



NanoGenerator[®] Nanoparticle Synthesis System and LipidFlex[™] Formulation

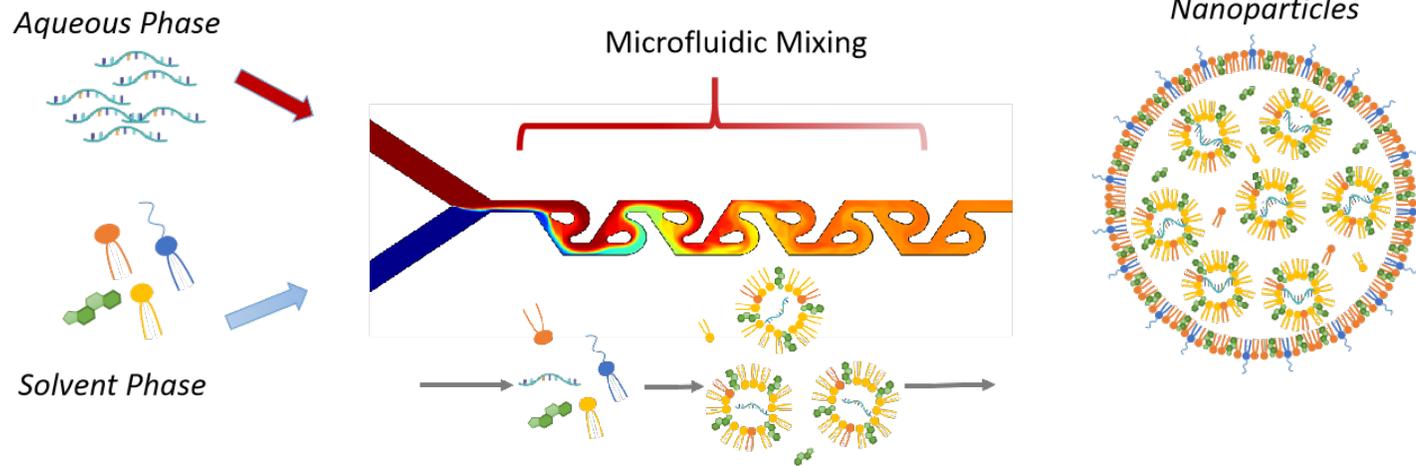
PreciGenome

AUG 2025

What are Lipid Nanoparticles?



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



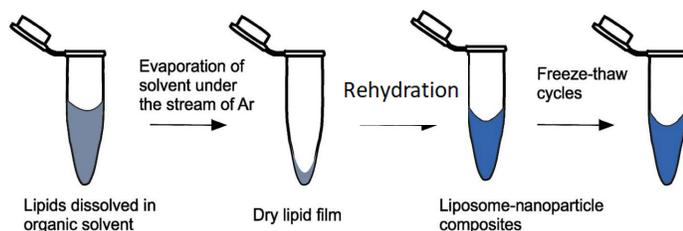
-  Cationic/ionizable lipid
-  Structural lipid
-  Cholesterol
-  PEGylated lipid
-  Nucleic acid payload

Lipid Nanoparticle Synthesis Methods



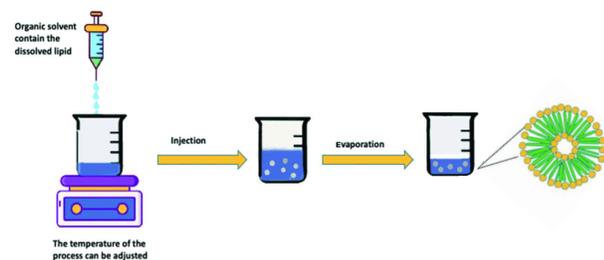
Conventional Methods

A Film hydration



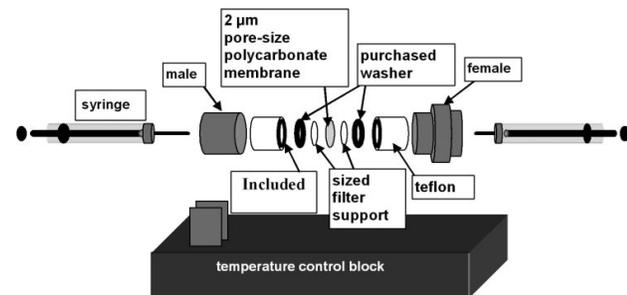
- Established method
 - Understood method
- High consumption of organic solvent
 - High PDI
 - Lack of reproducibility
 - Need for additional downsizing step
 - Difficulties in scaling-up

B Solvent injection



- Simple and fast
 - Scaling-up possible
- Exposure to organic solvent
 - High PDI
 - Stability problem

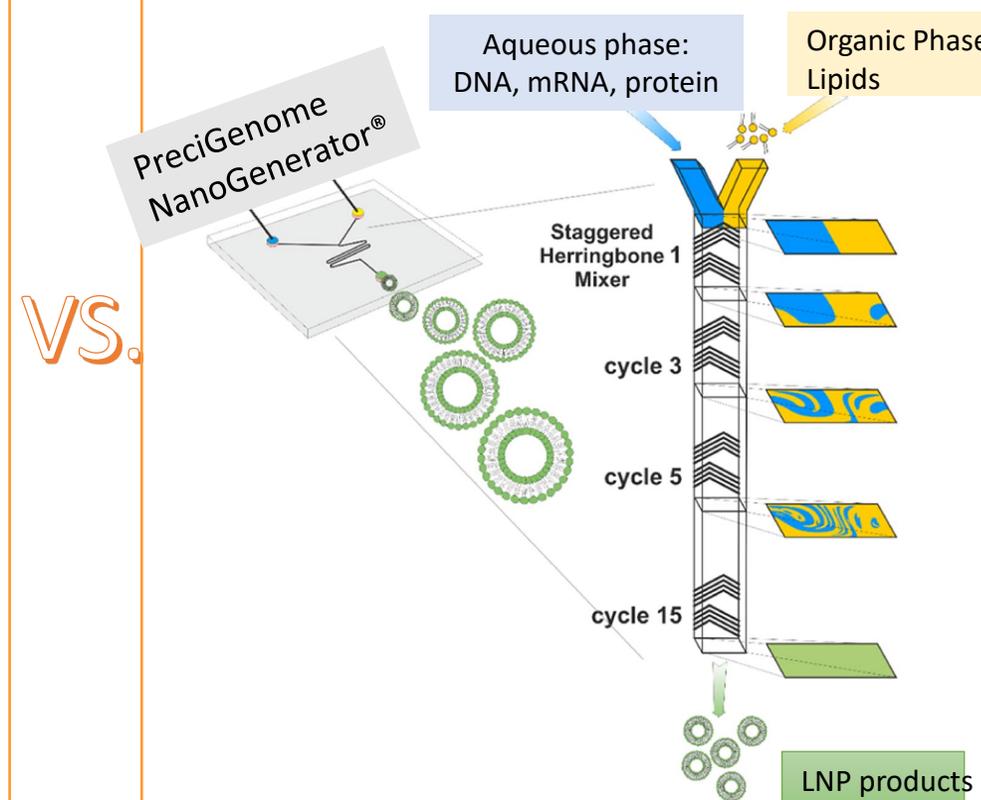
C Extrusion



- Uniform and homogenous formulation
- Possible clogging of membrane pores
 - Difficulties in scaling up

Nanomaterials, Volume 11, 2021, 3440

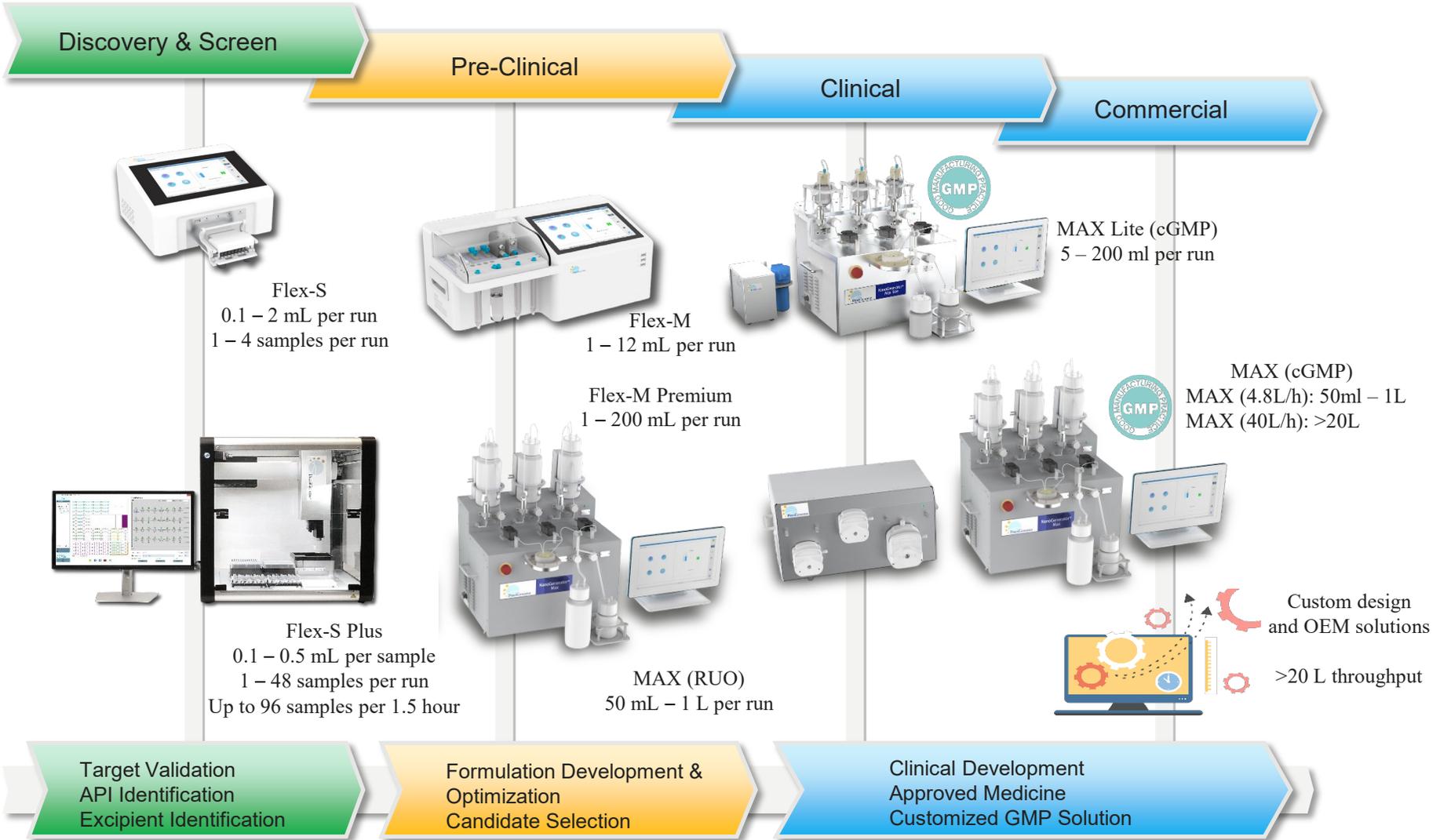
Microfluidic Mixer



VS.

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

NanoGenerator[®] - Nanoparticle Synthesis System



NanoGenerator[®] - Nanoparticle Synthesis System



Basic Features



	Flex-S	Flex-S Plus	Flex-M	Flex-M premium	MAX Lite	MAX (4.8L/h)	MAX (40L/h)
Product Model	PG-SYN-FS	PG-SYN-SP	PG-SYN-FM	PG-SYN-FM	PG-SYN-GL	PG-SYN-G	PG-SYN-G
R&D Stage	Screening & Discovery (Characterization, <i>in vitro</i> & <i>in vivo</i>)		Screening & Discovery (<i>in vivo</i>)	Discovery & Preclinical Studies	Preclinical & Clinical Studies	Preclinical & Clinical Studies	Clinical Studies & Production
cGMP Version	No				YES		
Throughput	0.1 – 2 ml	0.1 – 0.5 ml	1 – 12 ml	1 – 200 ml	5 – 200 ml	50 ml – 1 L	> 20 L
Multiple Samples per Run	1 – 4	(1 – 4) × 12	No				
MAX Flow Rate	3 or 4 ml/min	3.5 or 5 ml/min	5 ml/min	20 ml/min	24 ml/min	4.8 L/h	40 L/h
Flow Rate Ratio	3:1		1:1 – 5:1	1:1 – 10:1	1:1 – 9:1	1:1 – 9:1	1:1 – 5:1
Tunable Flow Rate & Ratio	Customer Design			YES			
Inline Dilution	No (dilution in the collection)		Optional		YES		
Inline Monitoring	Pressure			Pressure & Flow Rate			
Consumable Cost per Run	\$				\$\$	\$\$ (RUO) \$\$\$ (cGMP)	\$\$\$
Dimensions (cm)	32 × 40 × 21	63 × 57 × 66	53 × 27 × 24		42 × 30 × 30	62 × 38 × 43	
Weight (kg)	8.1	50	10.7		35	50	65

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 Lite (cGMP)



Small/Medium
Production
5 – 200 mL

NanoGenerator® Max (cGMP)



Commercial Production
50 mL – 1 L (MAX 4.8L/h);
> 20 L (MAX 40L/h)

OEM



Custom design and OEM solutions
cGMP certified manufacturing
>200 L throughput



Scalable LNP Production



Transferable results from early screening (Flex-S, 0.1mL) to pre-clinical development (Flex-M/M Premium, 12ml/200mL), then clinical studies and production (Max Lite: 200ml 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

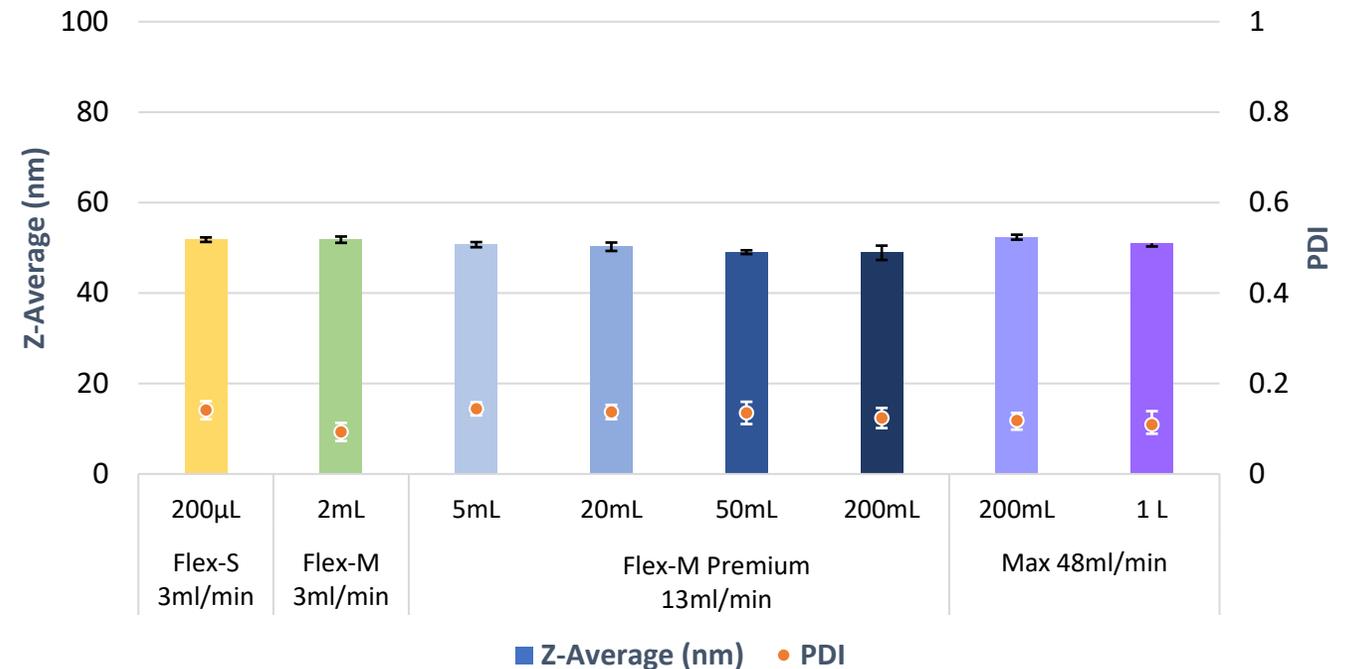


- MAX Lite: 5 – 200 mL



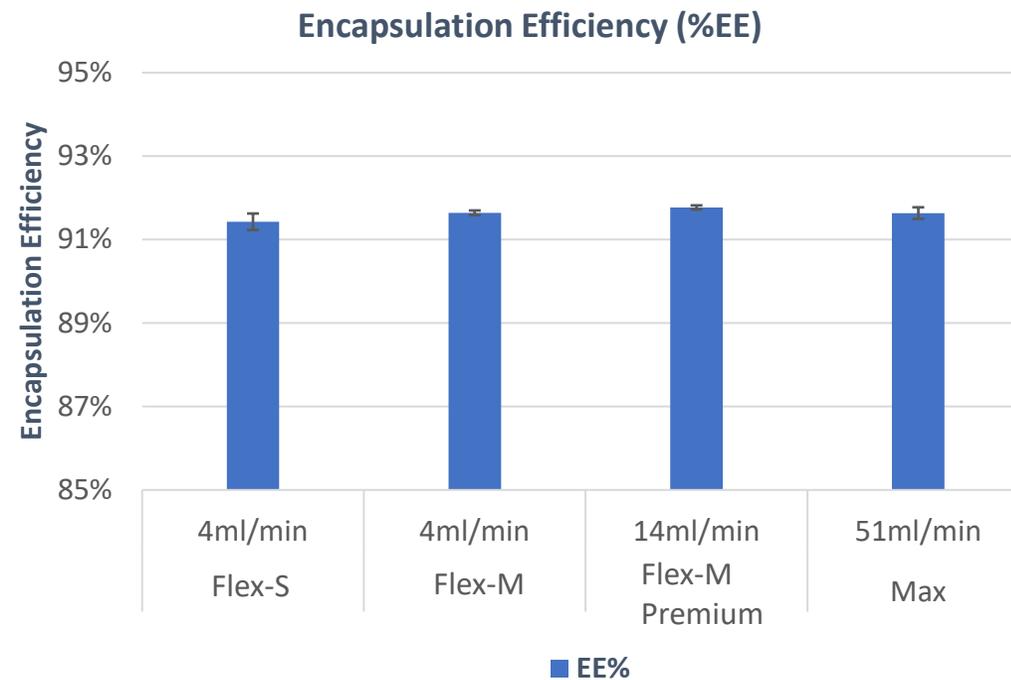
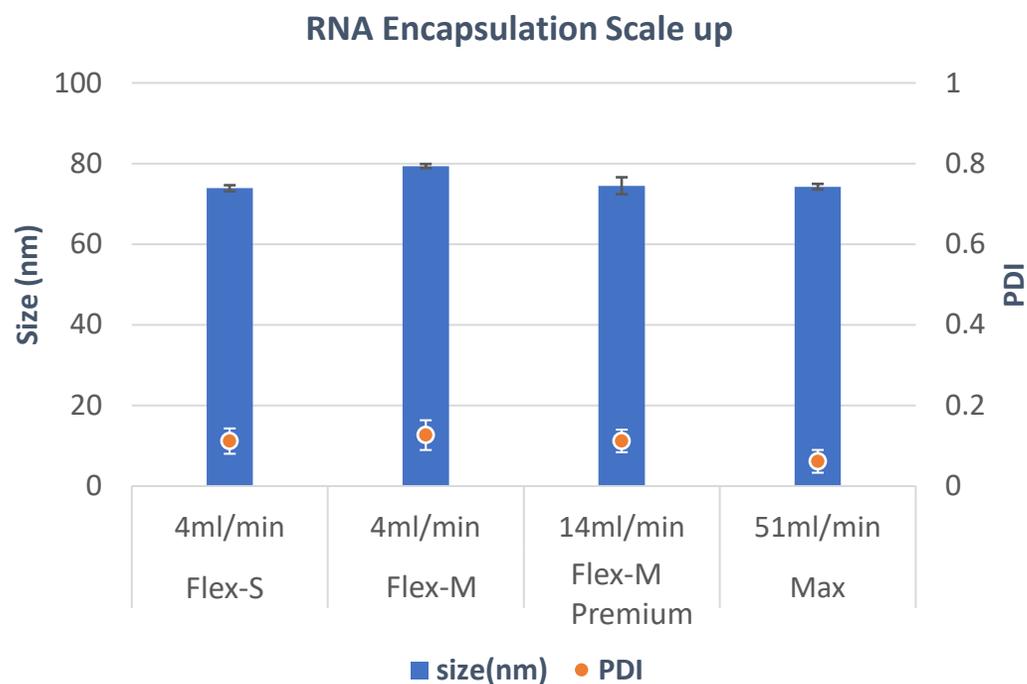
- MAX RUO & cGMP (4.8L/h) : 50 mL – 1 L
- MAX cGMP (40L/h): > 20 L

NanoGenerator® Scale Up



Reagents	
Aqueous phase	Sodium acetate buffer (100 mM, pH 5.2)
Solvent phase	LipidFlex, 15 mM in ethanol

Scalable LNP Production



Reagents	
Aqueous phase	Sodium acetate buffer (100 mM, pH 5.2)
Payload	RNA (~600 nt)
Solvent phase	LipidFlex RNA-LNP kit

NanoGenerator[®] Flex-S



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

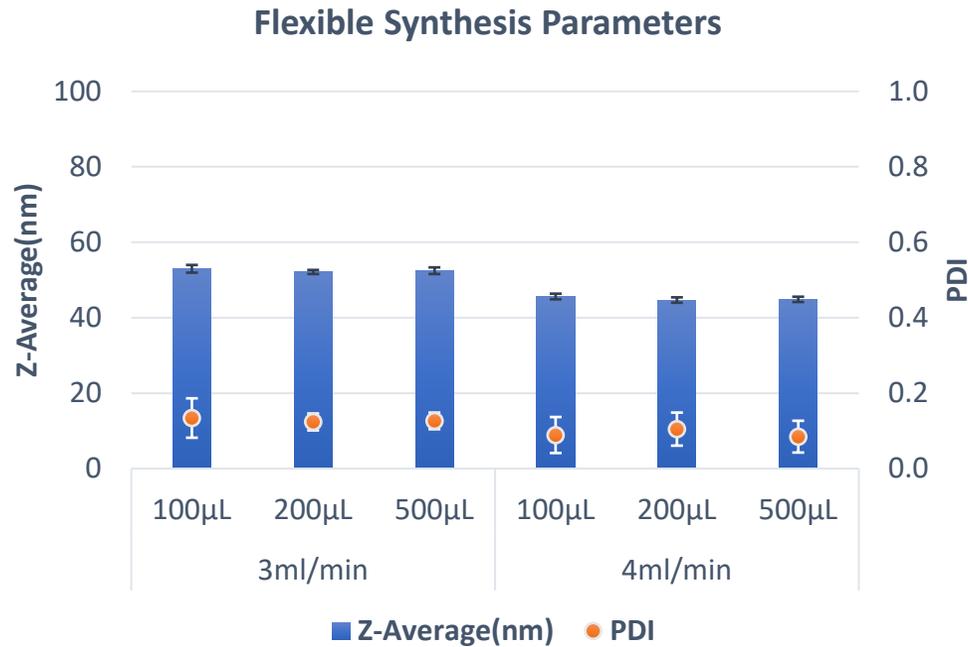


NanoGenerator[®] Flex-S

	NanoGenerator Flex-S	Syringe Pump Systems	Tubing Connection Systems
Dead volume per sample	< 20 μ L	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	Aqueous: 75 μ l	Aqueous: 1 mL	Aqueous: 1 mL
(Aqueous:Lipid = 3:1)	Lipid: 25 μ l	Lipid: 0.5 mL	Lipid: 0.5 mL
Estimated minimum mRNA cost	\$50	\$660	\$660



NanoGenerator® Flex-S

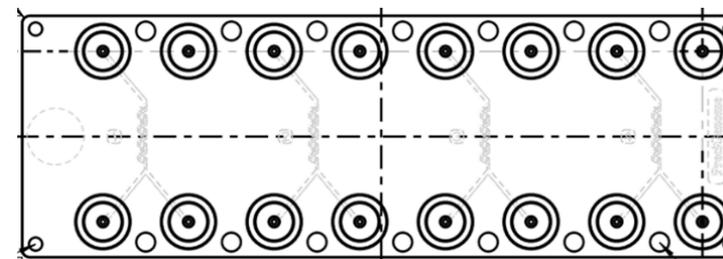
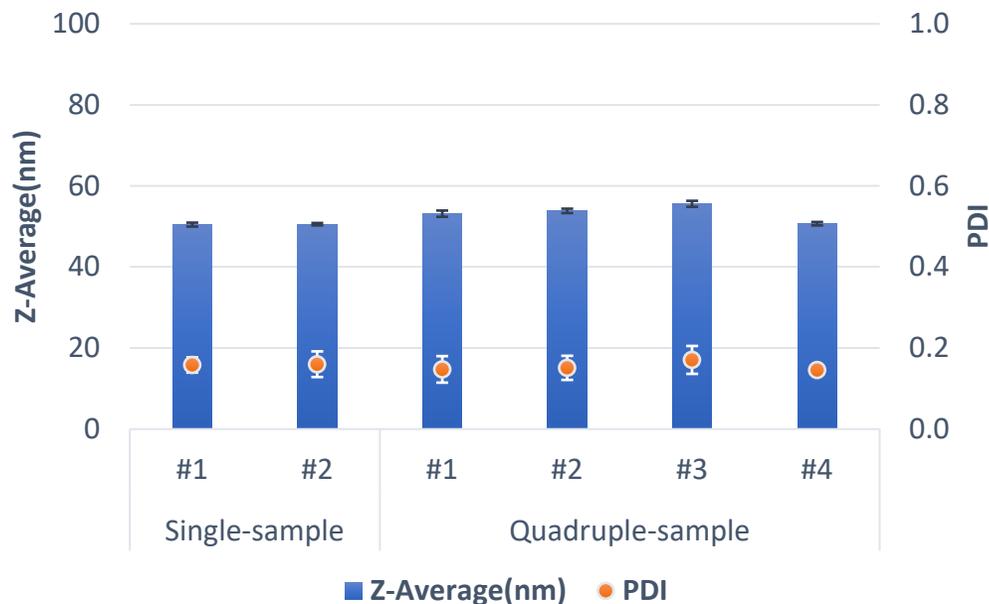


Model	Flex-S
Aqueous phase	Sodium acetate buffer, 100mM, pH 5.2
Solvent phase	LipidFlex, 15mM in ethanol

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



Flex-S Multi-Sample Synthesis Mode

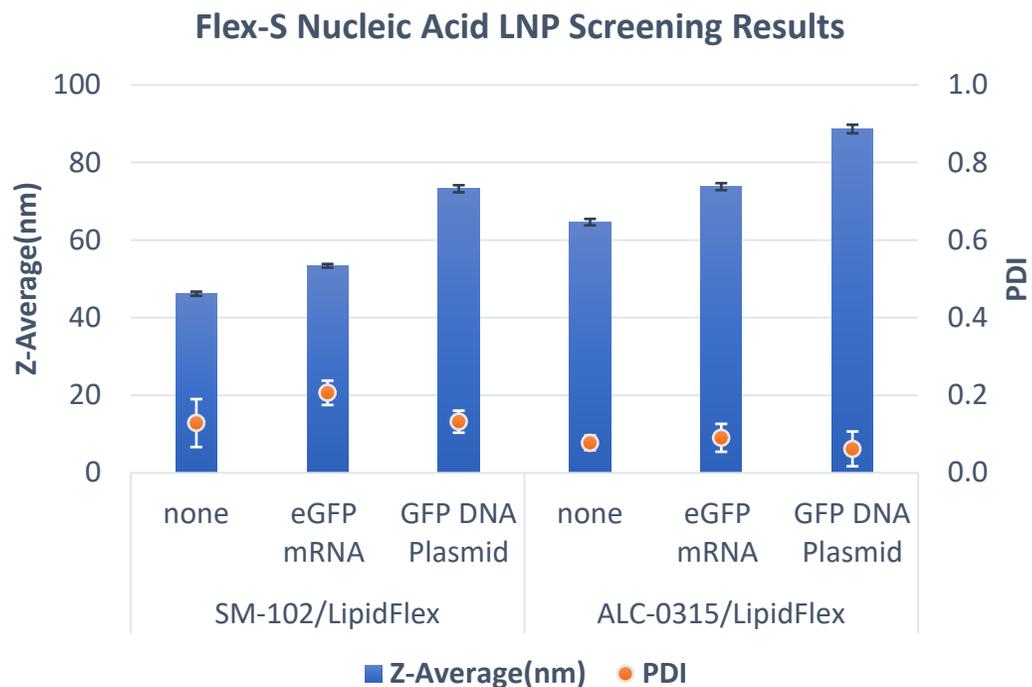
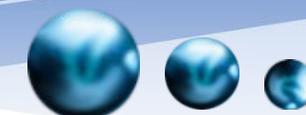


CHP-MIX-4

Multi-sample Synthesis by NanoGenerator® Flex-S:

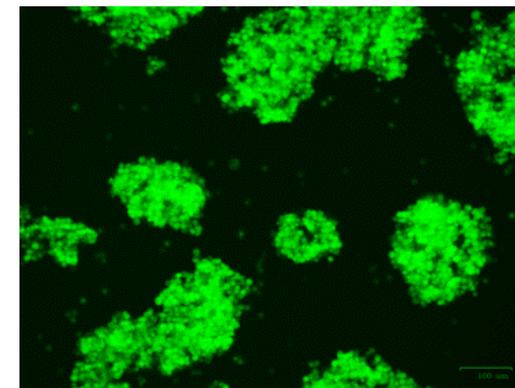
- **10 seconds, 4 samples.** Users can choose multi-sample synthesis mode to conduct formulation screening. The screening time is as low as 10 seconds
- **Reliable screening results.** Using PreciGenome's advanced air-flow control technology, users can obtain reliable LNP results on both single- and multi-sample synthesis modes.

Model	Flex-S
Aqueous phase	Sodium acetate buffer, 100 mM, pH 5.2
Solvent phase	LipidFlex, 15 mM in ethanol



Model	Flex-S
Aqueous phase	100 µg/mL eGFP mRNA (CATUG) or GFP DNA (ALDEVRON) in sodium acetate buffer (100 mM, pH 5.2)
Solvent phase	Ionizable lipid/LipidFlex, 40/60, 12.5 mM in ethanol

eGFP mRNA LNP Delivery to Jurkat Cells



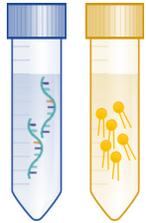
Jurkat Cells transfected with eGFP mRNA LNP. Green fluorescence image at 48 hours post transfection.

- **Robust Formulation Screening.** Using NanoGenerator[®] Flex-S, users can conduct formulation screening with low reagent consumption for high cost savings.
- LNP size and PDI depend on the payload and formulation choice.

Flex-S workflow



Step 1: Preparation



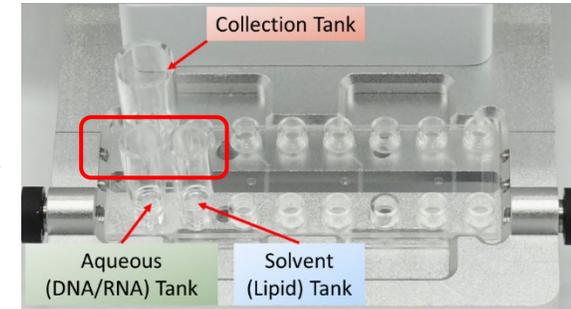
Aqueous: DNA, mRNA in buffer
Solvent: lipid mix in ethanol
(Lipid-Flex formulation)



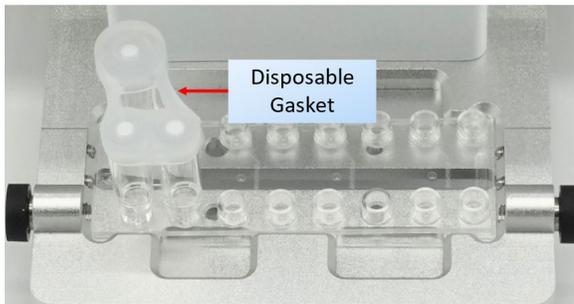
Step 2: Load chip



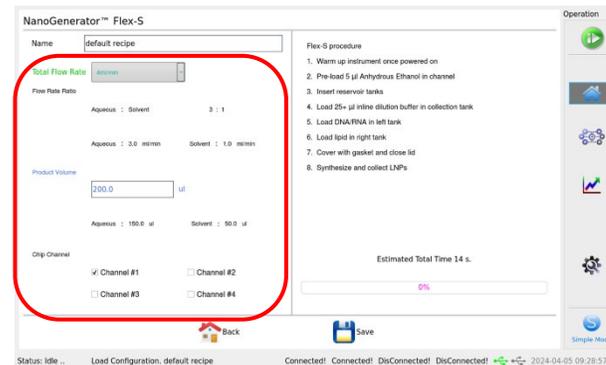
Step 3: Load samples



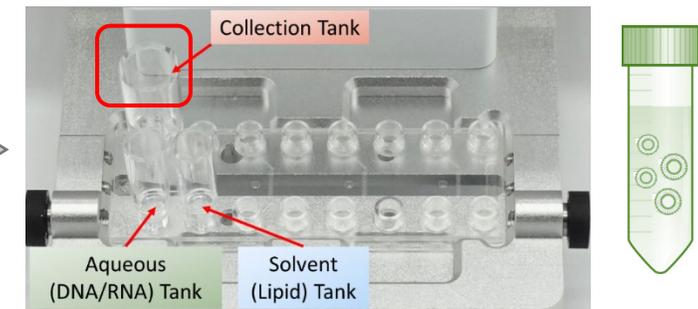
Step 4: Put on Gasket



Step 5: Set Parameters and Run



Step 6: Collect LNPs in seconds



Demo video: [PeciGenome Lipid Nanoparticle Synthesis System NanoGenerator \(3rd gen\) Flex-S Demo and Introduction \(youtube.com\)](#)

Demo video (multi-channel synthesis): [4 Samples per run for Lipid Nanoparticle Synthesis, NanoGenerator \(3rd gen\) Flex-S Demo \(youtube.com\)](#)



Consumables For Flex-S



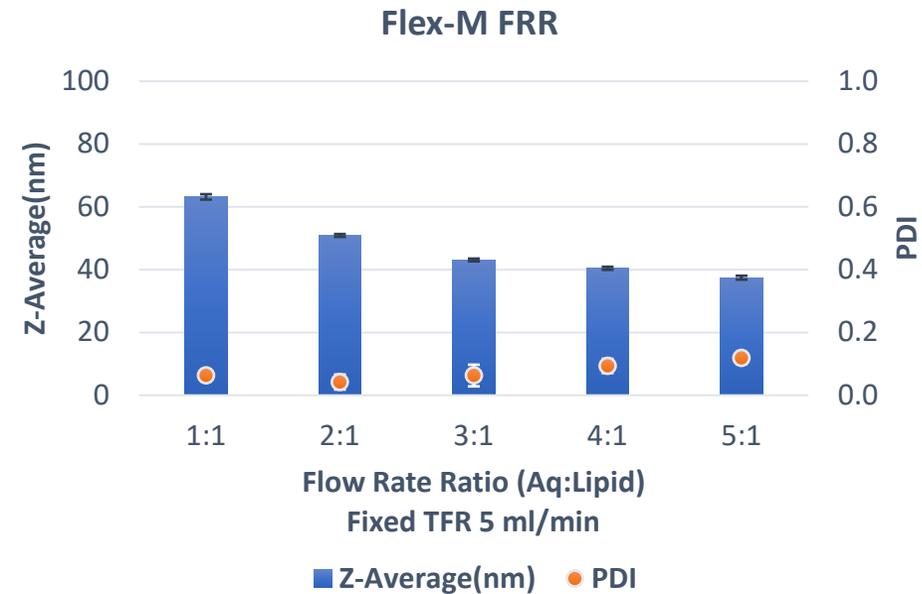
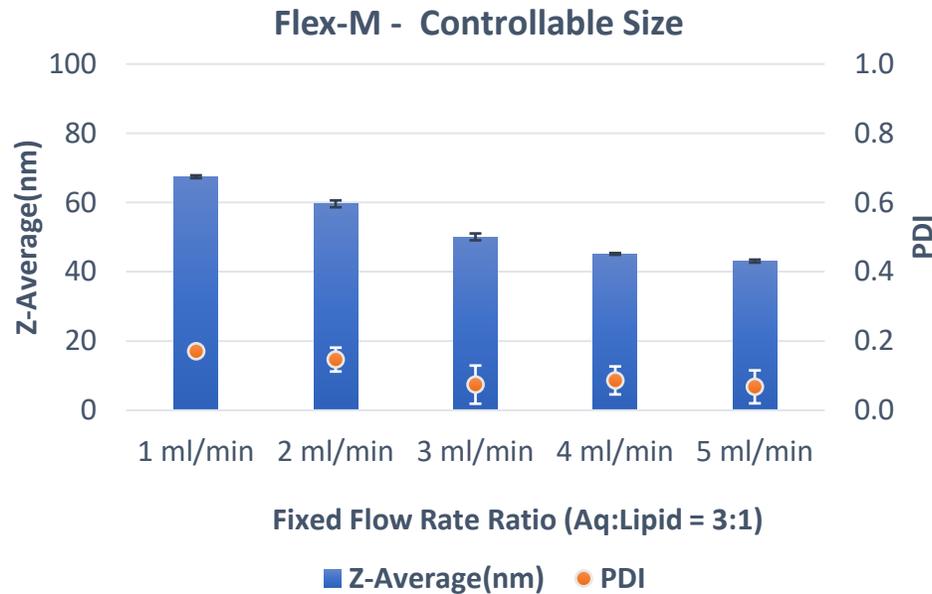
Catalogue number or brand	Items	Description
CHP-MIX-4	Mix-4 mixing cartridge	Microfluidic mixing chip for Flex-S & Flex-M, 4 devices per chip
PG-MRC-SYNS-Q20	Reservoir connector	Reagent reservoirs for Flex-S, 20 pcs/pack
PG-GSK-SYNS-Q20	Flex-S gasket	Gaskets for Flex-S, one per device, 20 pcs/pack
PG-GSK-SYNS4-Q5	Gasket sheet for Flex-S	Gasket sheet for Flex-S; One per chip (4 samples); 5 pcs/pack

NanoGenerator[®] Flex-M



NanoGenerator[®]
Flex-M/Flex-M Premium

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



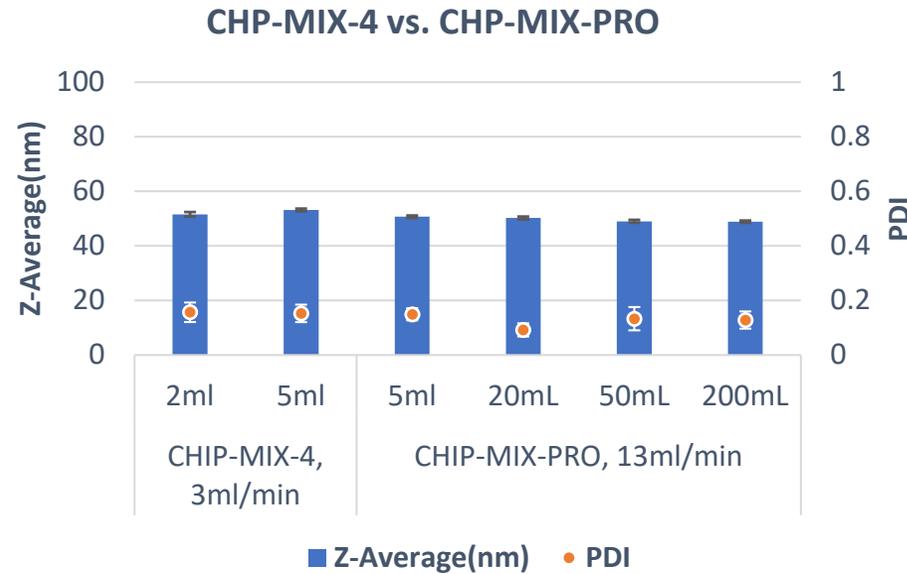
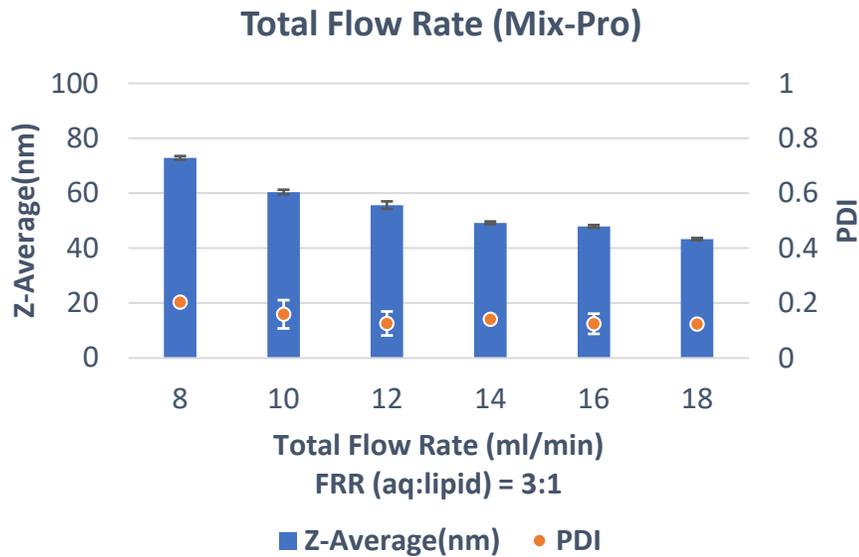
Model	Flex-M
Aqueous phase	Sodium acetate buffer 100 mM, pH 5.2
Solvent phase	LipidFlex, 15 mM in ethanol

Upgrade Flex-M to Flex-M Premium

- Extended synthesis volume per batch up to 200 mL
- Tunable total flow rate (TFR, 1 – 5 ml/min) and flow rate ratio (FRR, 1:1 to 10:1) in Flex-M with MIX-4
- Compatible with CHP-MIX-PRO Chip (up to 20 ml/min)



NanoGenerator®
Flex-M Premium



CHP-MIX-PRO

- Total flow rate: up to 20 ml/min
- Throughput: 5-200 ml

Model	Flex-M/Flex-M Premium
Aqueous phase	Sodium acetate buffer 100 mM, pH 5.2
Solvent phase	LipidFlex, 15 mM in ethanol

Transferable results between Flex-S/M

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

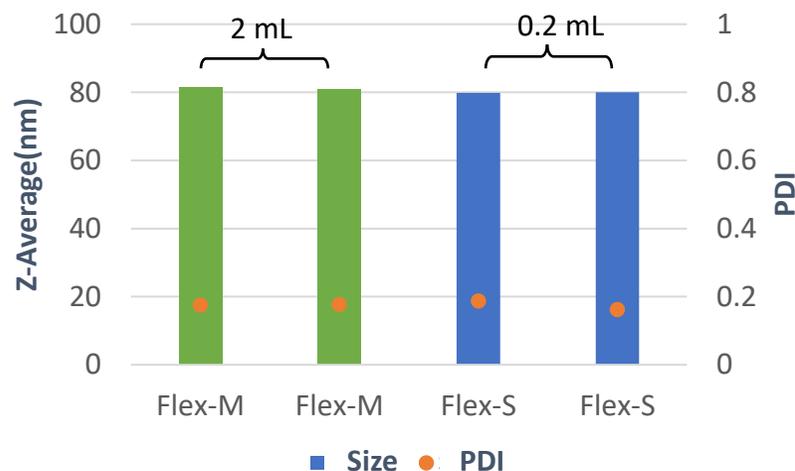


NanoGenerator® Flex-S

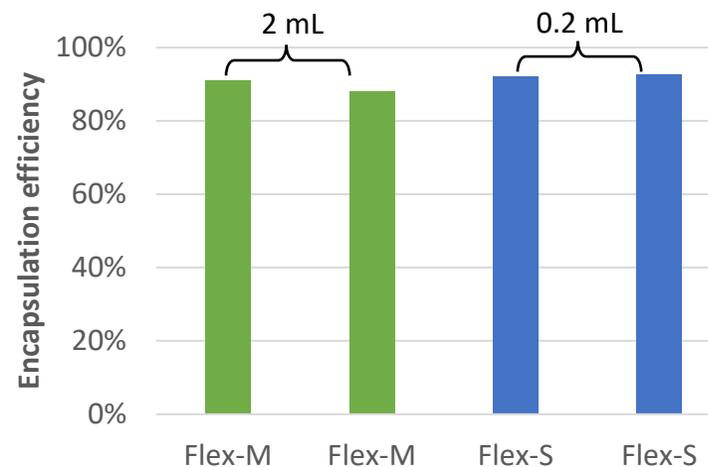


NanoGenerator® Flex-M/Flex-M Premium

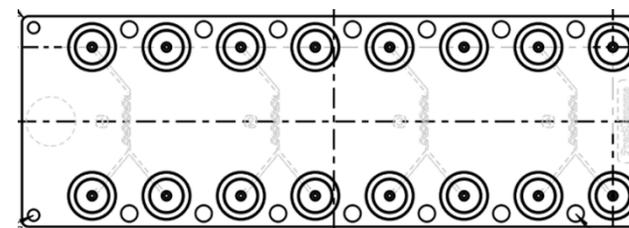
DNA LNP Synthesis



High Encapsulation Efficiency



Model	Flex-S/M
Aqueous phase	GFP DNA plasmid (100 µg/mL) in sodium acetate buffer(100 mM, pH 5.2)
Solvent phase	SM102/Lipidflex (40/60 mol%, 12.5 mM total lipid concentration) in ethanol
N/P ratio	6

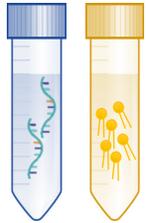


CHP-MIX-4

Flex-M/Flex-M Premium workflow



Step 1: Preparation

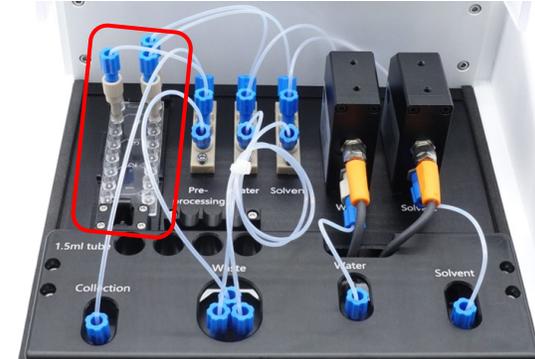


Aqueous: DNA, mRNA in buffer
Solvent: lipid mix in ethanol
(Lipid-Flex formulation)

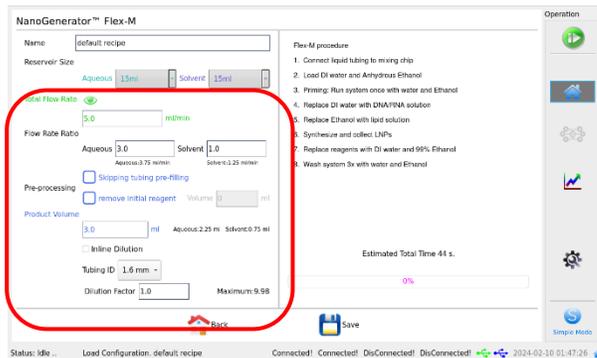
Step 2: Load sample tubes and collection tube



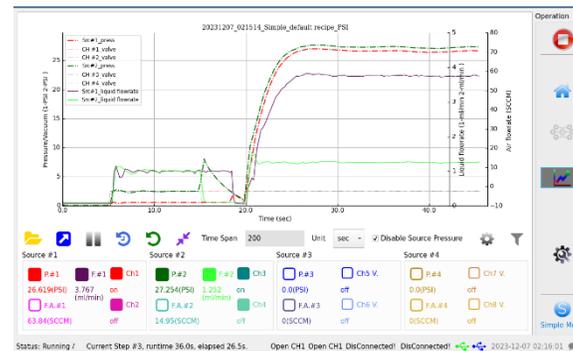
Step 3: Load chip



Step 4: Set parameters and Run



Step 5: Monitor flow rates



Step 6: Collect LNPs in seconds



Demo video: [NanoGenerator Flex-M \(3rd Gen\) Demo for Lipid Nanoparticles LNP, liposome synthesis \(youtube.com\)](https://www.youtube.com/watch?v=...)

Consumables for Flex-M/Flex-M premium



Catalogue number or brand	Items	Description
CHP-MIX-4	Mix-4 mixing cartridge	Microfluidic mixing chip for Flex-S & Flex-M, 4 devices per chip
CHIP-MIX-PRO	Mix-Pro chip	Microfluidic mixing chip for Flex-M premium, 1 device per chip
CHP-MIX-G1	Glass mixing chip	Glass microfluidic mixing chip
PG-MNT-CHP-2	Glass mixing chip holder	Chip holder for glass mixing chip
KIT-TUB-FIT-FM	Flex-M tubing kit	Tubing and Connector Kit for Flex-M

NanoGenerator® Flex-S Plus



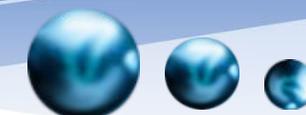
NanoGenerator®
Flex-S Plus



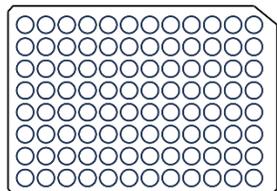
- Rapid screening of LNP formulations
- Rapid screening of mRNA/siRNA
- 48 samples per run
- 96 samples within 1.5 hours
- Disposable consumables

Model	Flex-S	Flex-S Plus
Multi-sample per run	1 – 4	(1 – 12) × 4 per run 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	3.5 ml/min, 5 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 workflow



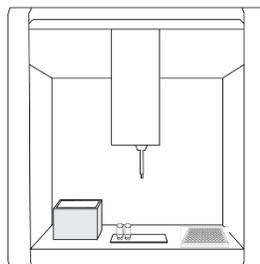
Input: raw materials



Library preparation



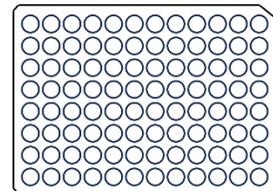
Up to 48 samples per run, 96 samples within 90 mins



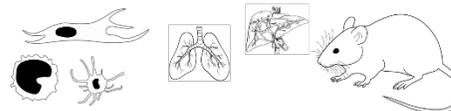
Buffer exchange



Output: LNPs w/o ethanol



In vitro & In vivo Studies



LNP Formulations

Payload library

- Payload type
- Payload Concentrations

Carrier library

- Lipid combination, ratio
- Lipid Concentration



Parallel LNP synthesis with microfluidics

Workflow:

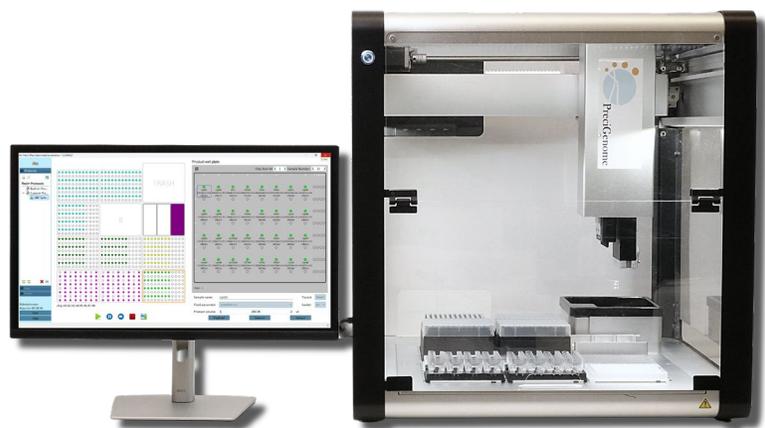
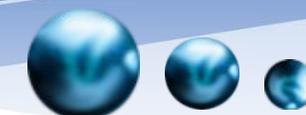
1. Load raw materials in 96 well plates
2. Seal the 96 well plates (optional)
3. Put consumables on the deck: chips, 96 well plates, pipette tips, and gaskets
4. Set parameters in the software and run the program (library prep & buffer exchange are optional)
5. Collect samples in 96 well plate
6. Discard/change consumables



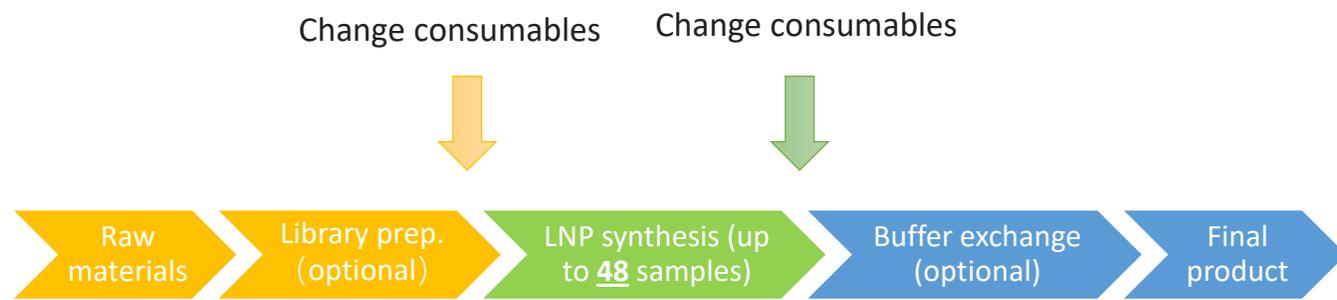
NanoGenerator® Flex-S Plus

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

NanoGenerator® Flex-S Plus workflow

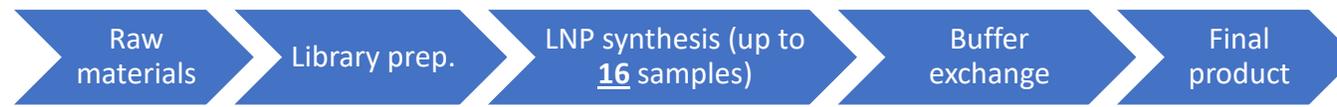


- **High throughput workflow**



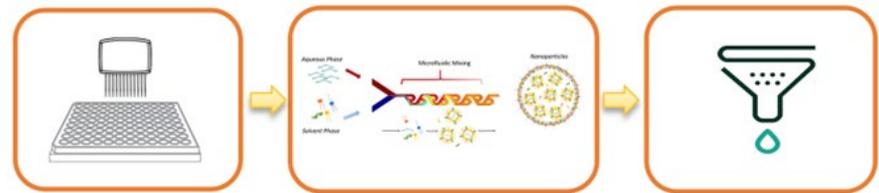
- **Automation workflow**

(no need to change consumable)



One instrument: offering two workflows

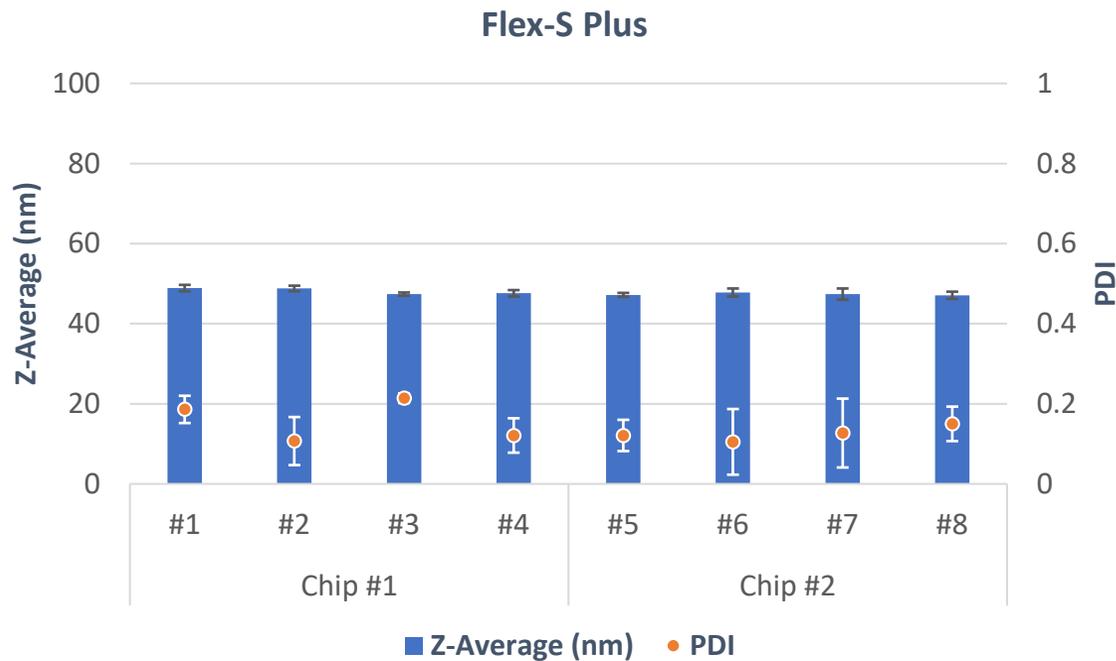
- High throughput workflow
- Automation workflow



Lipid & API Preparation

LNP Synthesis

Solvent & free payload removal



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

Model	Flex-S Plus
Aqueous phase	Sodium acetate buffer 100 mM, pH 5.2
Solvent phase	LipidFlex, 15 mM in ethanol
Parameters	3.5 ml/min, FRR 3:1, 200 µL

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 in 1.5 hours
- 96-well plate format

Model	Flex-S Plus
Aqueous phase	RNA in Sodium acetate buffer 100 mM, pH 5.2
Solvent phase	Different lipid formulation

Consumables for Flex-S Plus



Catalogue number or brand	Items	Description
KIT-SP-MIX4G-Q96	Chip & gasket package	Each package contains 24 chips and 24 gasket sheets; For 96 samples
CHP-MIX4-Q24	Chip for Flex-S plus	Qty: 96 samples pack, including mixing chips and reagent reservoirs, 24pcs (4 samples/pc).
PG-GSK-SP-Q24	Gasket sheets for Flex-S plus	Qty: 96 samples pack, including gasket 24pcs (4 samples/pc).
PG-PTIP200-Q960	200 µl pipette tip with filter	Boxes of pipette tips with filter for transferring solutions. 960 tips, 10 racks per pack
NEST® Wuxi NEST Biotechnology	Full skirt 100 µl 96-well PCR plate	For dilution buffer, aqueous samples, solvent samples or collection samples
Eppendorf® Eppendorf SE	Semi-skirt 200 µl 96-well PCR plate	For dilution buffer, aqueous samples, solvent samples or collection samples; Need to be used with 96-well plate holders
Any brand	Full skirt 300 µl 96-well cell culture plate	For collection samples
NEST® Wuxi NEST Biotechnology	Deep well 1 ml 96-well plate	For dilution buffer, aqueous samples, or collection samples
Nunc™ 96-Well	Deep well 1300 µl 96-well plate	For dilution buffer, aqueous samples, or collection samples
PG-P96-FOIL-Q100	Aluminum foil	To seal the 96-well plate
PG-SSEAL-Q10	Slit seal	96-well plate seal, allowing multi-times insertion and withdrawal of pipette tips
PG-SSEAL-STZ-Q10	Slit seal (Sterilized)	96-well plate seal, allowing multi-times insertion and withdrawal of pipette tips

Case Study I: mRNA LNP for T cell Transfection



eGFP mRNA Lipid Nanoparticles by Flex-S
Z-Average Diameter: 67.3 nm
PDI: 0.106

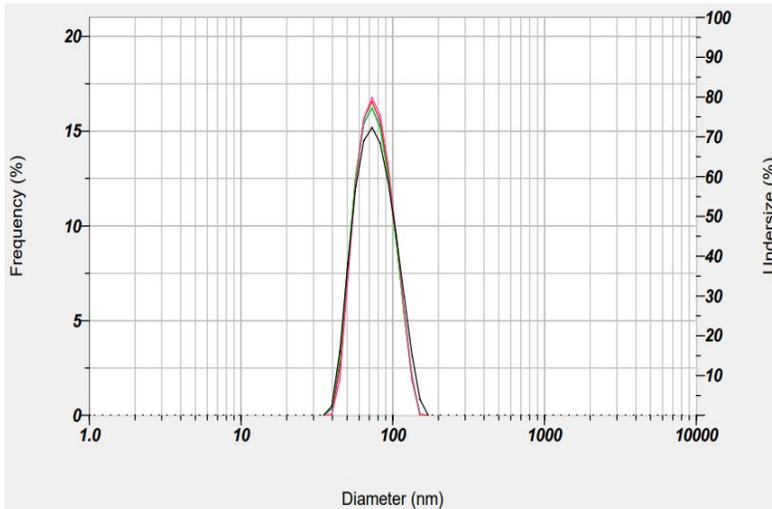


Figure 1. mRNA(eGFP)-LNP Synthesized by NanoGenerator® Flex-S. Average diameter is 67.3 nm. PDI is 0.106. Encapsulation efficiency is 94.5% (Ribo Green RNA Quantification Kit).

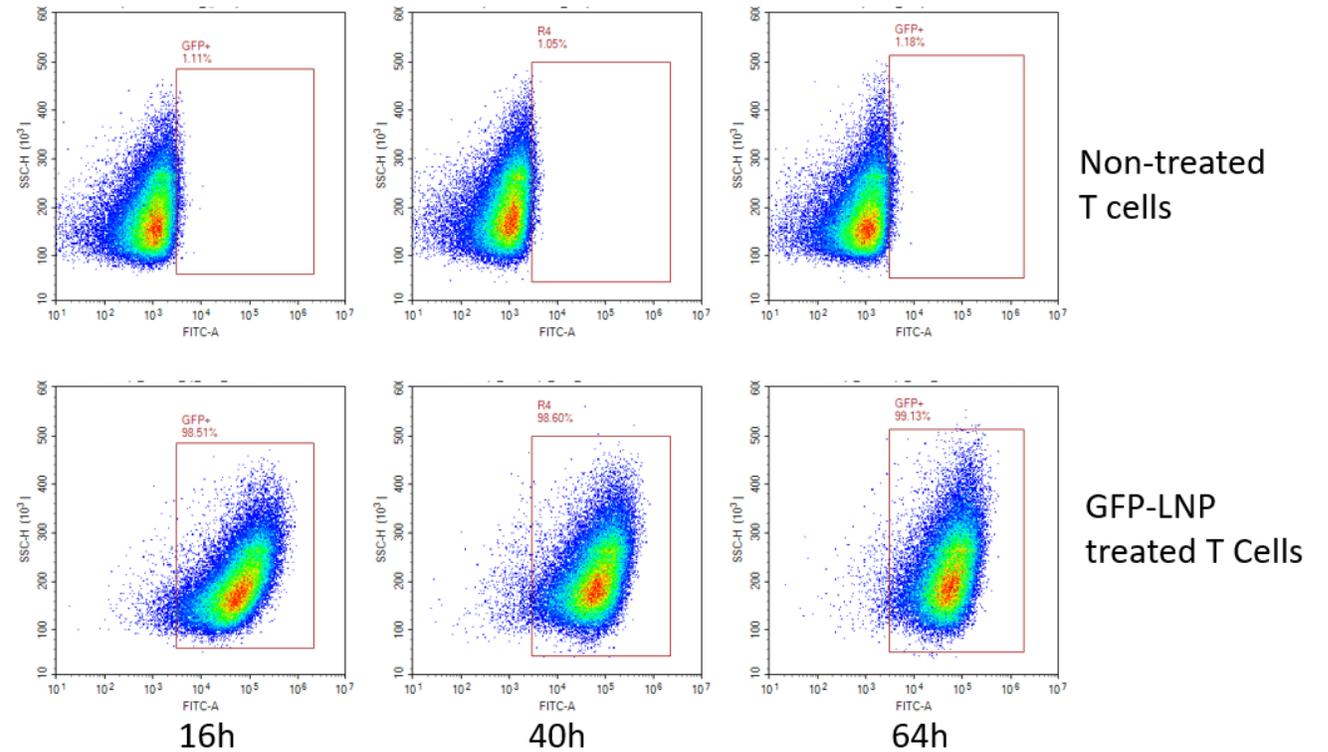
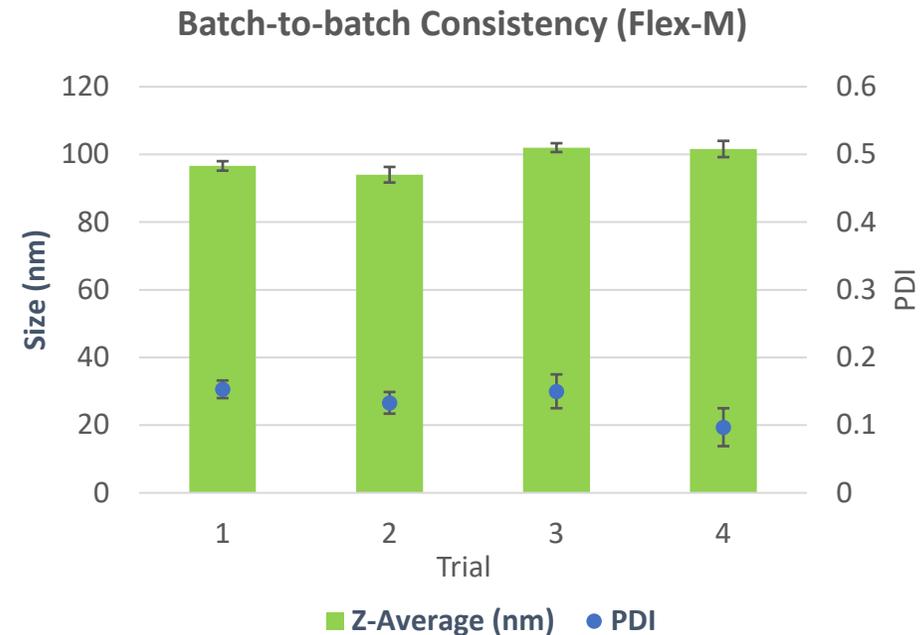
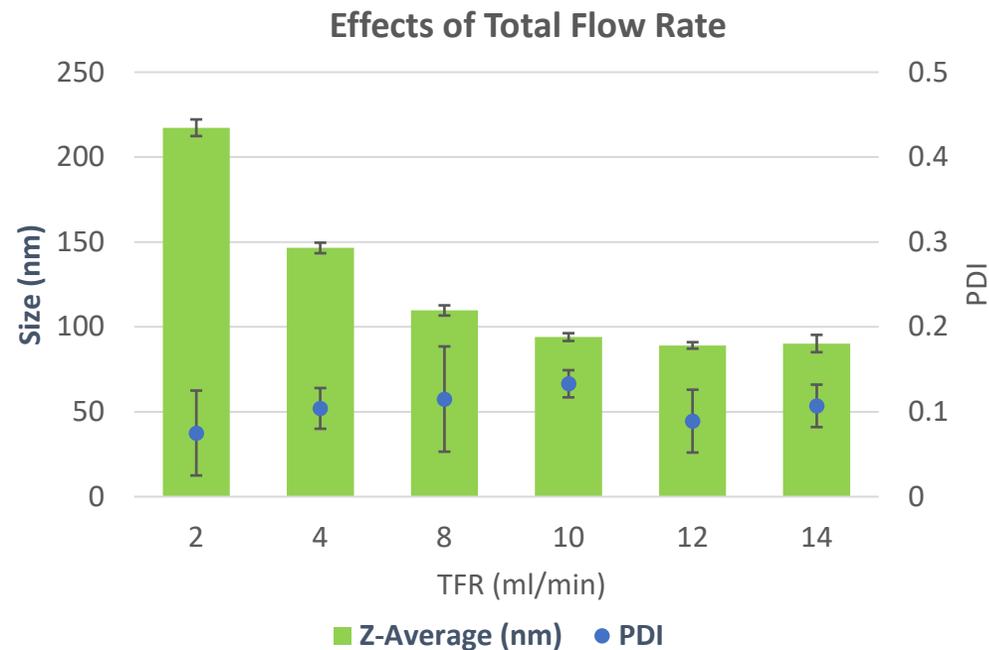


Figure 2. GFP(+) positive population of control (non-treat) and EGFP mRNA LNP treated primary T cells at 16, 40 and 64 hours. Cells were stained (1:50) using Biolegend 7-AAD Viability Staining for 10 minutes. Gating: First select for individual cells (excluding doublets). Then select for the healthy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

Case Study II: PLGA Nanoparticle Synthesis



- PreciGenome's NanoGenerator[®] can be used for 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



Recent Publications



Small Molecules

International Journal of Pharmaceutics
 journal homepage: www.elsevier.com/locate/jpharm

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. Vecchiarelli^{a,b}, N. Maffulli^a, G. Della Porta^{a,b,c,d}

^a Department of Medicine, Surgery and Dentistry, University of Salerno, Via S. Allende, 84081 Baronissi, (SA), Italy
^b Department of Industrial Engineering, University of Salerno, Via Giovanni Paolo II, 84084 Positano, (SA), Italy
^c IRCCS Istituto Mediterraneo di Neuroscienze, 80077 Positano, SA, Italy

Circular RNA

Article | [Open access](#) | Published: 26 September 2025

Circular RNA-based protein replacement therapy mitigates osteoarthritis in male mice

[Jinlong Sun](#), [Ling Li](#), [Wuyuan Tan](#), [Xubin Yin](#), [Jinghui Wang](#), [Rui Shao](#), [Shaokun Sun](#), [Si-Kun Guo](#), [Jingy Feng](#), [Bao-Qing Gao](#), [Ying Wang](#), [Meng-Yuan Wei](#), [Lijun Wang](#), [Heng Feng](#), [Xiang Gao](#), [Ping Hu](#), [Xianyou Zheng](#), [Ling-Ling Chen](#), [Guanghua Lei](#), [Youkui Huang](#) & [WeiGuo Zou](#)

Nature Communications **16**, Article number: 8480 (2025) | [Cite this article](#)

CRISPR-Cas mRNA+gRNA

Engineering circular guide RNA and CRISPR-Cas13d-encoding mRNA for the RNA editing of *Adar1* in triple-negative breast cancer immunotherapy

Shurong Zhou, Suling Yang, Jie Xu, Guizhi Zhu
 doi: <https://doi.org/10.1101/2025.07.22.666181>

Self-amplifying RNA

Article | [Open access](#) | Published: 29 April 2025

Controlling reactogenicity while preserving immunogenicity from a self-amplifying RNA vaccine by modulating nucleocytoplasmic transport

[Jason A. Wojcechowski](#), [Robyn M. Jong](#), [Imre Mäger](#), [Britta Flach](#), [Paul V. Munson](#), [Progya P. Mukherjee](#), [Barbara Mertins](#), [Katherine R. Barcay](#) & [Thomas Folliard](#)

npj Vaccines **10**, Article number: 85 (2025) | [Cite this article](#)

DNA

AMERICAN SOCIETY FOR MICROBIOLOGY | mSphere

RESEARCH ARTICLE
 August 2024, Volume 9, Issue 8, e02023-24
<https://doi.org/10.1128/mSphere.02023-24>

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 Stillman², Erika Petro-Turkquist^{1,2}, Eric A. Weaver^{1,3}, Hiep L. X. Vu^{1,4}

siRNA

POSTER PRESENTATIONS - PROFFERED ABSTRACTS | MARCH 22 2024

Abstract 4607: Targeted nanoparticle delivery of irinotecan and Ewing sarcoma-specific siRNA is an effective combination therapy for Ewing sarcoma

Sheetal A. Mitra; Jean-Hugues Parmentier; Hyung-Gyoo Kang; Timothy J. Triche

Check for updates

Author & Article Information
Cancer Res (2024) 84 (6_Supplement): 4607.
<https://doi.org/10.1158/1538-7445.AM2024-4607>

CANCER RESEARCH

CRISPR-Cas RNP

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

Kai Chen^{1,2,3,4}, Hesong Han^{1,2,3}, Sheng Zhao^{1,2}, Bryant Xu^{1,2}, Boyan Yan^{1,2}, Atip Lawanprasert^{1,2}, Marena Trinidad^{1,2}, Benjamin W. Burgstone^{1,2}, Niren Murthy^{1,2,3,4} & Jennifer A. Doudna^{1,2,3,4,5,6,7}

Protein/Peptide

Article | [Open access](#) | Published: 22 February 2025

Anionic lipids direct efficient microfluidic encapsulation of stable and functionally active proteins in lipid nanoparticles

Suresh Ambati, Yeqi Li, Matthew K. Whittaker, Eileen J. Kennedy, Wided N. Missaoui, Xiaorong Lin, Zachary A. Lewis & Richard B. Meagher

Communications Materials **6**, Article number: 34 (2025) | [Cite this article](#)

mRNA

BRIEF DEFINITIVE REPORT

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

Mariah Hassett¹, Leela L. Pevet², Rii He², Muhammad Heidarani^{1,3}, Pompoj Phruttiwanichakun¹, Stephanie de Wall¹, Madelon D. Smit^{1,4,5}, Alexander V. Cohen², Michael D. Robinson^{1,3,6,7} and Luke T. Moran^{1,3,6,7}

RESEARCH ARTICLE | MICROBIOLOGY

Identification of a protective antigen reveals the trade-off between iron acquisition and antigen exposure in a global fungal pathogen

Yuei Li, Tuyetnhi Pham, Kenton Hjojshier, and Xiaorong Lin

February 13, 2025 | 122 (7) e2420898122 | <https://doi.org/10.1073/pnas.2420898122>

PLGA

International Journal of Pharmaceutics
 Volume 667, Part B, 25 December 2024, 124934

PLA/PLGA nanocarriers fabricated by microfluidics-assisted nanoprecipitation and loaded with Rhodamine or gold can be efficiently used to track their cellular uptake and distribution

E.P. Lamparelli^a, M. Marino^a, M.R. Scognamiglio^b, R. D'Auria^a, A. Santoro^{a,c}, G. Della Porta^{a,c}

Recent Publications



Payload or Nanoparticle type		Reference example w/ precigenome's NanoGenerator®				
		Journal Name	Impact factor	Title	Link	Instrument
Small Molecular		International Journal of Pharmaceutics	5.2	Lipid nano-vesicles for thyroid hormone encapsulation: A comparison between different fabrication technologies, drug loading, and an <i>in vitro</i> delivery to human tendon stem/progenitor cells in 2D and 3D culture	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 - ScienceDirect	Flex-M
Nucleic Acid	SiRNA	AACR annual meeting 2024	NA	Abstract 4607: Targeted nanoparticle delivery of irinotecan and Ewing sarcoma-specific siRNA is an effective combination therapy for Ewing sarcoma	Abstract 4607: Targeted nanoparticle delivery of irinotecan and Ewing sarcoma-specific siRNA is an effective combination therapy for Ewing sarcoma Cancer Research American Association for Cancer Research	Flex-M
	mRNA	Journal of Experimental Medicine	10.6	Regenerating murine CD8+ lung tissue resident memory T cells after targeted radiation exposure	Regenerating murine CD8+ lung tissue resident memory T cells after targeted radiation exposure Journal of Experimental Medicine Rockefeller University Press	Flex-S/Flex-M
	SaRNA	NPJ Vaccines	6.1	Controlling reactogenicity while preserving immunogenicity from a self-amplifying RNA vaccine by modulating nucleocytoplasmic transport	Controlling reactogenicity while preserving immunogenicity from a self-amplifying RNA vaccine by modulating nucleocytoplasmic transport npj Vaccines	Flex-M
	CircRNA	Nature Communications	15.7	Circular RNA-based protein replacement therapy mitigates osteoarthritis in male mice	Circular RNA-based protein replacement therapy mitigates osteoarthritis in male mice Nature Communications	Flex-M
	DNA	mSphere	2.9	Lipid nanoparticle-encapsulated DNA vaccine confers protection against swine and human-origin H1N1 influenza viruses	Lipid nanoparticle-encapsulated DNA vaccine confers protection against swine and human-origin H1N1 influenza viruses mSphere	Flex-M
CRSPR-Cas system	CRISPR-Cas RNP	Nature Biotechnology	41.7	Lung and liver editing by lipid nanoparticle delivery of a stable CRISPR-Cas9 ribonucleoprotein	Lung and liver editing by lipid nanoparticle delivery of a stable CRISPR-Cas9 ribonucleoprotein Nature Biotechnology	Flex-M
	CRISPR-Cas mRNA+ gRNA	BioRxiv	NA	Engineering circular guide RNA and CRISPR-Cas13d-encoding mRNA for the RNA editing of Adar1 in triple-negative breast cancer immunotherapy	Engineering circular guide RNA and CRISPR-Cas13d-encoding mRNA for the RNA editing of Adar1 in triple-negative breast cancer immunotherapy bioRxiv	Flex-S
Protein/Peptide		Communication Materials	9.6	Anionic lipids direct efficient microfluidic encapsulation of stable and functionally active proteins in lipid nanoparticles	Anionic lipids direct efficient microfluidic encapsulation of stable and functionally active proteins in lipid nanoparticles Communications Materials	Flex-M
PLGA		International Journal of Pharmaceutics	5.2	PLA/PLGA nanocarriers fabricated by microfluidics-assisted nanoprecipitation and loaded with Rhodamine or gold can be efficiently used to track their cellular uptake and distribution	PLA/PLGA nanocarriers fabricated by microfluidics-assisted nanoprecipitation and loaded with Rhodamine or gold can be efficiently used to track their cellular uptake and distribution - ScienceDirect	Flex-M



LipidFlex™

Flexible Lipid Nanoparticle Formulation

LipidFlex™ is a 3-component lipid nanoparticle formulation that is 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

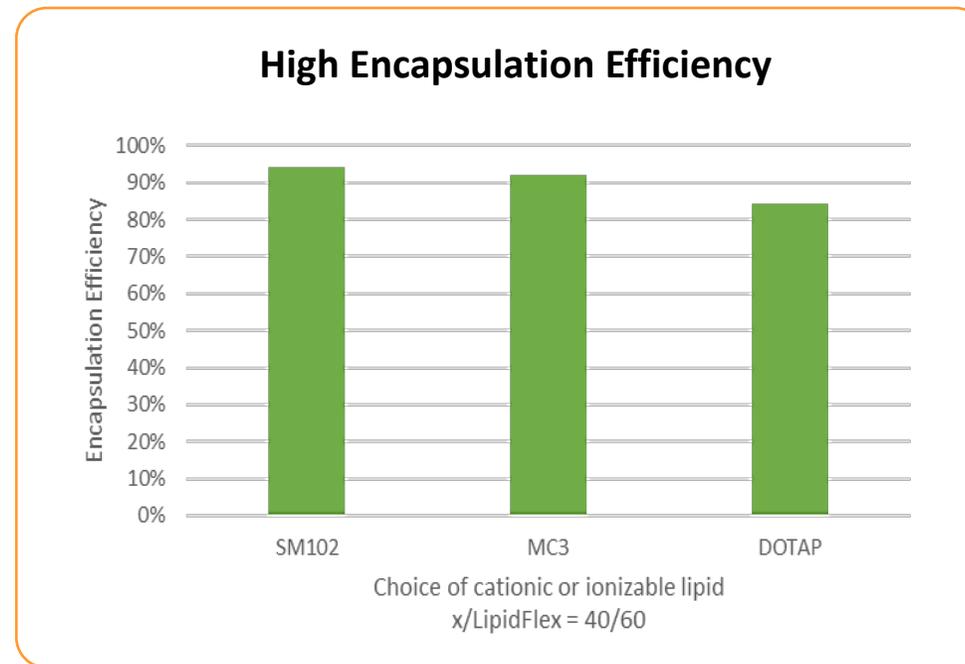
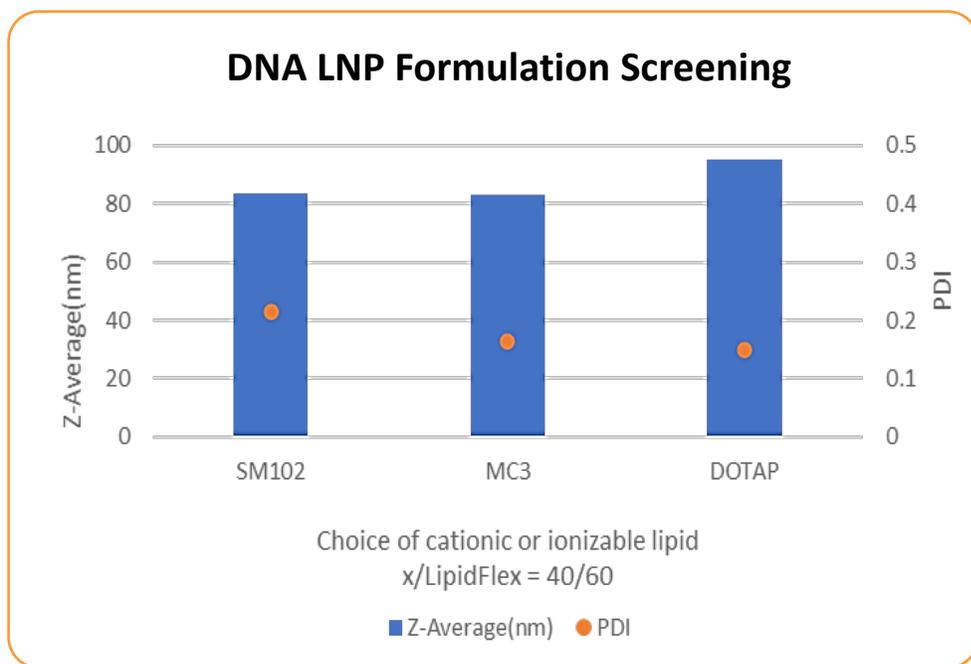


Model	LipidFlex™
Catalog #	PG-SYN-LF1ML
Components	Structural Lipid/ Cholesterol/Stabilizer
Product size	1000 µL
LipidFlex Conc.	30 mM
Ionizable lipid	NA

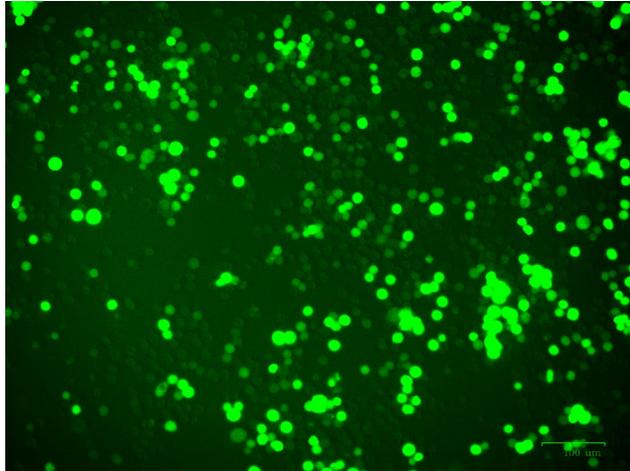
LipidFlex™ – Flexible Starting Kit



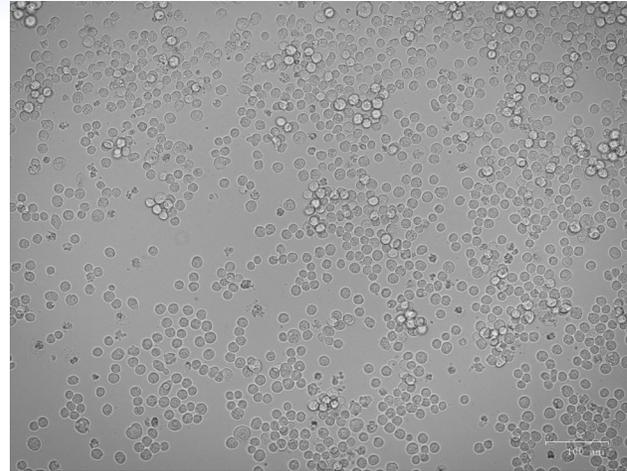
- PreciGenome provides a general LipidFlex™ formulation for quick formulation screening.
- By adding cationic/ionizable lipid into LipidFlex™, customers can prepare nucleic acid LNPs with high encapsulation efficiency



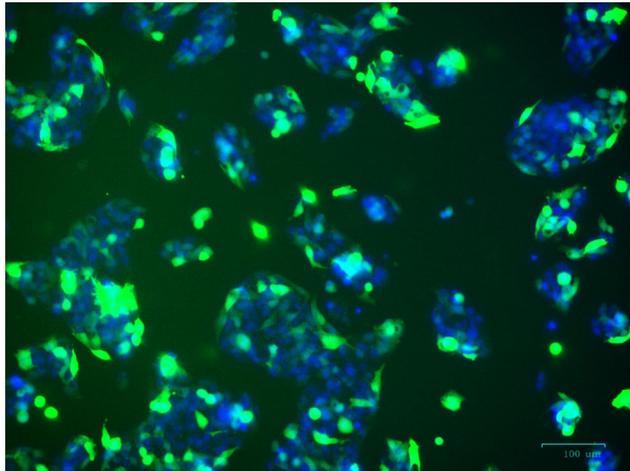
LipidFlex™ LNP – Cell Transfection to Different Cells



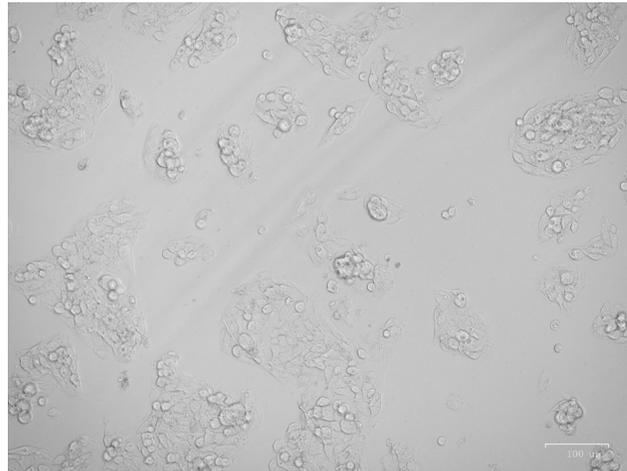
K562 – Green Fluorescence Field



K562 –Bright Field



HepG2 – Green and Blue field overlay



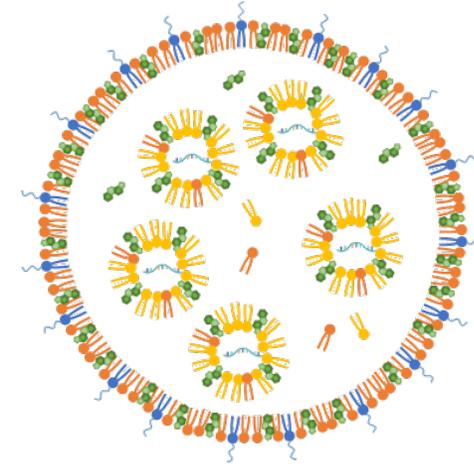
HepG2 –Bright Field

- 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 the NanoGenerator® Flex-S system and CHP-MIX-4 cartridge, customers can prepare potent mRNA LNPs in a convenient and efficient way.

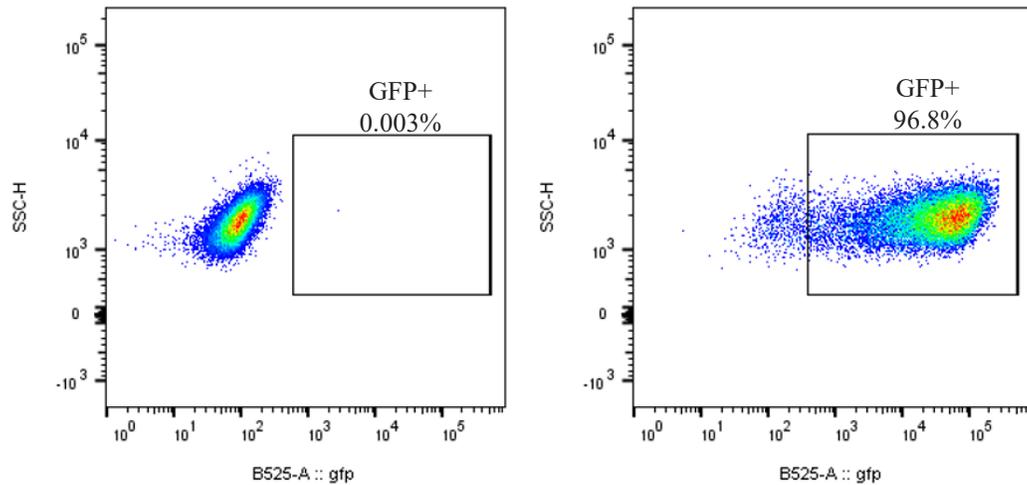


- Over 90% mRNA encapsulation efficiency
- High transfection efficiency
- High protein expression level
- High cell viability
- Time efficient synthesis process

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

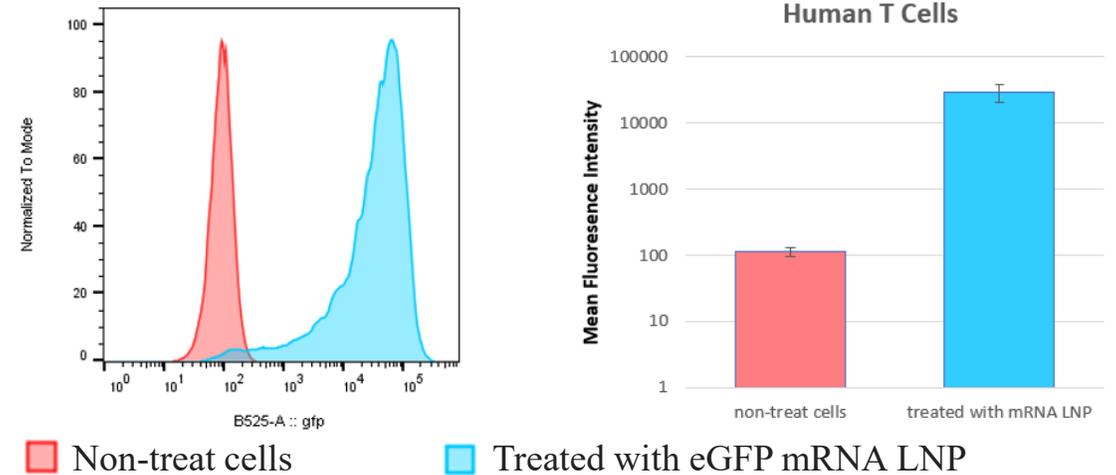


High Human T Cell Transfection Efficiency



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

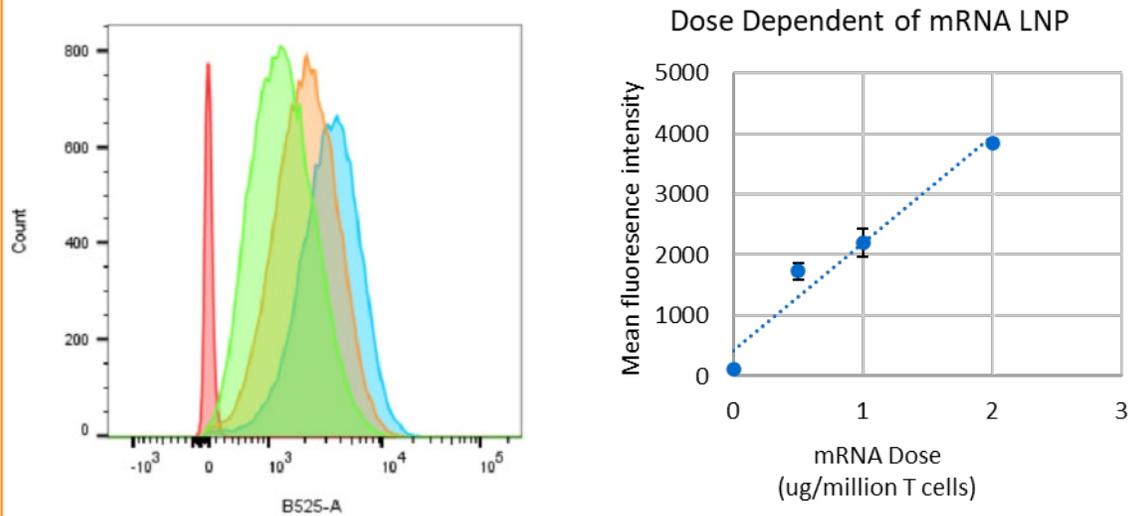
High Protein Expression Level



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

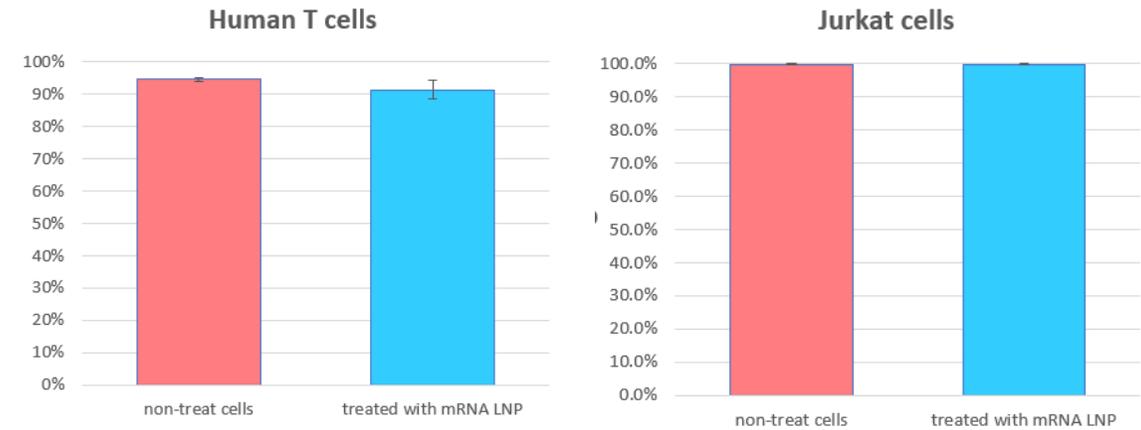


mRNA LNP Dose Dependency



* 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



NanoGenerator® Flex-S Plus



NanoGenerator® Flex-M/Flex-M Premium



NanoGenerator® MAX Lite



NanoGenerator® MAX

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)

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

Some of Our Customers



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Email: contact@precigenome.com

Tel: 1-408-708-4602

Address: 2176 Ringwood Ave.

San Jose, CA, United States 95131

