

NanoFabTx™ Drug Delivery Selection Guide

Introduction

Selecting the right formulation tools and delivery platforms is a key step in the advancement of pharmaceutical research and development. With the increasing complexity of therapeutic modalities and delivery challenges, researchers require dependable, streamlined solutions to optimize their workflows and accelerate progress from discovery to clinical evaluation. Our offerings include a broad range of advanced formulation tools and user-friendly screening kits, empowering scientists to enhance efficiency, ensure reproducibility, and enable scalable solutions throughout their research and development processes.

Potential applications of our NanoFabTx™ platform include:

- Delivery of small molecules and nucleic acids
- Screening and selection of optimal formulations for liposomes, nanoparticles, and microparticles
- Optimal particle size control and determination
- Drug-loading capacity and efficiency optimization

This guide is designed to help you make informed decisions for your drug delivery requirements by providing an overview of essential technologies and ready-to-use product options that support your innovative research objectives.

Formulation Devices

NanoFabTx™ formulation devices (**Figure 1**) are designed to simplify particle and lipid system preparation. With

advanced options for microfluidic mixing and flash precipitation, these tools enable rapid, precise, and scalable control over parameters such as particle size, uniformity, encapsulation efficiency, and reproducibility.



Figure 1. NanoFabTx™ NanoFlash CIJ (Confined Impingement Jet) device.

Table 1 summarizes the key formulation devices available under the NanoFabTx™ portfolio, highlighting their mechanisms, compatible delivery systems, and essential specifications.

Table 1. NanoFabTx™ Formulation Devices – Mechanisms and Specifications.

Cat. No.	938343	911593	911860	911879
Product name	NanoFabTx™ NanoFlash CIJ device	NanoFabTx™ microfluidic – nano device kit for synthesis of 100–200 nm nanoparticles and liposomes	NanoFabTx™ microfluidic – micro device kit for synthesis of 1–5 µm particles	NanoFabTx™ microfluidic – micro for synthesis of 10–30 µm particles
Formulation mechanism	Turbulent mixing, flash precipitation	Microfluidic mixing	Microfluidic mixing	Microfluidic mixing
Delivery system	Lipids, Polymers	Polymer, lipid	Polymer	Polymer
Payload species	Small molecules, RNA	Small molecules, RNA	Small molecules, RNA	Small molecules, RNA
Flow rate	10 mL/min–40 mL/min	0.1 µL/min–10 mL/min	0.1 µL/min–5 mL/min	30 µL/min–5 mL/min
Minimum output volume	2 mL	0.2 mL	0.2 mL	0.2 mL
Mixer materials	Aluminum	Glass	Glass	Glass
Compatible solvents	Ethanol, tetrahydrofuran, acetonitrile, dichloromethane, chloroform, acetone, PBS	DMSO, ethanol, acetone, acetonitrile, acid buffer, PBS	DMSO, ethanol, acetone, acetonitrile, acid buffer, PBS	DMSO, ethanol, acetone, acetonitrile, acid buffer, PBS
Additional accessories needed	Syringe pump or manual mode without pump	Syringe pump or P-pump	Syringe pump or P-pump	Syringe pump or P-pump

Drug Delivery Kits

NanoFabTx™ drug delivery kits (**Figure 2**) provide researchers with a streamlined, ready to use platform for developing lipid and polymer based delivery systems with high reproducibility and minimal optimization burden. Each kit includes pre formulated lipid mixes or polymer screening components engineered to support efficient encapsulation, targeted delivery, and controlled release of a range of payloads, including nucleic acids, small molecules, and proteins. By offering standardized blends such as DOTAP (1,2-Dioleoyl-3-trimethylammonium-propane), DC Chol (3β-[N-(N',N'-dimethylaminoethane)-carbamoyl]cholesterol), PEG lipids, functionalized targeting lipids (folate, mannose, RGD), and reactive chemistries (azide, maleimide, DBCO), these kits enable rapid formulation prototyping across diverse therapeutic applications, from mRNA and siRNA delivery to insoluble drug solubilization and antibody conjugated nanoparticles. Integrated protocols tailored for microfluidic devices (e.g., NanoFabTx™ NanoFlash CIJ and microfluidic mixers) further ensure consistent particle size control and batch to batch

uniformity. Together, these comprehensive kits reduce formulation complexity, accelerate screening workflows, and empower researchers to quickly identify optimal delivery systems for parenteral administration and sustained or self dissociating release profiles.

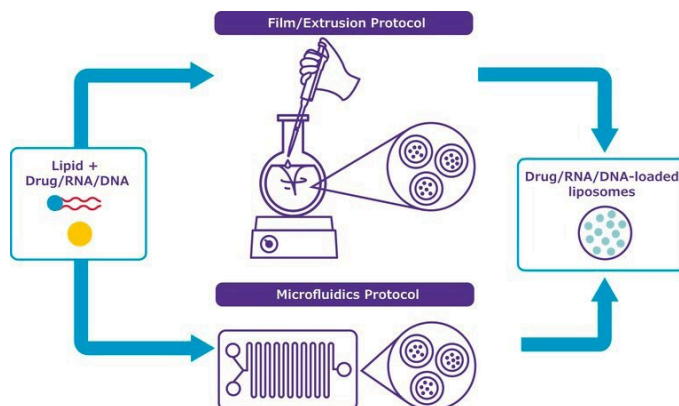


Figure 2. NanoFabTx™-DOTAP Lipid Mix, a ready-to-use nanoformulation blend for the synthesis of cationic DOTAP-functionalized liposomes using extrusion or microfluidic methods (protocols and reagents included).

Table 2. NanoFabTx™ Drug Delivery Kits – Self Dissociation Release Profiles.

Product No.	Name	Payload Species	Applications	Administration Route	Recommended Formulation Device
926027	NanoFabTx™-DOTAP Lipid Mix	Nucleic acid	general cell transfection; nucleic acid delivery; siRNA/mRNA/pDNA screening	Parenteral	911593
926345	NanoFabTx™-DC-Chol Lipid Mix	Nucleic acid	general cell transfection; nucleic acid delivery; siRNA/mRNA/pDNA screening	Parenteral	911593
937231	NanoFabTx™ for gene delivery-Azide lipid mix	Nucleic acid	targeted delivery of nucleic acids; antibody conjugation via click chemistry	Parenteral	911593
937266	NanoFabTx™ for gene delivery-Maleimide lipid mix	Nucleic acid	targeted delivery of nucleic acids; antibody conjugation via maleimide-thiol chemistry	Parenteral	911593
937258	NanoFabTx™ for gene delivery- Folate lipid mix	Nucleic acid	targeted delivery of nucleic acids; selective targeting of cells overexpressing folate receptors	Parenteral	911593

Product No.	Name	Payload Species	Applications	Administration Route	Recommended Formulation Device
922420	NanoFabTx™ - PEG Lipid Mix	Small molecules	delivery of insoluble drugs; increased drug circulation time	Parenteral	911593
930113	NanoFabTx™-COOH Lipid Mix	Small molecules	targeted delivery of insoluble drugs; antibody conjugation via EDC/NHS chemistry	Parenteral	911593
924512	NanoFabTx™-NH ₂ Lipid Mix	Small molecules	targeted delivery of insoluble drugs; antibody conjugation via EDC/NHS chemistry	Parenteral	911593
932612	NanoFabTx™ Biotin Lipid Mix	Small molecules	targeted delivery of insoluble drugs; selective targeting of avidin binding cells (e.g., HeLa cells); antibody conjugation via biotin-avidin interaction	Parenteral	911593
932620	NanoFabTx™ - Azide Lipid Mix	Small molecules	targeted delivery of insoluble drugs; antibody conjugation via click chemistry	Parenteral	911593
933562	NanoFabTx™ Synthetic Folate Lipid Mix	Small molecules	targeted delivery of insoluble drugs; selective targeting of cells overexpressing folate receptors	Parenteral	911593
934216	NanoFabTx™-Mannose Lipid Mix	Small molecules	targeted delivery of insoluble drugs, selective targeting of cells overexpressing mannose receptors	Parenteral	911593
934194	NanoFabTx™-PEG RGD Lipid Mix	Small molecules	delivery of insoluble drugs via PEG-RGD targeted liposomes to cancer cells	Parenteral	911593
934224	NanoFabTx™-RGD Lipid Mix	Small molecules	delivery of insoluble drugs via PEG-RGD targeted liposomes to cancer cells	Parenteral	911593
934208	NanoFabTx™ DBCO Lipid Mix	Small molecules	targeted delivery of insoluble drugs; antibody conjugation via click chemistry	Parenteral	911593
933554	NanoFabTx™ NTA Lipid Mix	Small molecules	targeted delivery of insoluble drugs; His-tagged antibody conjugation via reversible metal chelation	Parenteral	911593
933570	NanoFabTx™-Maleimide Lipid Mix	Small molecules	targeted delivery of insoluble drugs; antibody conjugation via maleimide-thiol chemistry	Parenteral	911593
933546	NanoFabTx™ - Natural Folate Lipid Mix	Small molecules, protein	targeted delivery of insoluble drugs or thermo-sensitive proteins; selective targeting of cells overexpressing folate receptors	Parenteral	911593
933589	NanoFabTx™ NanoFlash PEG Lipid Mix	Small molecules	delivery of insoluble drugs; control of lipid nanoparticle for CIJ device	Parenteral	938343

Table 3. NanoFabTx™ Drug Delivery Kits – Sustainable Release Profiles.

Product No.	Name	Payload Species	Applications	Administration Route	Recommended Formulation Device
917737	NanoFabTx™ materials screening kit	Small molecules	delivery of insoluble drugs with PEG-free polymeric nanoparticles; includes PLGA, PCL, PLA polymers to optimize the encapsulation, release, stability and degradability of drugs with different hydrophobicity, size, and surface charge	Parenteral	911593
912220	NanoFabTx™ PLGA-micro for synthesis of 1-5 μm particles	Small molecules	delivery of insoluble drugs; control of 1–5 μm polymer microparticles	Parenteral	911860
912212	NanoFabTx™ PLGA-micro for synthesis of 10-30 μm particles	Small molecules	delivery of insoluble drugs; control of 10–30 μm polymer microparticles	Parenteral	911879
909637	NanoFabTx™ PLGA-nano for synthesis of 100 and 200 nm particles	Small molecules	delivery of insoluble drugs; control of 100–200 nm polymer nanoparticles	Parenteral	911593

Product No.	Name	Payload Species	Applications	Administration Route	Recommended Formulation Device
917796	NanoFabTx™ PEG-PLGA drug formulation screening kit for synthesis of PEGylated nanoparticles	Small molecules	delivery of insoluble drugs with PLGA-based nanoparticles; PLGAs of different sizes optimize encapsulation, release, and stability of drugs with different hydrophobicity, size, and surface charge	Parenteral	911593
915408	NanoFabTx™ PEGylated nanoparticle formulation screening kit	Small molecules	delivery of insoluble drugs with PEG-polymeric nanoparticles; includes PLGA, PCL, PLA polymers to optimize the encapsulation, release, stability and degradability of drugs with different hydrophobicity, size, and surface charge	Parenteral	911593
920436	NanoFabTx™ PEG-PLA drug formulation screening kit	Small molecules	delivery of insoluble drugs with PLA-based nanoparticles; PLGAs of different sizes optimize encapsulation, release, and stability of drugs with different hydrophobicity, size, and surface charge	Parenteral	911593
918881	NanoFabTx™ PEG-PCL drug formulation screening kit	Small molecules	delivery of insoluble drugs with PCL-based nanoparticles; PLGAs of different sizes optimize encapsulation, release, and stability of drugs with different hydrophobicity, size, and surface charge	Parenteral	911593
918075	NanoFabTx™ PLA-nano for synthesis of 100 and 200 nm particles	Small molecules	delivery of insoluble drugs with PLA-based 100-200 nm nanoparticles	Parenteral	911593

Microneedle kits: NanoFabTx™ Polymers for Microneedles

Microneedles are tiny polymeric projections that come in various lengths, pitches, and arrays, designed for the delivery of topical therapeutic molecules and vaccine antigens through the skin. Made from biodegradable synthetic or natural polymers, they can be efficiently formulated with NanoFabTx™ Polymers for Microneedles (Figure 3) using microneedle templates.

Offering versatile options for dissolving and hydrogel-based arrays, NanoFabTx™ polymers are chosen for their biocompatibility and ease of processing, allowing researchers to create microneedle patches that enable controlled delivery and patient-friendly administration.

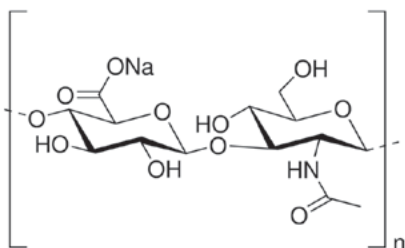


Figure 3. NanoFabTx™ Polymers for Microneedles: hyaluronic acid sodium salt.

Table 4. NanoFabTx™ Polymers for Microneedles – Materials and Types.

Cat. No.	Polymer Name	Type of microneedle
938858	Polyvinyl Alcohol (PVA)	Dissolving
938882	Hyaluronic Acid Sodium Salt	Dissolving
938831	Gelatin methacrylate (GelMA) hydrogel kit	Hydrogel/swelling
419273	Sodium carboxymethylcellulose (NaCMC)	Hydrogel/swelling

Microneedle Templates

Microneedle templates (Figure 4) provide precise dimensions and array configurations for creating consistent and reliable microneedle structures. These templates are designed to support accurate fabrication, ensuring uniform needle height, pitch, and shape for controlled delivery applications.

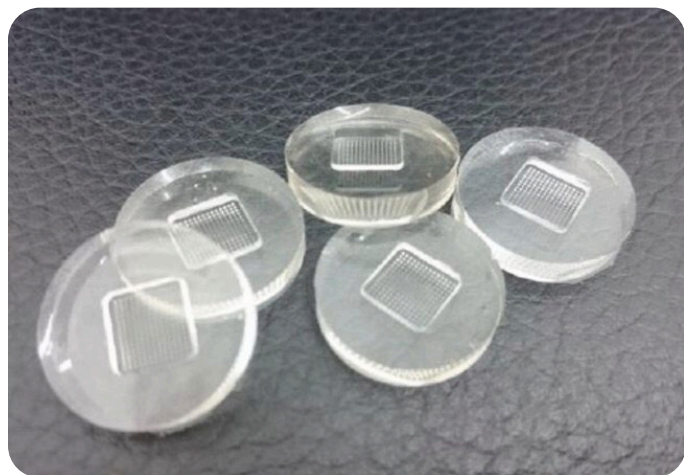


Figure 4. Microneedle template, which is 10 x 10 array, height 600 μm, base size 200 μm, 500 μm pitch.

Table 5. Microneedle Templates for Dissolvable Microneedle Patch Production.

Cat. No.	Array Size	Needle Height (μm)	Base Size (μm)	Needle Pitch (μm)	Needle Shape
934445	10 × 10	300	100	500	Pyramidal
934585	10 × 10	800	200	500	Pyramidal
934496	10 × 10	600	200	500	Pyramidal
934518	15 × 15	600	200	500	Pyramidal
934461	10 × 10	500	150	500	Pyramidal
934615	6 × 6	1000	250	1500	Pyramidal
934577	10 × 10	700	200	500	Pyramidal
934488	10 × 10	500	200	500	Pyramidal
934453	10 × 10	400	150	500	Pyramidal
934593	6 × 6	800	250	500	Pyramidal
934607	6 × 6	1000	250	1000	Pyramidal

Microneedle Applicator

Note: accessory for microneedle templates; not needed for formulation

Microneedle applicator accessories (**Figure 5**) are designed to simplify the handling and application of microneedle templates. These tools ensure consistent placement and ease of use, supporting accurate and reproducible microneedle delivery in research and development workflows.

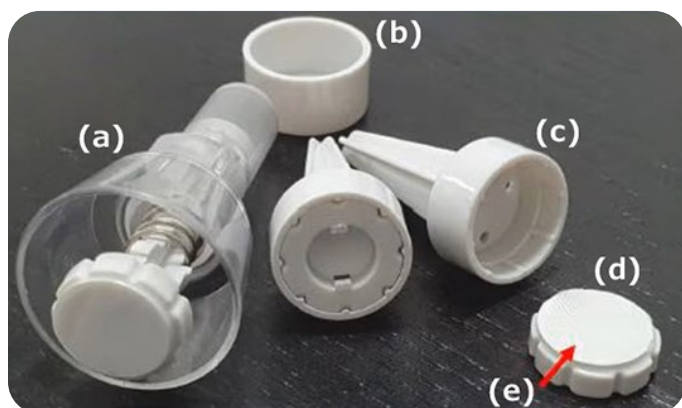


Figure 5. Microneedle spring applicator set showing (a) the spring applicator, (b) the loader's cap, (c) the loader, (d) the button, and (e) the microneedles.

Table 6. NanoFabTx™ Microneedle Applicator Accessories.

Product No.	Description
934623	Microneedle spring applicator set
934631	Microneedle loader set

NanoFabTx™ formulation devices (**Figure 1**) are designed to simplify particle and lipid system preparation. With advanced options for microfluidic mixing and flash precipitation, these tools enable rapid, precise, and scalable control over parameters such as particle size, uniformity, encapsulation efficiency, and reproducibility.



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