

®
诺海生物科学仪器(上海)有限公司
Nuohai Life Science (Shanghai) Co.,Ltd

*Nanomedicine
CRO Solution*



Microflow T



Microflow S



Microflow M



Microflow G

Mingtai Microflow™

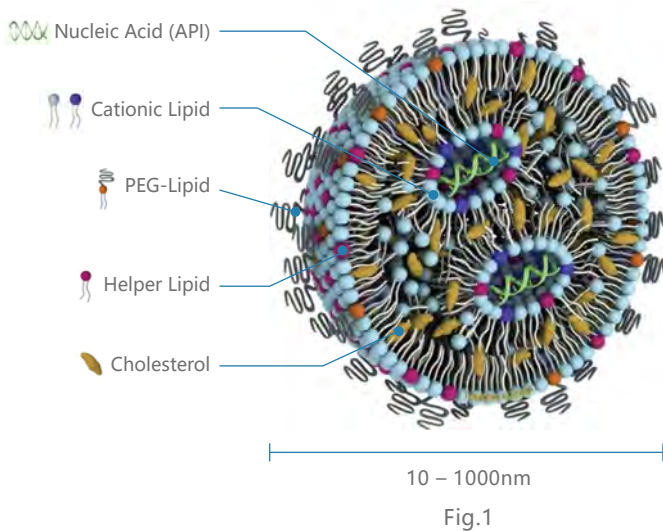
Microfluidic Nanomedicine Synthesizing System

Formulation Screening to Manufacturing



What is Nanomedicine?

Branch of medicine that are roughly 10 - 1000 nm in size. Tiny size makes nanomedicine different from the medicine in regular size. Usually a nanomedicine consists of active pharmaceutical ingredients (APIs) and excipients (or called carrier), and possess broad applications like:



The type of the carrier is based on API and application. For example, nucleic acid is encapsulated as lipid nanoparticles (LNPs, Fig.1). LNPs are usually composed of cationic lipid, PEG-lipid, helper lipid, and cholesterol to form millions of nanoparticles. The chemical and physical characteristics of those LNPs will affect the delivery and expression.

Fig.1 source : 2021 Sep 1;131:16-40.doi: 10.1016/j.actbio.2021.06.023. Epub 2021 Jun 18.

Microflow™ Applications

PARTICLE TYPE	ACTIVE INGREDIENT	APPLICATIONS	CARRIER MATERIALS
Nucleic acid lipid nanoparticles (LNPs)	Nucleic Acid Peptides and Proteins Small Molecules Imaging Contrast Agents	<ul style="list-style-type: none"> Genetic disease Nucleic acid vaccine Gene and cell therapy 	<ul style="list-style-type: none"> Cationic lipids Helper lipids Cholesterol PEG-Lipid
Liposomes		<ul style="list-style-type: none"> Antimicrobials Cancer chemotherapy Vaccine 	<ul style="list-style-type: none"> Phospholipid Cholesterol PEG-Lipid
Polymer nanoparticles		<ul style="list-style-type: none"> Antimicrobials Cancer chemotherapy Controlled-release 	<ul style="list-style-type: none"> Poly-lactides (ex: PLGA) Block copolymers (ex: PEG-β-PLGA) Polysaccharides (ex: chitosan, cellulose)

Nanomedicine Development Promoter

Microflow™ provides multiple solutions for each stage of new drug development

Screening

Microflow T

25 μ L – 250 μ L

With tiny preparation scale (microliter), microfluidic synthesis system, Microflow T, can produce nanoparticles in few seconds, making it fast, convenient, economical, and efficient screen hundreds of formulations at the beginning of a research program. Meanwhile, the flow rate ratio has been optimized so that user can focus more on formula itself.



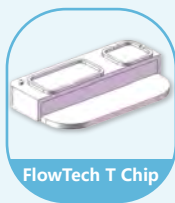
Small scale (25 – 250 μ L) to reduce cost.



Fast synthesis (within 10 s) to accelerate R&D.



Constant ratio (2:1) to lower risks.



FlowTech T Chip




Optimization

Microflow S

0.5 mL – 60 mL


Ideal nanoparticle synthesis system for labs with the volume of products from 0.5 to 60 mL, which is suitable to perform several groups of cell or animal experiment. Large range of flow rate ratio makes the device appropriate for many application fields, including the preparation of liposome, polymer nanoparticle, and etc. More flow rate option, from 0.1 to 50 mL/min, allows users to adjust their product size in a larger range. Through reusable cartridge and unlimited syringe brand, the cost for daily use has been reduced as much as possible.



Consistency
From series T, S, M to G, Mingtai provides consistent design of the cartridge path, suitable for fast large scale production.

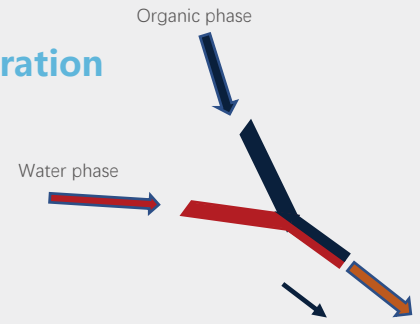
Stability and repeatability
Well designed path ensures the precise control of the flow rate, making products stable and repeatable.

Efficiency
Short synthesis process speeds up screening.



Optimized mixture technology for nanomedicine preparation

With special and optimized flow channel design, two liquid streams keep separate in Microflow™ FlowTech™ microfluidic chip during flow and the ingredients react with each other under control through diffusion. This technology makes reaction more controllable and repeatable. Meanwhile, narrow channel and fast flow rate make the reaction finished within 3 ms.



Pre-IND

Microflow M

120 L/h Max (Customizable)

To meet the large consumption during preclinical study, Microflow M is able to synthesize a few ten liters of products with up to 120 L/h flow rate. Meanwhile, large range of flow rate ratio (1:1 to 10:1) is reserved for special formulation. Same cartridge design makes it possible to enlarge production capacity rapidly and reliably. Reusable design for cartridge is also reserved to reduce cost of daily use.



Consistency

From series T, S, M to G, Mingtai provides consistent design of the cartridge path, suitable for fast large scale production.



Durability

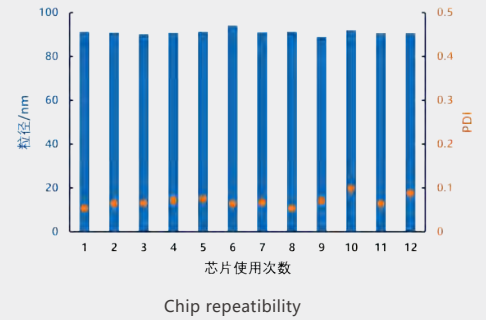
Long life and low failure rate for accessory design. Easy to replace.



FlowTech M Chip



- Inject ingredient solution (water phase and organic phase) into FlowTech chip
- Ingredients react with each other in laminar flow under control.
- Ingredients react through diffusion.
- Combination can be finished within 3 ms, making solution polarity changed and nanoparticles self-assembled.
- Fast, uniform, and controllable.



GMP

Microflow G

120 L/h Max (Customizable)

As a clinical manufacturing device which is designed to conform GMP regulation, Microflow G has the same large synthesis capacity up to 120 L/h as Microflow M and moreover possesses most certificate for GMP regulation, including sterility, material, dissolution, and etc. Extra certificate requested by customers can also be performed. Large range of flow rate ratio (1:1 to 10:1) and reusable design for cartridge is reserved, but single-use for clinical manufacturing is recommended.

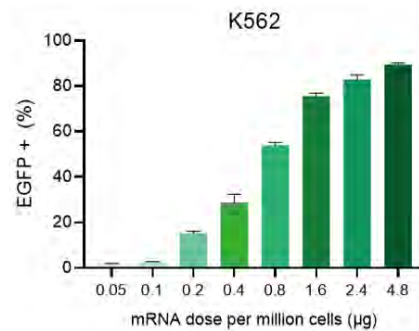


FlowOrigin M: lipid nanoparticle kit

Lipid nanoparticles (LNP) are the most clinically advanced non-viral delivery system, which usually has higher transfection efficiency than regular methods, like electrotransfection and lipofection. FlowOrigin M is a pre-optimized lipid mixture designed to encapsulate siRNA and mRNA. DNA can also be encapsulated with a lower encapsulation efficiency if customer doesn't have RNA. With the help of FlowOrigin, researchers are able to screen nucleic acid sequences without any formula.

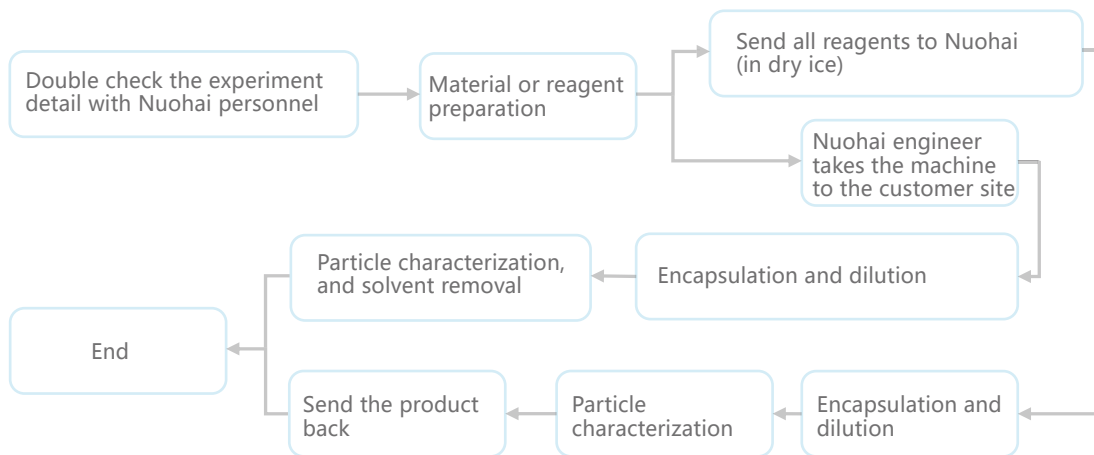


FlowOrigin M lipid nanoparticle kit

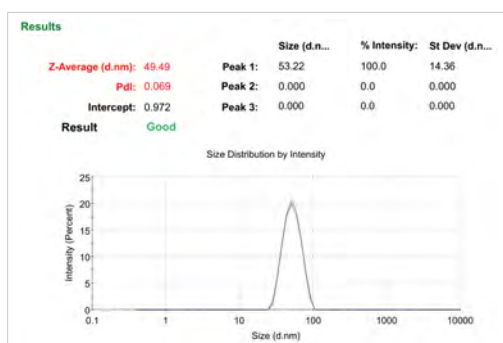


Transfection efficiency

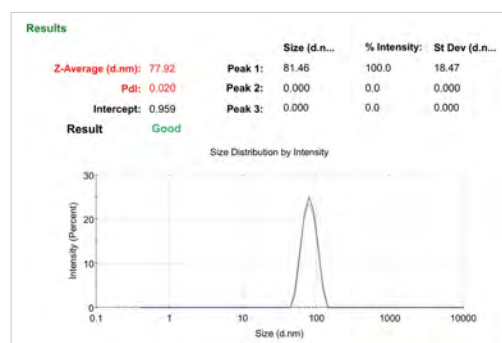
Service Flowchart



Service Cases



Case 1




Case 2

About Nuohai Life Science

Nuohai life Science was founded in 2017. Been qualified as National High-tech Enterprise in 2020. In 2021, Nuohai was listed as Standardization Pilot Project (project No.S21-02-025) Enterprise and then qualified as Innovative Enterprise next year. Now Nuohai has been the first batch of Small and Medium Technology Enterprise in Shanghai.

Nuohai life Science provides microfluidic nanomedicine synthesizing system and related CRO service, from formulation screening to sample characteristic. Through special and optimized microfluidic chip, we can encapsulate multiple types of APIs, like small molecules, mRNA, siRNA, DNA, and etc., making it possible to targeted deliver. This technology could be used from small to large scale, and be applied from pre-IND to GMP manufacturing. At present, four models have been installed in several pharmaceutical companies.

Products

 铭汰医药设备 Minghai Pharmaceutical Equipment	Microfluidic Nanomedicine Synthesizing System
 诺海生命科学 Nuohai Life Science	LS18 Tiling Lightsheet Microscope
	Tissue Clearing Kit (Hydrophilic)
	Embryo Clearing Kit
	Enhanced Tissue Clearing Kit
	Tissue Expansion Kit
	BackLight Plate For Transparent Tissue
	SWIR 1.0 NIR-II Whole Body In-vivo Imaging System
	Organoid and 3D Cell Culture System
	Nhr-20 high SNR endoscopic Raman system
 lifecanvas technologies	Life Canvas technologies automatic tissue transparency processing system and fluorescent immunolabeling system
 VISIKOL	Visikol 3D tissue imaging reagent and kit
 REGEN+HU	RegenHU Biological 3D printer
 PST	Photosound Whole Body In-vivo Imaging Platform
 GATTA QUANT	GATTAquant offers confocal series nanoscale, PAINT nanoscale, SIM nanoscale, STED nanoscale and custom nanoscale for biological sample measurement
 CELLENDES Cell • Environment • Design	Cellendes 3D bionic hydrogel kit
 IRISystem	IRISystem Mouse implants and instruments

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