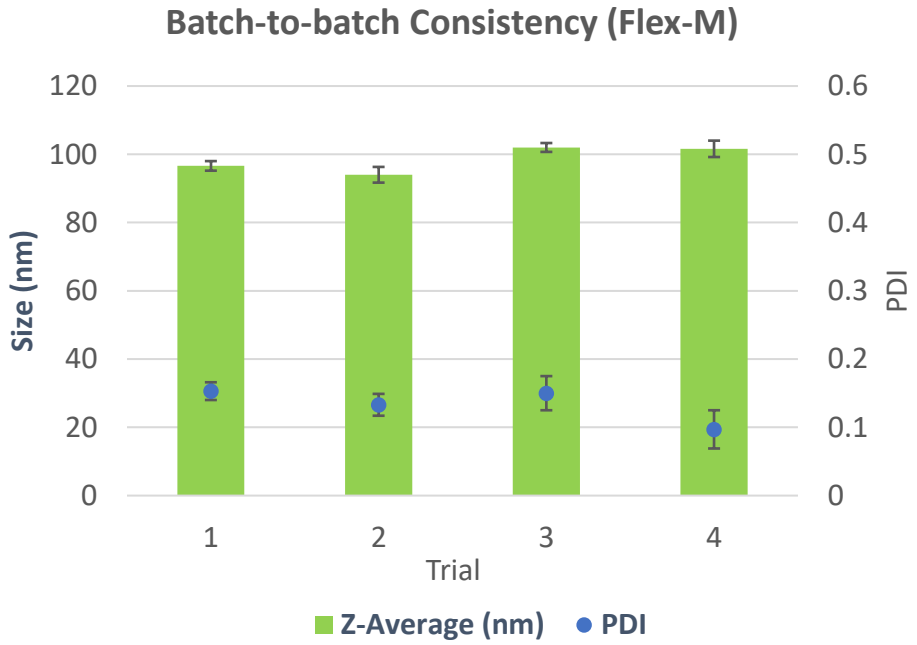
[a] Department of Medicine, Surgery and Dentistry, University of Salerno, Via S. Allende, 84081 Baronissi, (SA), Italy
[b] Department of Industrial Engineering, Università di Salerno, via Giovanni Paolo I, 84084 Fisciano, (SA), Italy
[c] IRCCS Neuromed, Department of Vascular Physiopathology, 86077 Pozzilli, IS, Italy
[d] Interdepartment Centre BIONAM, Università di Salerno, via Giovanni Paolo I, 84084 Fisciano, (SA), Italy

# Case Study: PLGA Nanoparticle Synthesis

- PreciGenome's NanoGenerator® is used for the synthesis of a variety of nanoparticles, including PLGA (poly(lactic-co-glycolic acid)) nanoparticles.

- PLGA NP size tuning is controlled by the formulation parameters, the total flow rate and the flow rate ratio.



# LipidFlex™ – Flexible Starting Kit

## LipidFlex™

### Flexible Lipid Nanoparticle Formulation

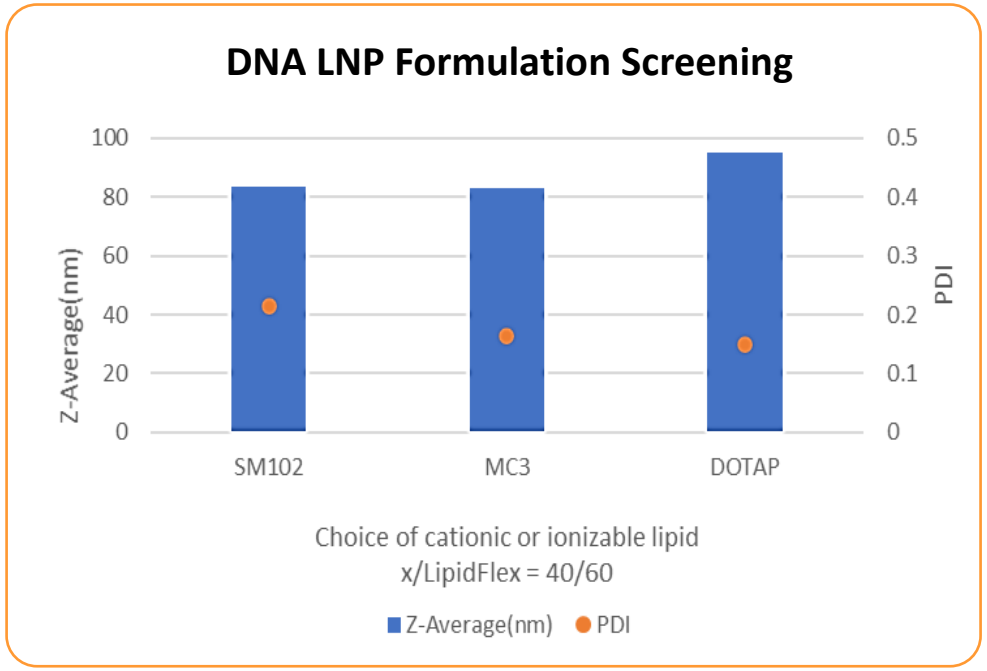
LipidFlex™ is a 3-component lipid nanoparticle formulation that compatible with various cationic/ ionizable lipids for nucleic acid encapsulation and cell transfection. LipidFlex™ Pack kit includes ionizable lipid (SM102).

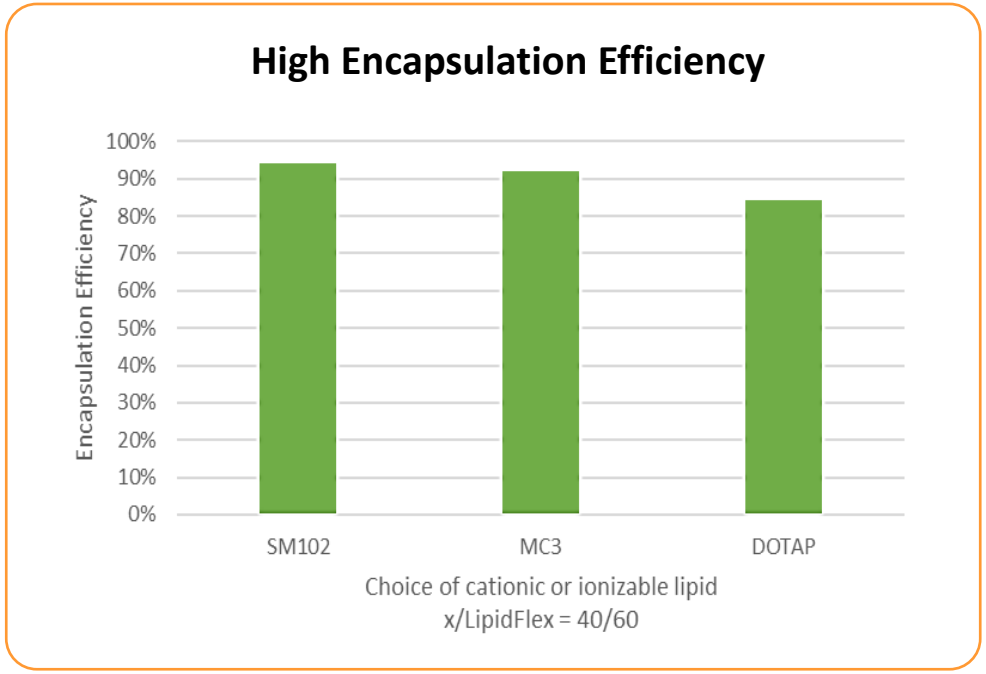
- Flexible cationic/ionizable lipid ratio
- Flexible with various N/P ratio
- High nucleic acid encapsulation efficiency
- High mammalian cell transfection rate

| Model | LipidFlex™ |
|---|---|
| Catalog # | PG-SYN-LF1ML |
| Components | Structural Lipid/ Cholesterol/Stabilizer |
| Product size | 1000 µL |
| LipidFlex Conc. | 30 mM |
| Ionizable lipid | NA |

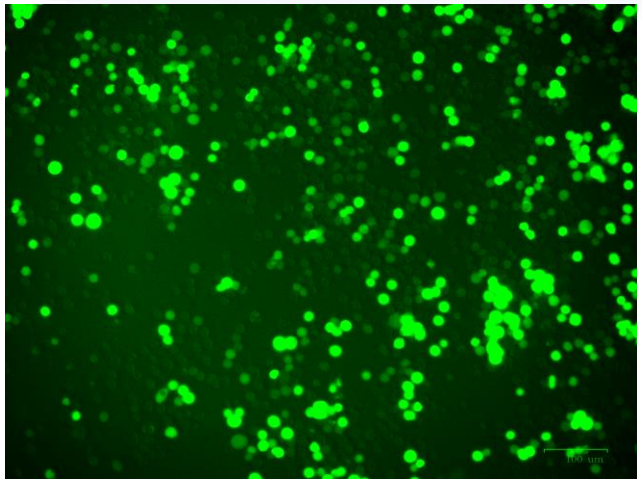
# LipidFlex™ – Flexible Starting Kit

- PreciGenome provides a general LipidFlex™ formulation for quick formulation screening.
- By adding cationic/ionizable lipid into LipidFlex™, customer can prepare nucleic acid LNP with high encapsulation efficiency.

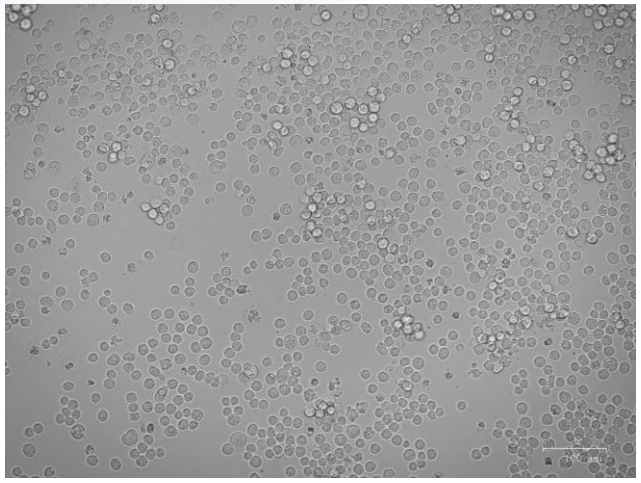


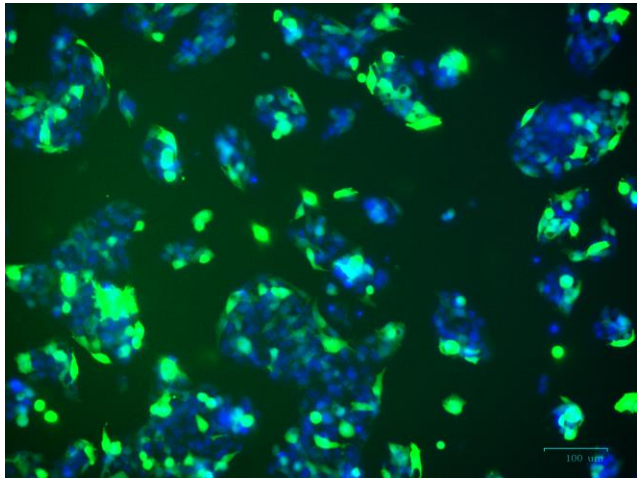
# LipidFlex™ LNP – Cell Transfection to Different Cell Lines



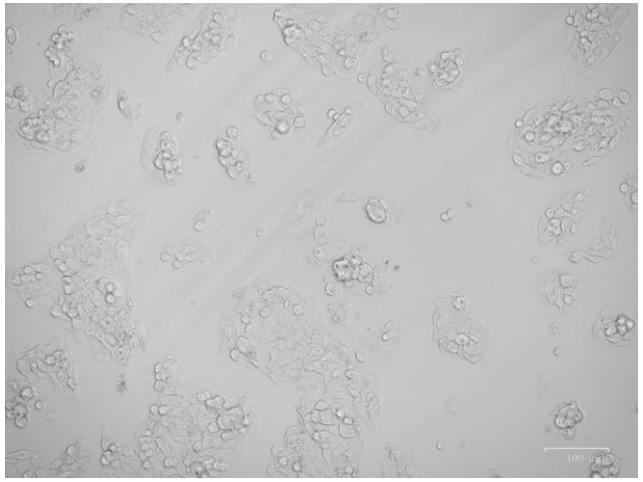
K562 – Green Fluorescence Field



K562 –Bright Field



HepG2 – Green and Blue field overlay

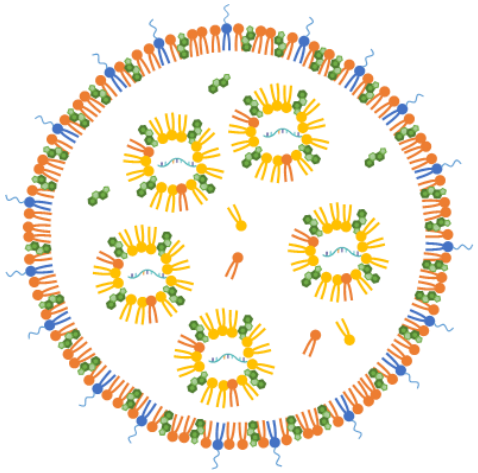


HepG2 –Bright Field

- DNA lipid nanoparticle (gWiz GFP plasmid, Aldervon) was generated using SM102/PG-LipidFlex (40/60 mol%) formulation by PreciGenome NanoGenerator.
- HepG2 and K562 Cell lines are successfully transfected by GFP DNA LNP. 48 hours post transfection, HepG2 Cell nucleuses are stained with Hoechst 33342 dye (blue color) before imaging.

# LipidFlex™ T Cell Kit

LipidFlex™ T cell kit is a highly efficient lipid formulation to synthesize mRNA lipid nanoparticles (LNP) for primary human T cell gene delivery. Using NanoGenerator® Flex-S system and CHP-MIX-4 cartridge, customers can prepare potent mRNA LNP in a convenient and efficient way.

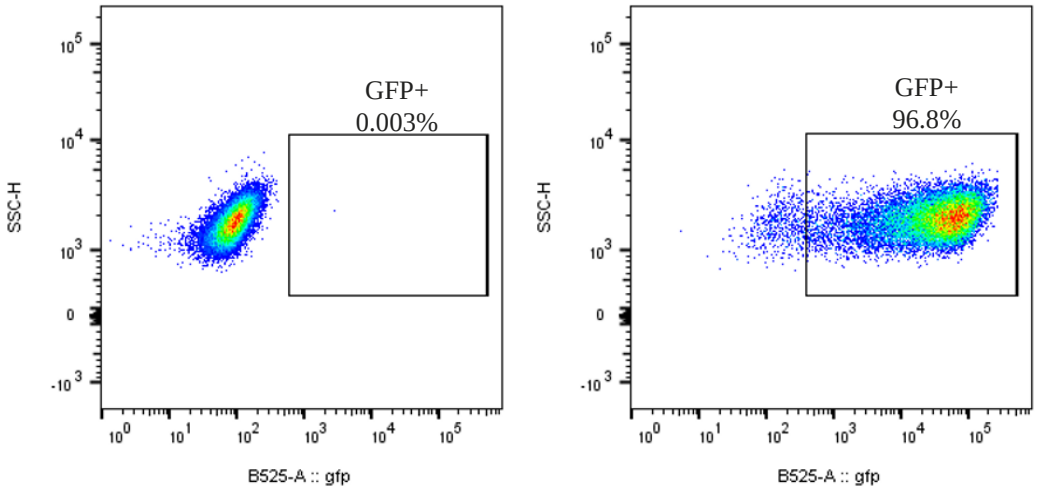


- Over 90% mRNA encapsulation efficiency
- High transfection efficiency
- High protein expression level
- High cell viability
- Time efficient synthesis process

| Component | Size | Storage |
|---|---|---|
| LipidFlex T cell Lipid mix | 125 µL | -80 ˚C |
| Formulation Buffer 1 (10x) | 60 µL | 4 - 8 ˚C |
| Formulation Buffer 2 | 600 µL | 4 - 8 ˚C |

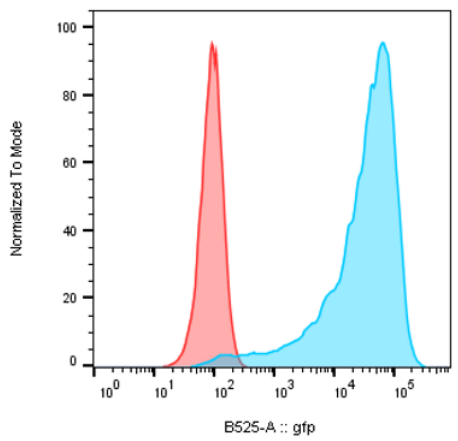
# LipidFlex™ T Cell Kit

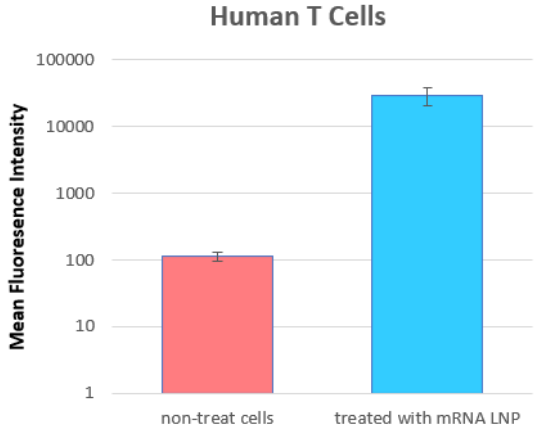
## High Human T Cell Transfection Efficiency




* 24 hours post-treatment Human T cells (eGFP mRNA from Trilink)

## High Protein Expression Level



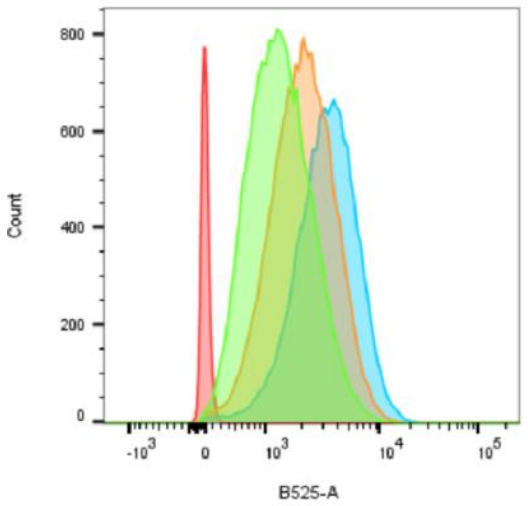



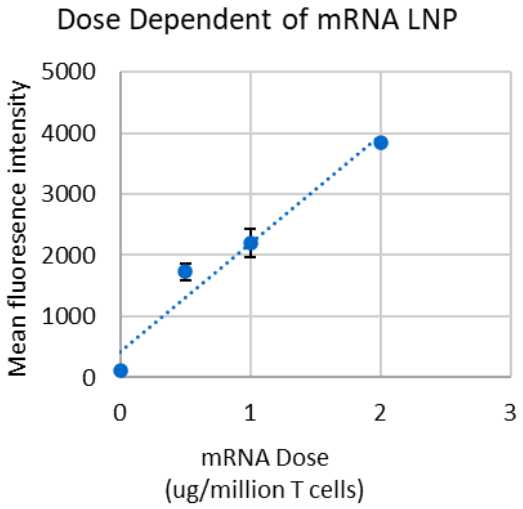

Non-treat cells  Treated with eGFP mRNA LNP

* 24 hours post-treatment Human T cells (eGFP mRNA from Trilink)

# LipidFlex ™ T Cell Kit

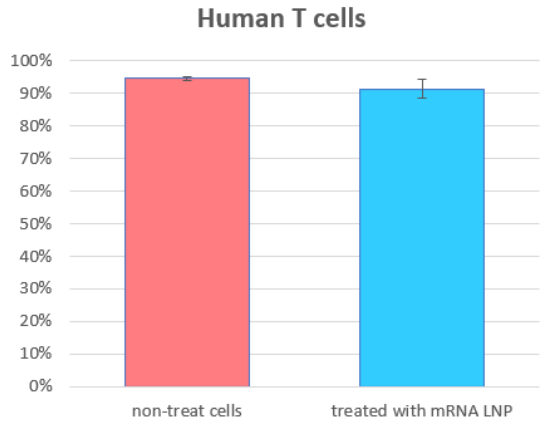
## mRNA LNP Dose Dependency

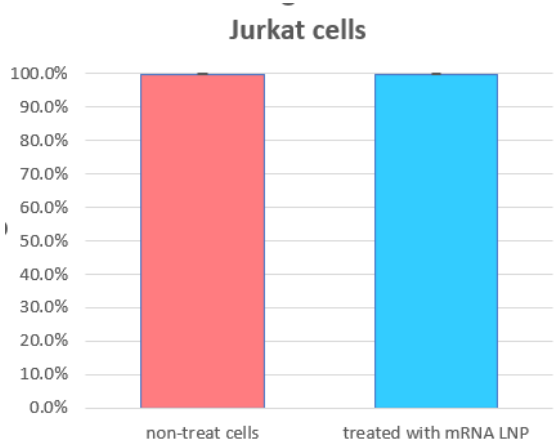



* 24 hours post-treatment Jurkat cells (eGFP mRNA from ProMab)

## High Cell Viability




* 24 hours post-treatment Human T cells and Jurkat cells

# Why PreciGenome?

NanoGenerator® Flex-S

### High Performance & Efficiency

- Tunable size (40-200nm)
- Low PDI (0.05-0.2)
- High encapsulation efficiency

### Open Platform

- Upgradable system
- Transferable microfluidic chips

### Scalable Throughput

- Low volume for screening (Flex-S)
- Medium volume production (Flex-M/Flex-M Premium)
- High volume production (Pro, Max-GMP)

NanoGenerator® Flex-S Plus

NanoGenerator® Flex-M/Flex-M Premium

### Simple Operation

- Simple setup
- Compact size
- Intuitive UI w/ touchscreen

### Cost Effective

- Affordable configuration
- Lower cost per run

### Custom Support

- Demo, Training and Support
- Extended Warranty
- Hot swap option
- Local US company

NanoGenerator® MAX

# Some of Our Customers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San Jose, CA, United States 95131