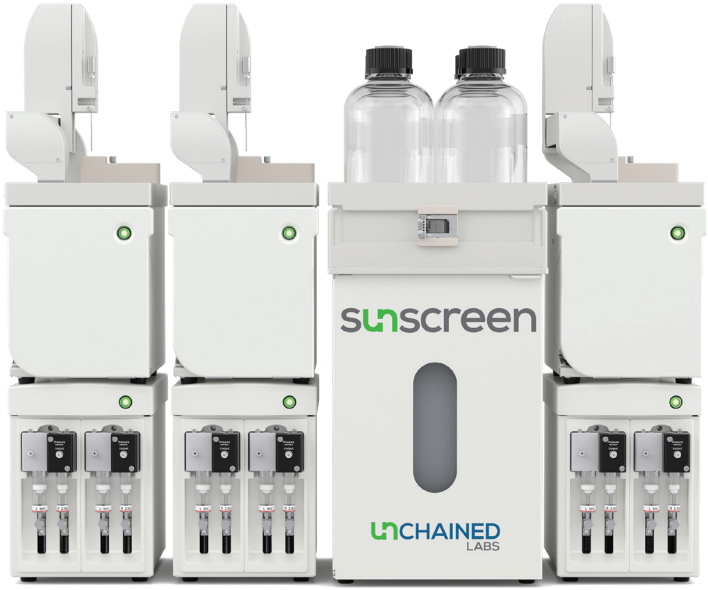
sunscreen

UNCHAINED LABS

Crank them out

Finding the perfect LNP formulation can feel like it drags on forever. You need to figure out the best lipid mixture, the right lipid to payload ratio and the optimal flow rates to mix it all together. Worst of all, it's usually done one experiment at a time. Sunscreen totally flips the script by creating 96 unique, small volume LNP formulations in less than 6 hours – so you can explore more formulations in a single day than you ever thought was possible.

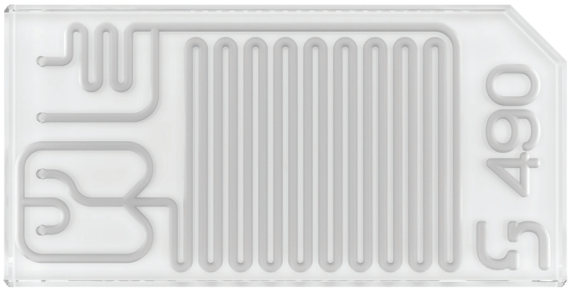
- 96 formulations in <6 hours
- 200 µL–2 mL per experiment
- 0.1–30 mL/min flow rates
- Reusable microfluidics
- Scalable method



Mix it up

Fill one plate with payloads, the other with lipids and you're ready to mix them up with a Sunny. For a simple, well-known T-mixing approach or to increase fluid contact area for particle formation with a cross-junction, grab a Sunny XT. To use Sunscreen's full range of flow rates, ratios and integrated in-line dilution, choose a Sunny Trident. Sunnies can easily be subbed in and out of Sunscreen so once you find your favorite, you can use it over and over again.

Sunny Trident



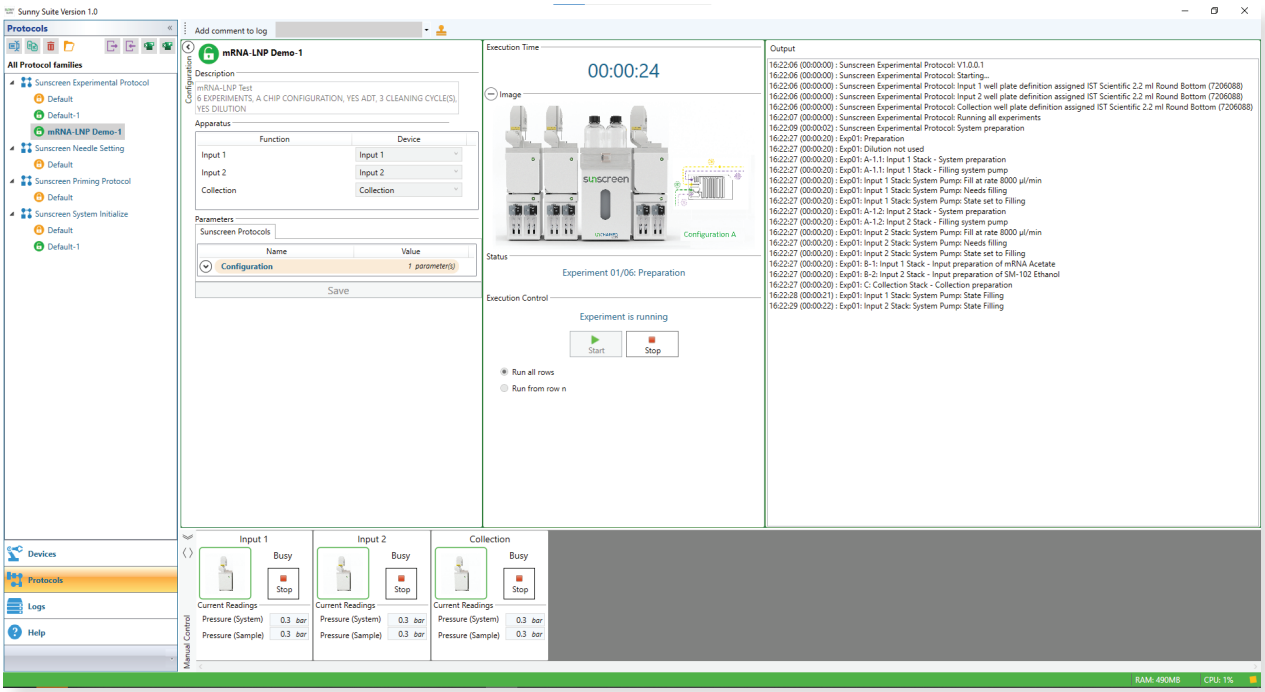
- Reverse-angle mixing
- In-line dilution

Sunny XT

- Cross-type or T-mixing
- Multiple channel sizes

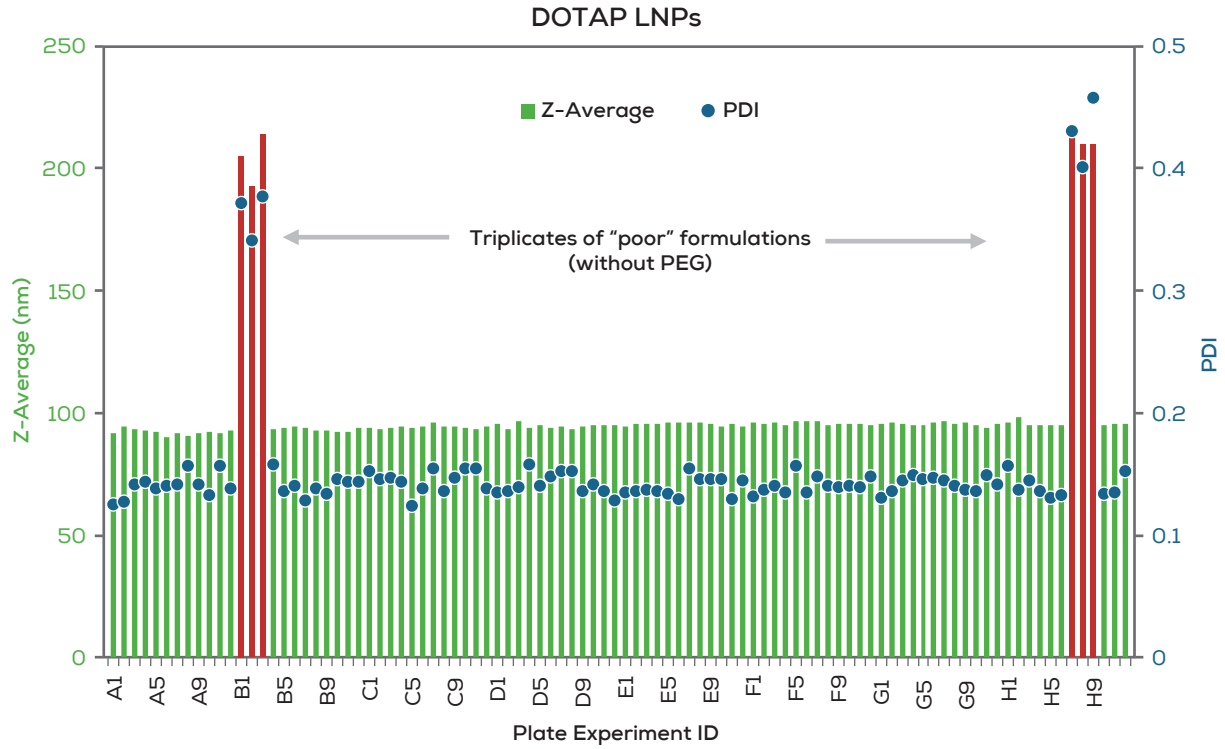
Set it, forget it

Tell Sunscreen's Sunny Suite Software what's in your plates, the lipid to payload ratios, the flow rates you want to mix at, and you're ready to go. The software checks to make sure your experiments will work, so you don't need to worry about screwing things up. Sunscreen takes it from there, knocking out an entire plate of LNPs way before the day is done. You'll still have you plenty of time to start buffer exchange or characterization – all before you clock out.



Bank on it

When you ask Sunscreen to make a full plate of formulations, you can trust that every one will be made consistently, with no variability across the entire plate. The automated washing protocol between experiments ensures that nothing carries over from the last formulation, so a not-so-good formulation won't affect the next good one. If you really want to supercharge your workflow, grab a Stunner to check the LNP sizes and PDIs in less than an hour to suss out your winners right away.

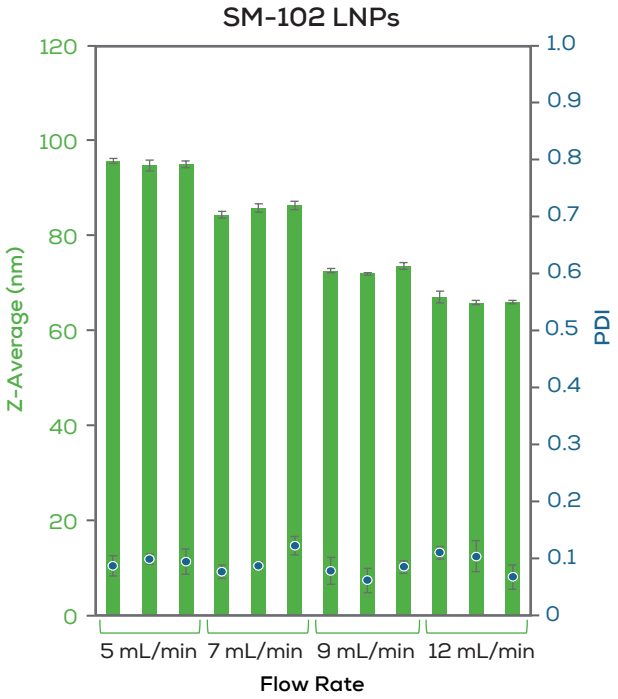


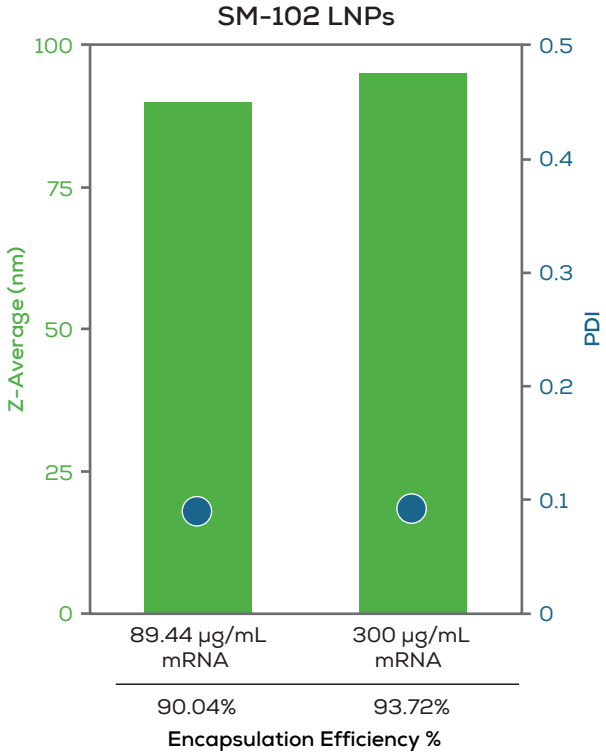
Narrow it down

Once you've found a great lipid mix, Sunscreen helps you take the first pass at finding the right ratios and flow rates to get the size just right. When you're ready to scale up the killer conditions you find on Sunscreen, they can be transferred directly to Sunshine – the Sunny too.

Do more with less

mRNA, siDNA and pDNA typically cost a ton and are difficult to make. Sunscreen lets you use way less of these precious payloads each time you try to get them into LNPs. Scale down your experiments and save lots of dough while you figure out your formulation.





Specifications

Application			
Throughput	Up to 96 formulations within 6 hours		
Total flow rate range	0.1–30 mL/min (chip dependent)		
Flow rate ratio (aqueous to organic) range	1:1 to 5:1		
Typical sample volume range (at a 3:1 FRR)	400 µL–2 mL		
Minimum input volume (including dead volume)	105 µL		
Continuous mode volume range	NA		
In-line dilution	Yes		
Typical particle size range	40–200 nm*		
PDI	<0.2*		
Encapsulation efficiency	>90%*		
Instrument			
Physical			
Weight and dimensions (required space)	57 kg, 60 cm H x 90 cm W x 40 cm D		
Operating pressure	0-10 bar		
Electrical			
Voltage input	100 V–240 V AC, 50-60 Hz		
Communications	USB via Sunny Suite Software		
Other Information			
Fluidic port sizes	¼"-28 and 10–32 and Luer fittings		
Sample loop size	2.5 mL		
Fluid store volumes	4 x 1000 mL bottles		
Waste storage volume	5 L		
Wetted materials	PTFE, PCTFE, FEP, ETFE, PEEK, Polypropylene, FFKM, Hastelloy C276, Stainless Steel T316, Glass, Tygon (Waste Tubes), HDPE (Waste Container)		
Computer	Separate computer with Win 11, monitor, keyboard and mouse		
Consumable			
Sunnies	Glass microfluidic mixing devices of various geometries and channel sizes		
Available types	Sunny 490 Trident T Sunny 100 XT	Sunny 190 XT Sunny 275 XT	Sunny 150 5-input Sunny 50 Micromixer (edge connected)

* Formulation dependent

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Rev A