

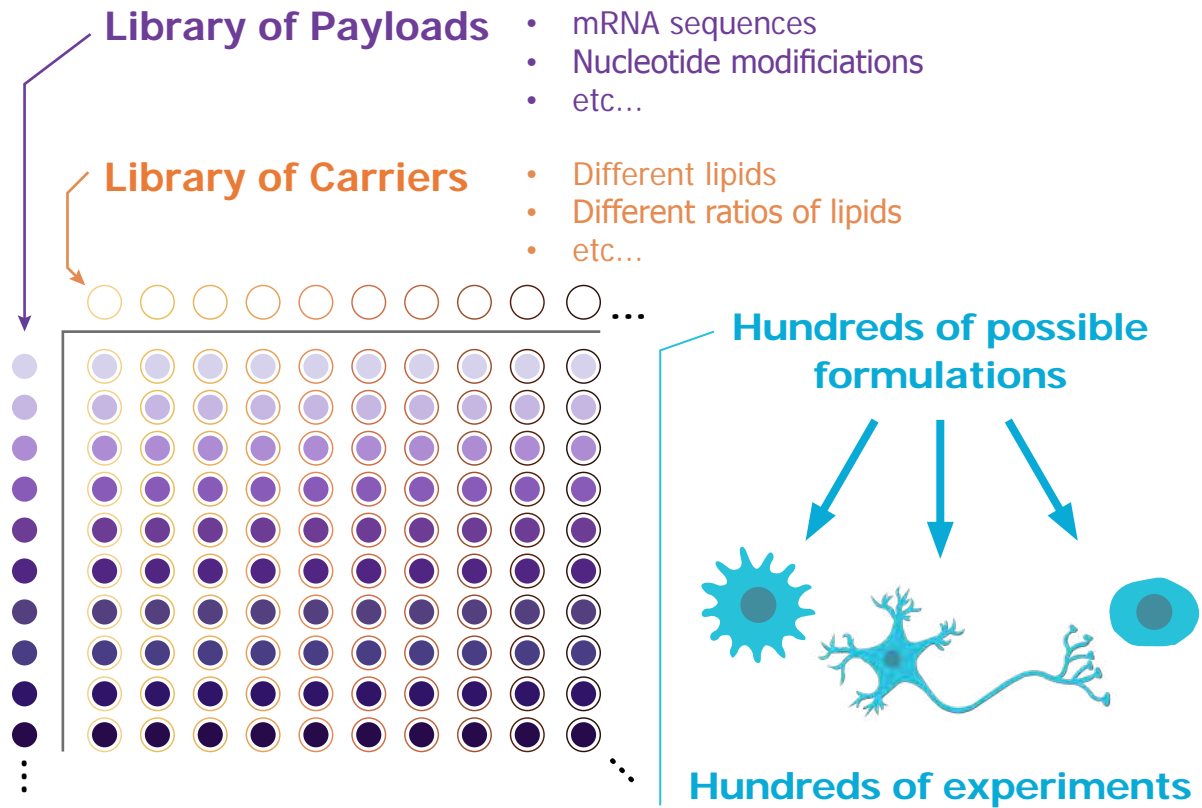
# NanoAssemblr® Spark™

Freedom to Discover

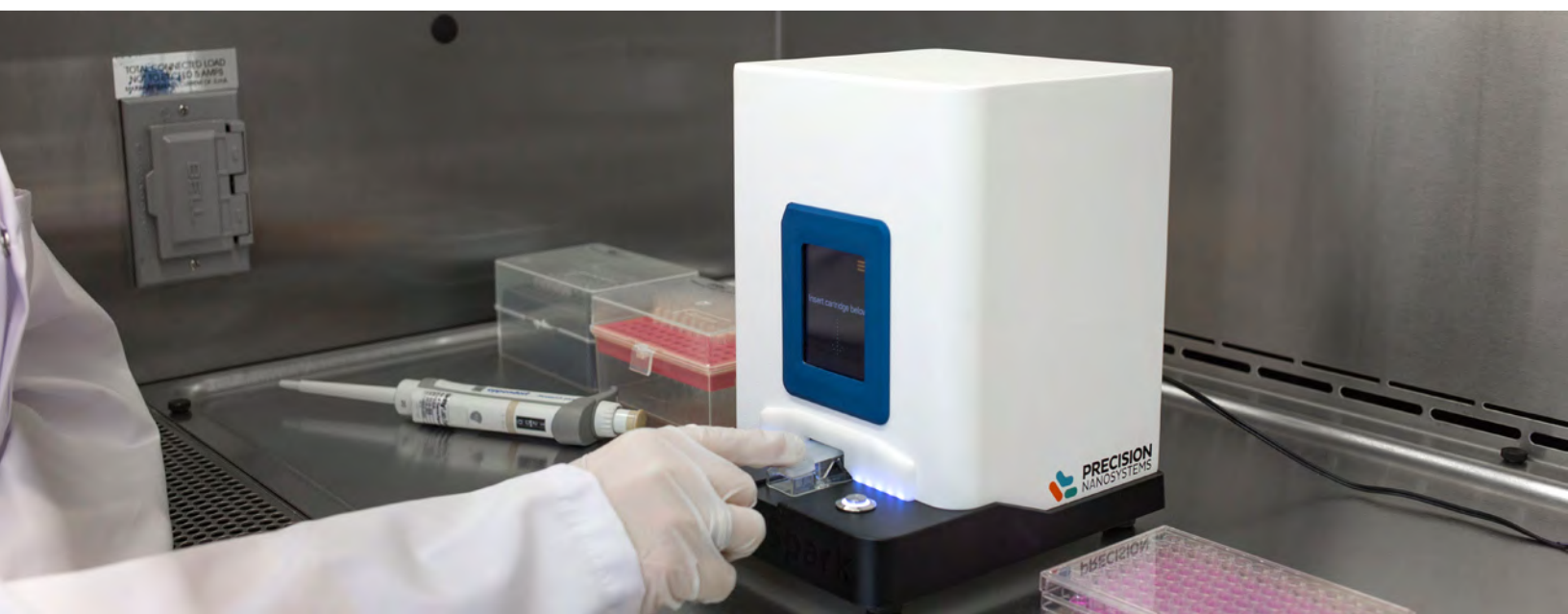


# Explore Novel Genomic Medicine Formulations

Rapid, reliable, small-scale formulations are needed to streamline discovery of revolutionary new medicines.

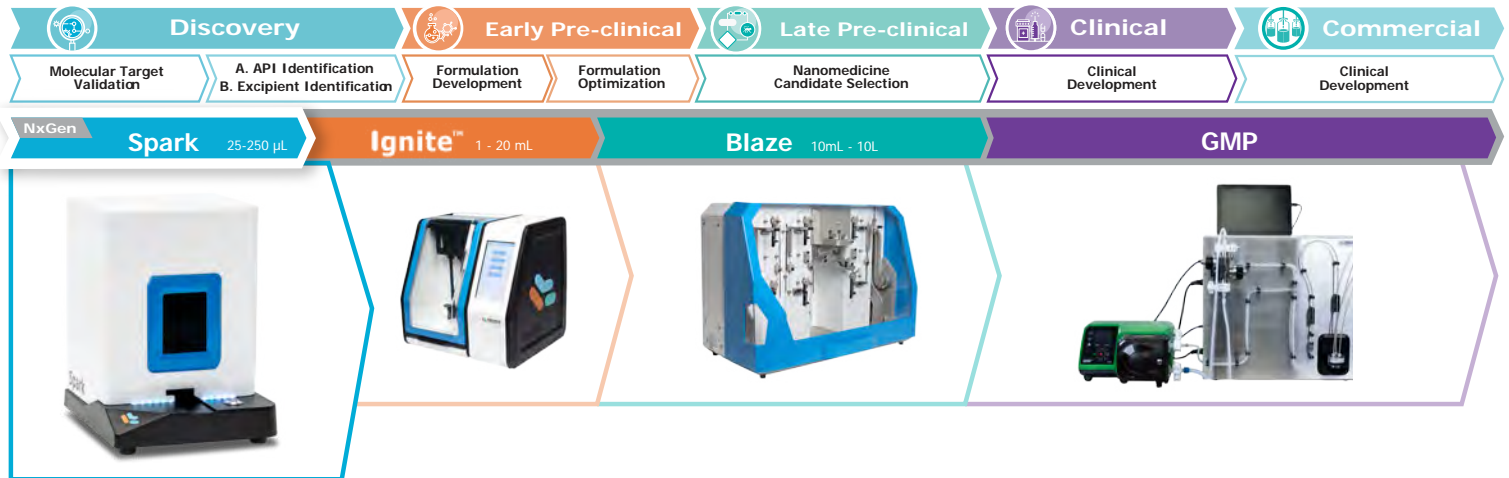


These materials can be costly or in short supply. Rapid, reliable, small-scale formulations are needed.



# Accelerate Nanomedicine Development

The NanoAssemblr<sup>®</sup> Spark<sup>™</sup> is ideal for nanomedicine formulation discovery and screening at microliter scales



## Spark provides:



### UNMATCHED RECOVERY

Advanced microfluidics allows microliter formulation volumes with near complete sample recovery.



### INTUITIVE OPERATION

Simply pipette starting materials into wells, push a button, and pipette completed formulations out.



### RAPID PRODUCTION

Process requires less than 10 seconds, allowing hundreds of formulations to be made in hours.



### ROBUST PROCESS

Electronic control minimizes batch-to-batch and user variability.



### WORKFLOW INTEGRATION

The Spark system is designed for operation in a sterile bio-safety hood, so formulations can be made on-demand, and applied to cells in culture.



### SCALABLE

NxGen microfluidic mixing technology allows formulations to be scaled across the NanoAssemblr Platform to accelerate future development.

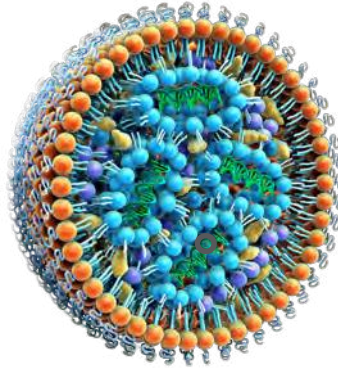
# Powerful Screening Capabilities

## Spotlight: Lipid Nanoparticles (LNPs)





### LNPs are the most clinically advanced RNA delivery technology

#### Inside an LNP


Ionizable cationic lipids contribute to excellent encapsulation and payload release. Excipients, payloads and their relative quantities affect potency.



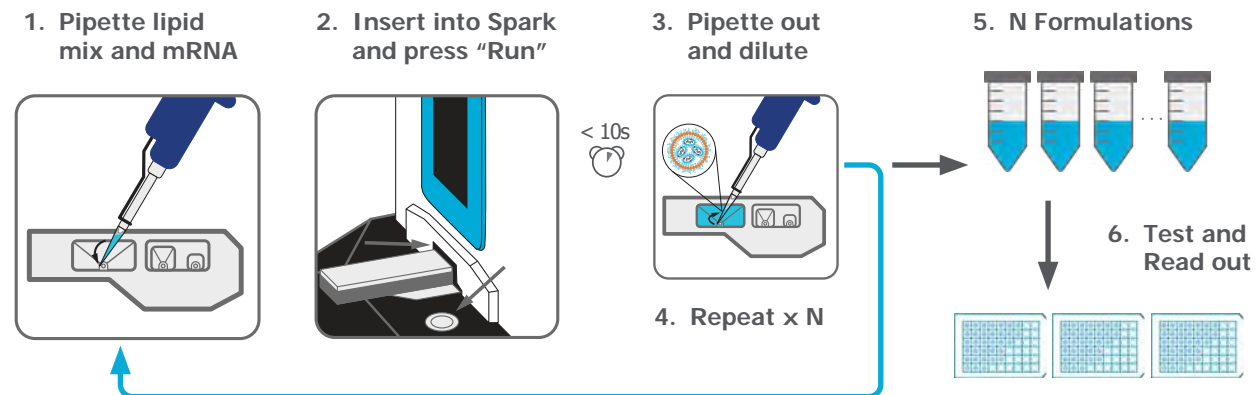
#### Excipients

-  Ionizable Cationic Lipid
-  Cholesterol
-  Helper Lipid
-  PEG-lipid

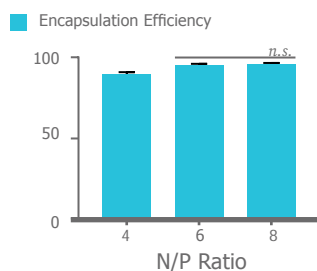
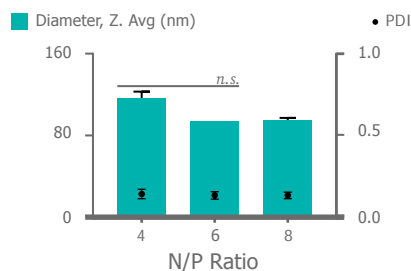
#### Payload

-  siRNA
-  mRNA
-  Plasmid

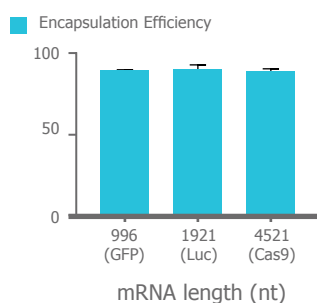
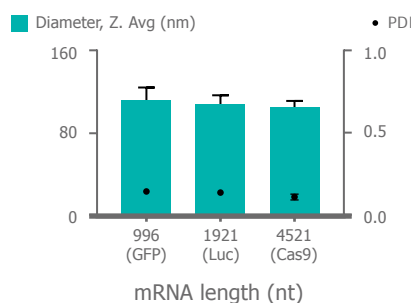
## Screen LNP formulations efficiently with Spark



## Formulate LNPs in seconds using less than 25 µg of mRNA and 1 mg of ionizable lipid



N/P ratio is a key factor in performance. Here, mRNA LNPs were rapidly made at 3 N/P ratios with Spark



LNPs encapsulating 3 different mRNAs were made with different mRNA lengths on the Spark with no change in size.



# Case Study

## Screening mRNA LNPs in human neurons for neurotherapeutic applications

### Background

**Therapeutic paradigm:** Development of a gene-based therapy for neurodegenerative disease applications.

**Formulation:** mRNA encoding a green fluorescent protein (GFP) reporter gene encapsulated in an ionizable, cationic-lipid based nanoparticle.

### Challenge

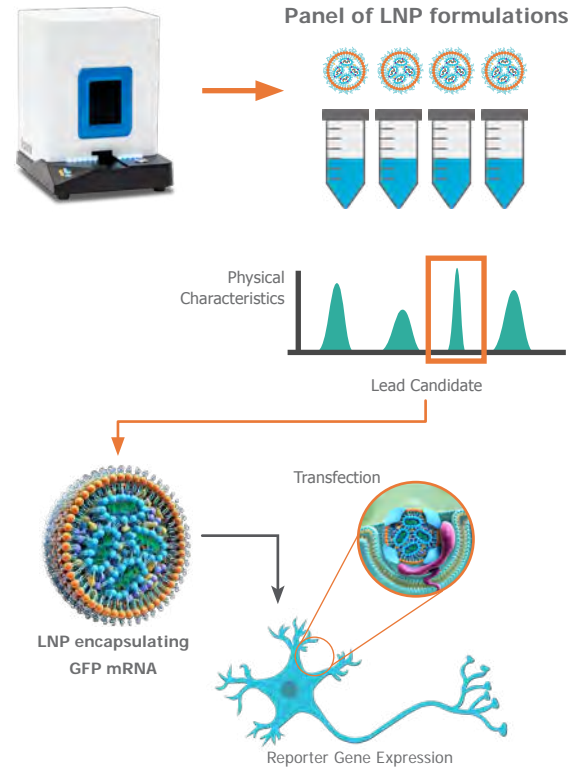
Human neurons are sensitive, difficult-to-transfect cells and are highly susceptible to harsh gene delivery methods. Small LNP formulation volumes under consistent conditions are ideal for screening novel lipid excipients tailored towards safe and effective neuronal gene delivery.

### Methodology

A panel of LNP formulations were quickly and easily formulated on the NanoAssemblr Spark. Lead candidate formulations were selected based on particle characteristics, the intensity of gene expression and preservation of iPSC-neuron viability.

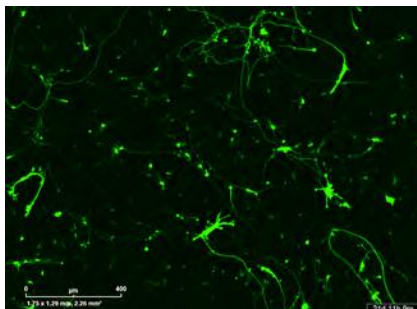
### Outcomes

The Spark enabled an accelerated screening workflow to identify mRNA LNP formulations optimal for gene delivery to neurons.



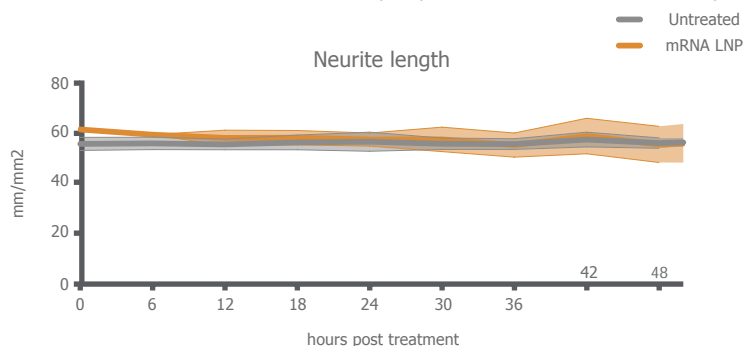
### Efficient gene delivery, robust gene expression

Human iPSC-neurons strongly express the GFP mRNA delivered using mRNA LNPs formulated on the Spark.



### Safe solutions for sensitive cells





Lead mRNA LNP formulations minimally impact neuron health and viability.



The NanoAssemblr Spark accelerates screening workflows for the identification of novel LNPs for biological applications. Lead candidates were rapidly identified as effective nucleic acid delivery systems while preserving the viability of human neurons.

See the full story online:  
[www.precisionnanosystems.com/spark](http://www.precisionnanosystems.com/spark)

# Ordering Information

INSTRUMENT AND CARTRIDGES	PRODUCT CODE	INCLUDES	DESCRIPTION	
	<b>NanoAssemblr<sup>®</sup> Spark<sup>™</sup></b>	NIS0001	1 NanoAssemblr <sup>®</sup> Spark <sup>™</sup> Instrument 1 Power supply (worldwide) 1 One-year warranty	Electrical: 100-240 VAC, 0.58 A (Max.)  Dimension (WxDxH): 16.5 x 19.5 x 22.5 (cm)  Weight: 3.6 kg
	<b>Spark<sup>™</sup> Cartridge</b>	NIS0009 NIS0013	20 pack 80 pack	Spark <sup>™</sup> Cartridge is equipped with NxGen <sup>™</sup> microfluidic mixing technology. No cleaning or cleaning validation required: Cartridges are single-use and gamma irradiated for sterility.
REAGENTS	PRODUCT CODE	INCLUDES	DESCRIPTION	
	<b>GenVoy-ILM<sup>™</sup> T Cell Kit for mRNA</b>	1000701	1 kit	Ionizable lipid mix optimized for the delivery of messenger RNA (mRNA) into activated human primary T cells using LNPs
	<b>GenVoy-ILM<sup>™</sup> T Cell Kit for mRNA with Spark Cartridges</b>	1000683	1 kit 5 cartridges	

If you have any additional questions, please reach out to your regional PNI representative, or email us at [info@precision-nano.com](mailto:info@precision-nano.com)

Or go to our website: [www.precisionnanosystems.com](http://www.precisionnanosystems.com)

## About Precision NanoSystems

Precision NanoSystems is a global leader of innovative solutions for the discovery, development, and manufacture of genomic medicine based gene and cell therapies, small molecule and protein-based drugs. Precision NanoSystems ULC is a wholly owned subsidiary of Pall Corporation.

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