

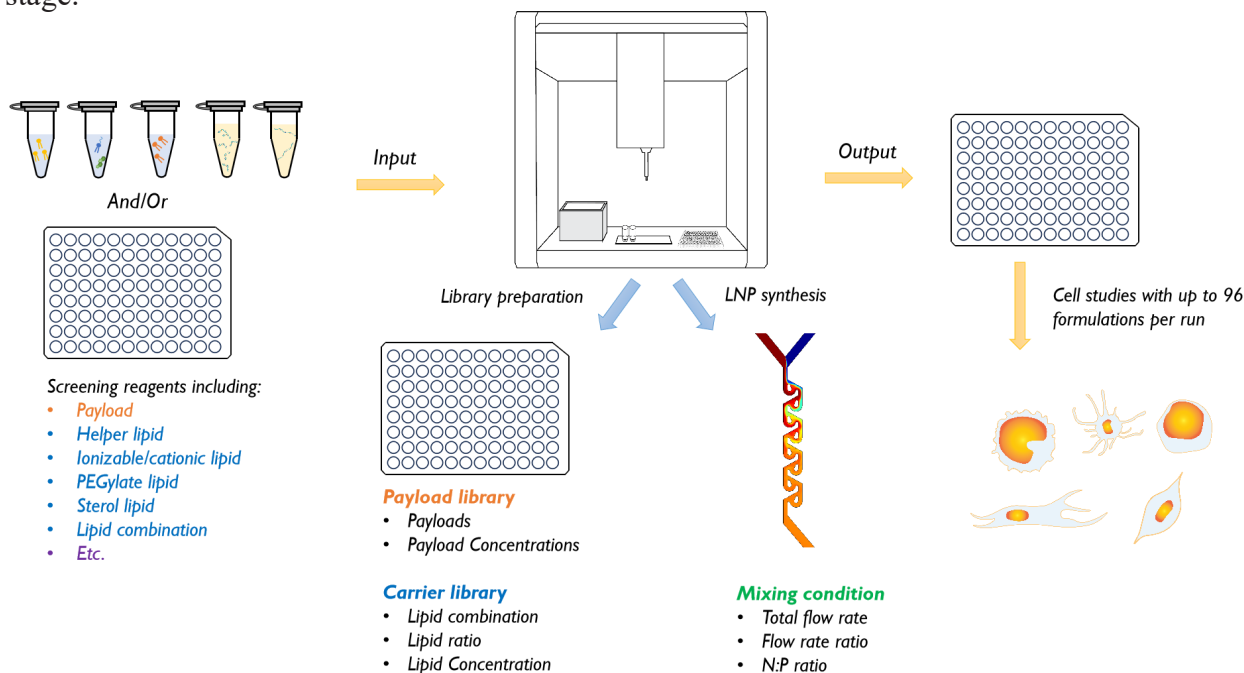
# NanoGenerator™ Flex-S System

High-throughput Discovery & Screening  
for Lipid Nanoparticle Formulations



# Formulation Screening & Discovery with High-throughput

Flex-S System facilitates the rapid screening of nanoparticle formulations and early-stage mRNA candidates, offering a substantial increase in project efficiency. It offers precise control of parameters ensures consistent critical quality attributes, guaranteeing speed, cost-effectiveness, and reliability at every stage.



## System Benefits

### High Throughput & Efficiency



- Multiple sample (1/4/48/96) per run.
- Runtime <5min for 4 samples, <1 hours for 48/96 samples

### Regulatory Compliant



- Intuitive software (21 CFR Part 11 compliant)
- Single-use mixing cartridge

### Scalable & Reproducible



- Direct transfer from discovery to clinical manufacturing
- Reproducible manufacturing

### Automation



- Automated workflow
- Real-time data monitor & record
- Electronic batch records

### High Yield



- Small reagent (down to 50uL) for each sample.
- Save up to 80% of RNA/Lipid cost

### Custom design & Service



- On-site 3Q installation & qualification
- Custom design & OEM

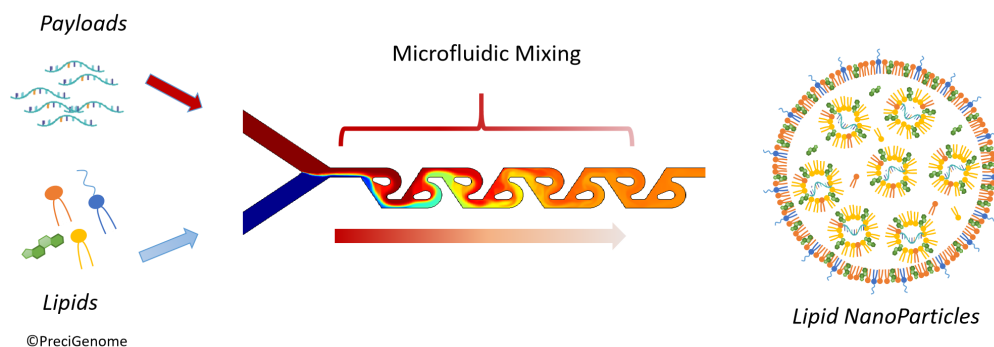
# Advanced Microfluidic and Flow Control Technology

Microfluidic is an emerging technology that leverages precise manipulation of fluids at the microscale in the nanoparticle synthesis. Microfluidics offer superior control over LNP characteristics, such as size, surface charge, and drug loading, with low sample consumption, high reproducibility, and low-risk scalability.

PreciGenome's NanoGenerator™ applies microfluidic approaches to synthesize varieties of nanoparticles in a continuous mode, from the small scale discovery & screening phase to the large scale manufacturing phase.

## Microfluidic Mixing System

- Controllable particle size
- Low PDI
- High encapsulation efficiency
- High reproducibility



## System Specifications

Model	Flex-S	Flex-S Plus
Multi-sample per run	1 - 4	1 - 48/96
Fully automation	N/A	Yes
Library preparation	N/A	Yes
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, 4 ml/min
Flow rate ratio	3:1, 4:1	3:1, 4:1
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.

# NanoGenerator™ Flex-S Nanoparticle Synthesis System

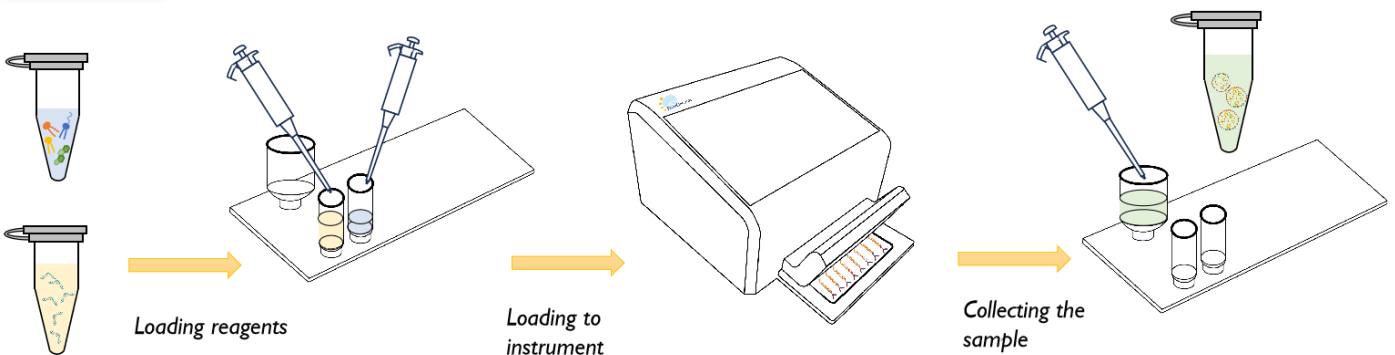
PreciGenome's NanoGenerator™ Flex-S design is for small scale production. The throughput volume range is from 0.1 to 0.5 mL, which is perfect for formulation screening and early discovery applications.

Smaller output volume (<0.05ml per run) is achievable by recipe optimization.



NanoGenerator™ Flex-S nanoparticle synthesis system

## Workflow



### Example of Formulation Screening by Flex-S

Screening Panel			LNP Characterization			Cell Study
Formulation	Ionizable Lipid	N/P Ratio	Size (nm)	PDI	EE%	GFP expression
#1	40%	3.57	56.6	0.19	86%	+
#2	40%	5.35	79.9	0.246	84%	+
#3	40%	8	75.2	0.214	85%	++
#4	60%	5.35	128.5	0.13	81%	NA
#5	40%	5.35	62.8	0.186	90%	++
#6	40%	8	54.3	0.184	93%	++
#7	50%	8	79	0.155	88%	+
#8	50%	11	82.2	0.126	90%	NA
#9	50%	8	87.5	0.12	91%	+++

# NanoGenerator™ Flex-S Plus Nanoparticle Synthesis System



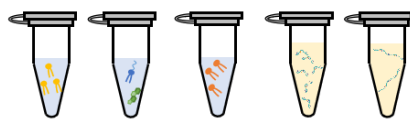
NanoGenerator™ Flex-S plus high throughput screening system

Flex-S Plus System facilitates the rapid screening of nanoparticle formulations and early-stage mRNA candidates, offering a substantial increase in project efficiency.

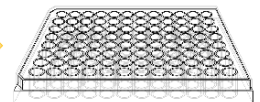
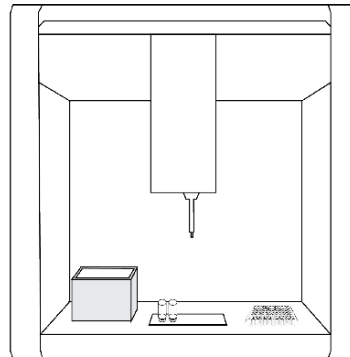
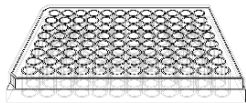
With the capability to conduct as many as 48/96 experiments within a single hour, this platform streamlines screening processes. It offers comprehensive automation of complex protocols, enabling you to concentrate on other laboratory duties.

Additionally, the system permits experimentation with as little as 20 µl of payload reagent, such as mRNA, while providing adaptable control over collection volumes to optimize the use of valuable materials.

## Automated Screening Workflow

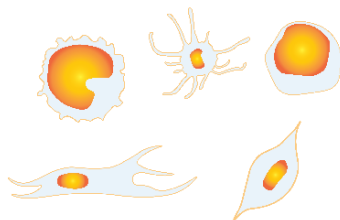


And/Or

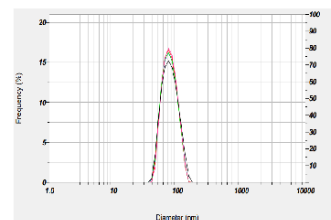


Loading to instrument

Collecting the sample



Cell studies with up to 96 formulations per run



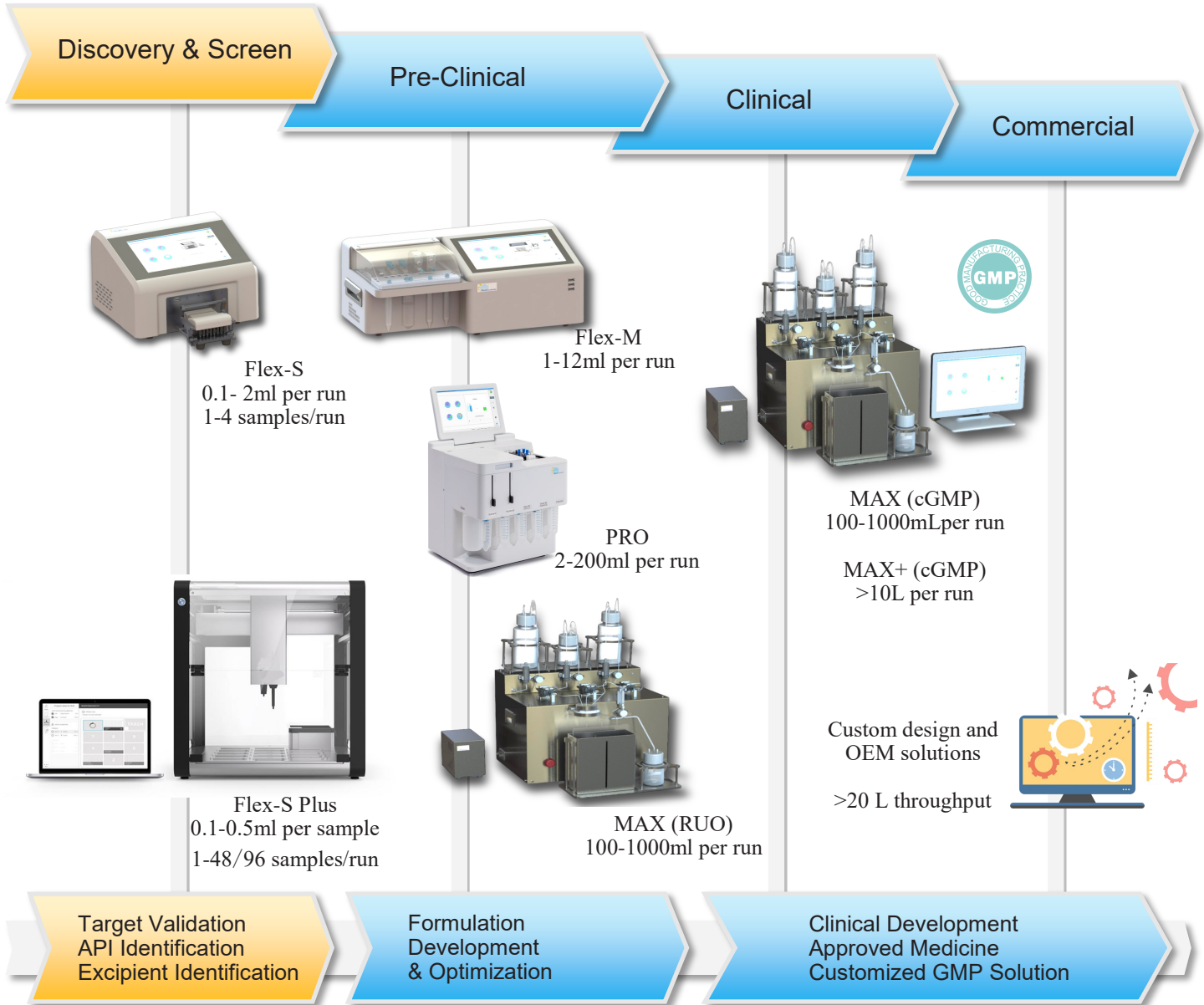
- Size/PDI measurement
- Encapsulation efficiency measurement

Screening factors:

Payloads, carrier formulation, total flow rate, flow rate ratio, N:P ratio, LNP concentration.

# Path from Discovery to Commercialization

The NanoGenerator GMP System is a fully equipped instrument, ready for immediate use in the development of pre-clinical, clinical, and commercial nanomedicine drugs.



NanoGenerator system offers controllable and reproducible mixing conditions, ensuring the accurate synthesis of LNPs through its scalable architecture found in the entire NanoGenerator product line.

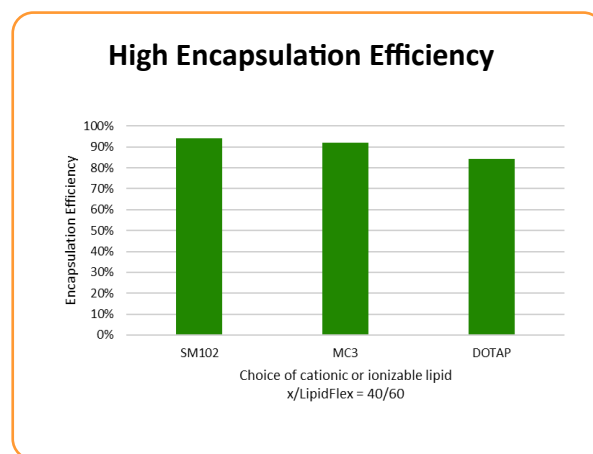
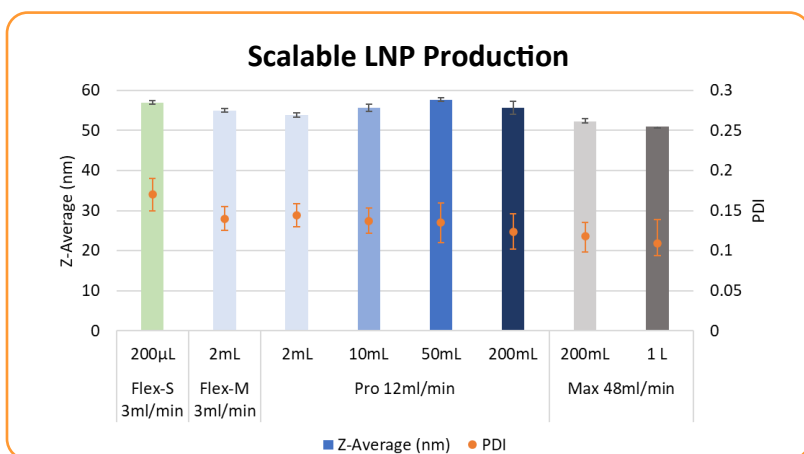
This architecture facilitates the seamless transfer of crucial process parameters, guaranteeing consistent critical quality attributes (CQAs) as one transitions from process development to clinical production and commercial manufacturing for a wide range of applications, such as vaccine development, gene therapy, cell therapy, etc.

# Cost-effective, Scalable, and Reproducible Formulation Screening

PreciGenome NanoGenerator™ platform's precise control of parameters ensures consistent critical quality attributes, such as particle size, throughout the entire development and manufacturing process. This guarantees speed, cost-effectiveness, and reliability at every stage.

## Reagents Cost Comparison

	NanoGenerator Flex-S	Syringe Pump Systems	Tubing Connection Systems
Dead volume per sample	< 20ul	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	100 uL – 1 mL	1 – 10 mL	1 – 10 mL
Minimum input volume (Aqueous :Lipid = 3:1)	Aqueous : 75ul Lipid: 25ul	Aqueous: 1 mL Lipid: 0.5 mL	Aqueous: 1 mL Lipid: 0.5 mL
Estimated minimum mRNA cost	\$50	\$660	\$660







PreciGenome is located in the heart of Silicon Valley, San Jose, California, USA. We have been focusing on developing nanoparticle synthesis systems and solutions for our customers since we started our business. Our technology enables rapid prototyping with high quality and reliable performance for lipid nanoparticles, liposomes, PLGA, etc.

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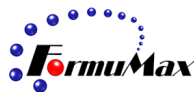
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### Some of Our NanoGenerator Customers



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