

# STUnNER

LNP Characterization



**UnCHAINED**  
LABS

## Conquer LNP characterization

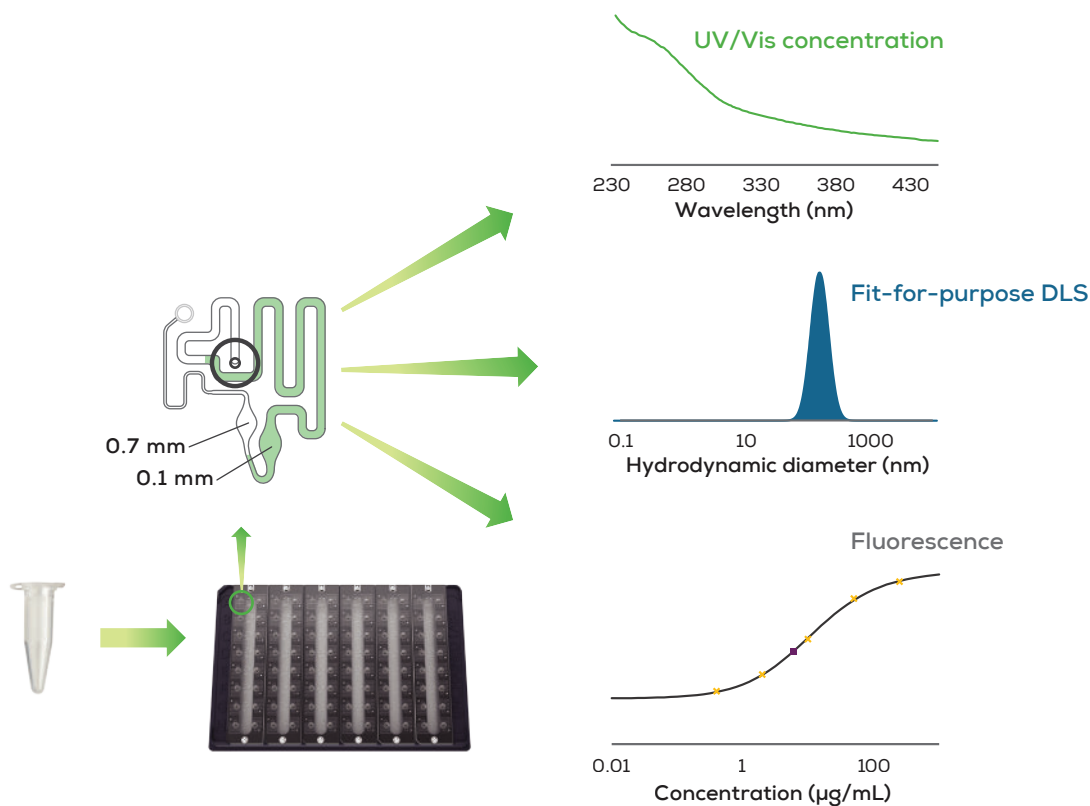
Stunner is the only system that pulls together UV/Vis concentration with rotating angle dynamic light scattering (RADLS) on the same 2  $\mu$ L sample. Add on dye-based fluorescence with Stunner AF (Add Fluorescence) and see even more in the same run. Nail down your lipid nanoparticle quality by knocking size, encapsulation efficiency (EE%), particle concentration and detection of aggregates off your list in one hit. Without skipping a beat, you'll know if your nanoparticle is good to go.

- Sizing & polydispersity
- Encapsulation efficiency
- Particle concentration
- Aggregation



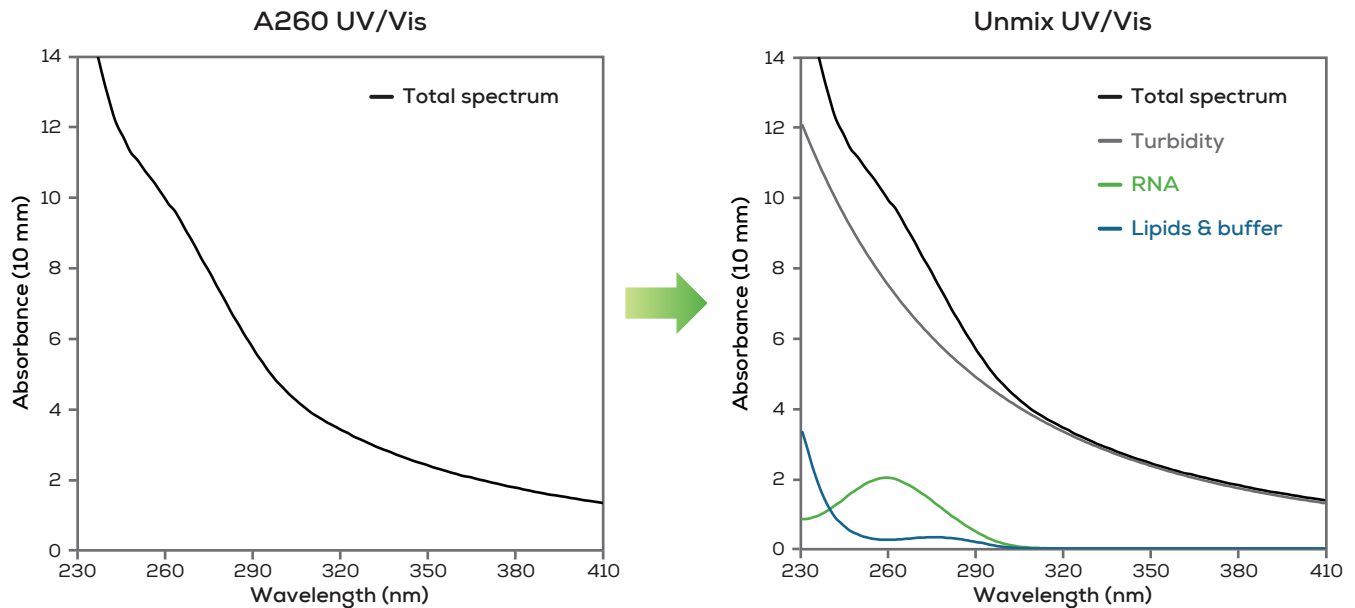
## Teeny sample, tons of info

Just load 2  $\mu\text{L}$  of sample in a 96-well Stunner plate for reagent-free quant with UV/Vis and you'll see all the payload present in and outside of your therapeutic nanoparticle. Fluorescence is ready to measure dye-based quant of free payload and calculate EE% with no added effort. Get the full work-up with sizing from DLS or RADLS and have all your characterization done in around two hours.



## See through the fog

Cloudy solutions of LNPs and other nanoparticles hang up other techniques but Stunner's short pathlengths teamed up with UV/Vis get you the answers you need. Cut through all that turbidity with Unmix and check out just the absorbance signal from your payload.



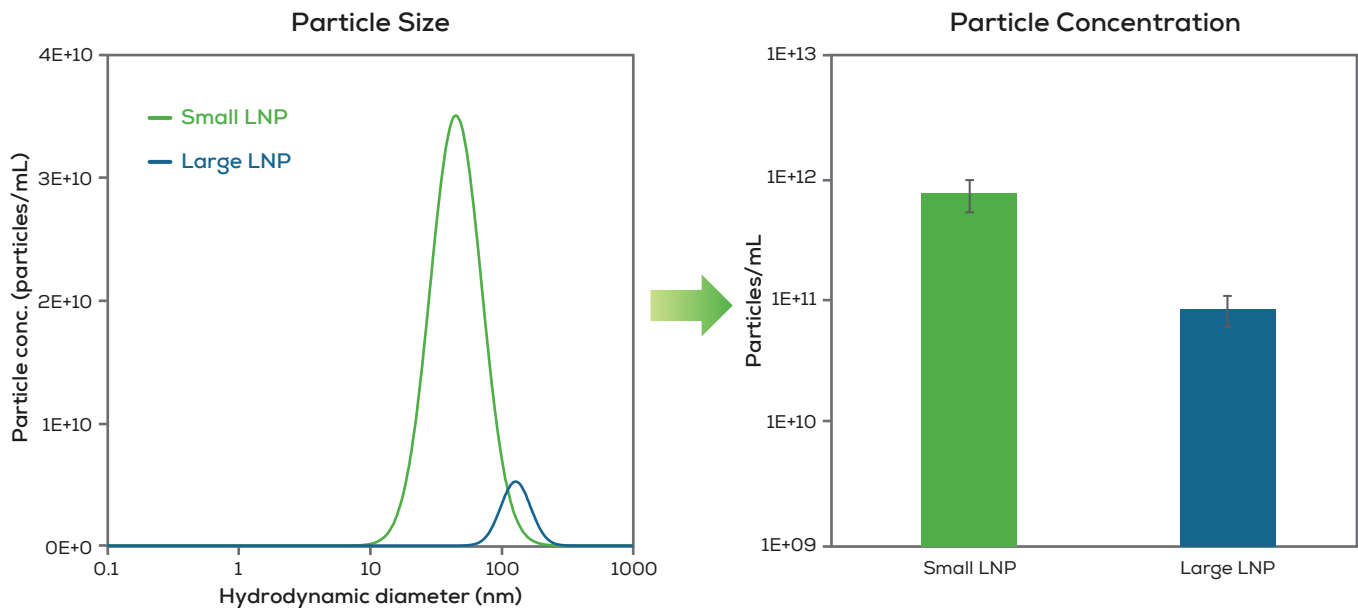
## Get Stunner AF

Want fluorescence? Stunner AF (Add Fluorescence) delivers UV/Vis with sizing data and takes it up a notch with fluorescence for dye-based quantification of free RNA. Load up standards, undiluted LNPs, and LNPs mixed with RiboGreen for Total RNA and Free RNA quant. Build up your own assays or grab EE% plus sizing to rip through LNP characterization with our optimized applications.



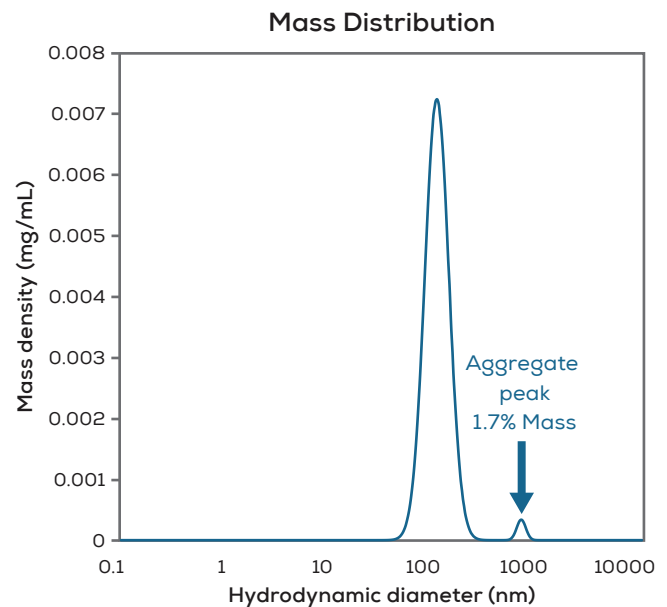
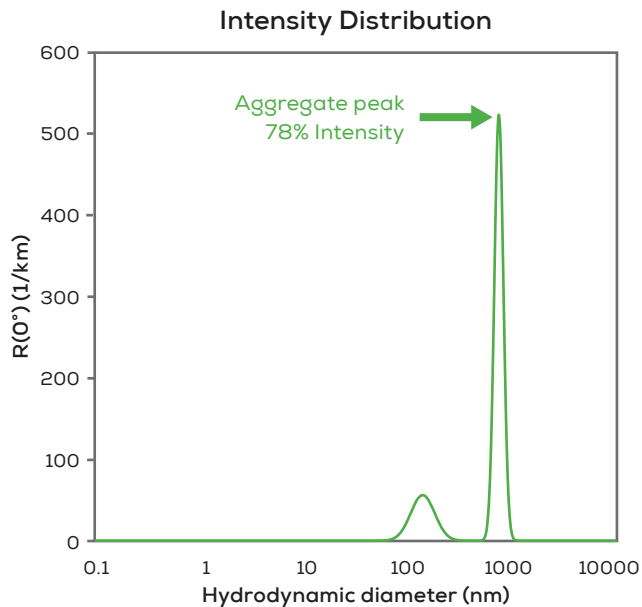
## LNP sizing & quant in one shot

Stunner sizes up and counts your LNPs by combining DLS and SLS data from a bunch of different angles. Compare different formulations and mixing parameters to see which one gets you the perfect LNP size – and from the same run, Stunner clocks which contain the most particles too.



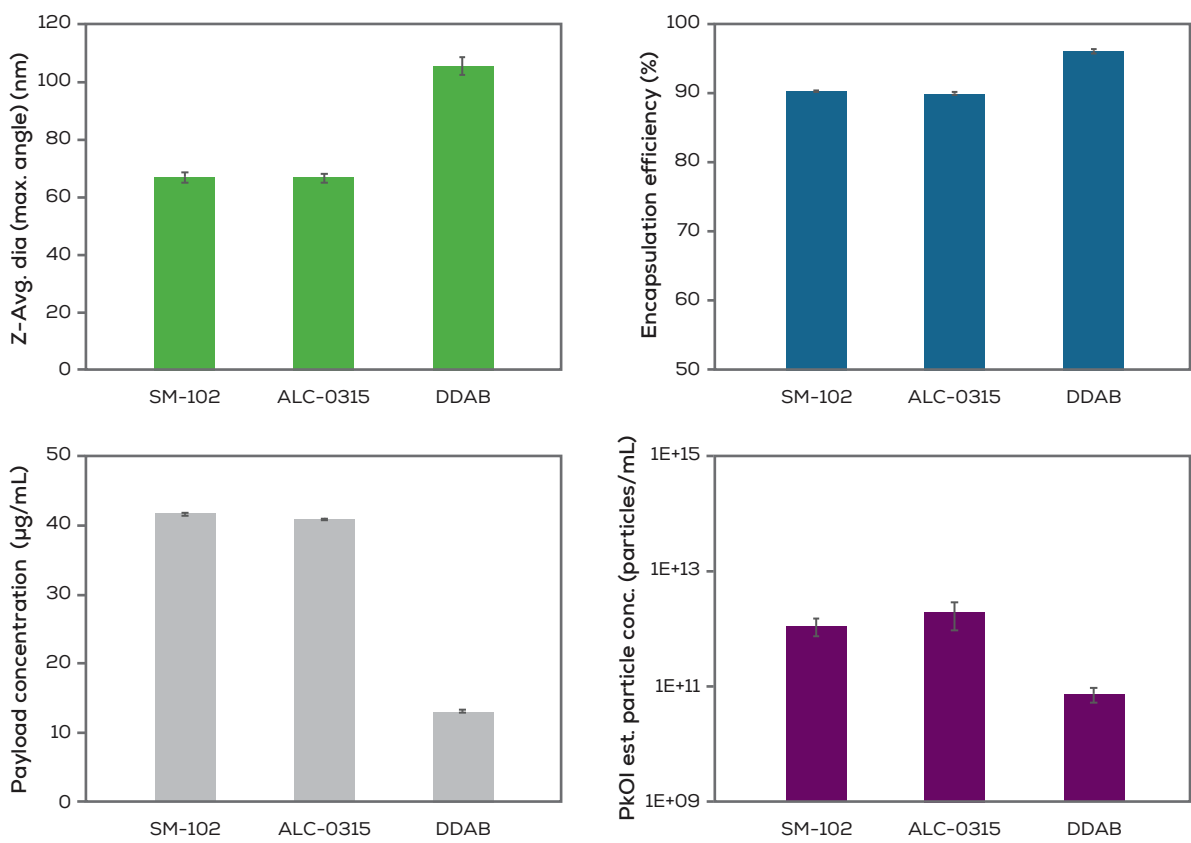
## Know what's up

Stunner can catch even the tiniest bit of aggregation. Check out your LNP size by intensity distribution first and stay on the lookout for aggregates. If you see aggregation rearing its ugly head, make the switch to mass distribution to see how bad it might be. Beef up your sizing stats and never get fooled by rogue aggregates again.



# Screen at light speed

Stunner is the ultimate tool for LNP screening and rapid characterization, delivering all the need-to-know info on up to 44 LNP samples on a single plate in about 2 hours. Combine UV/Vis, fluorescence, DLS and SLS from multiple angles to get size, EE%, total payload concentration, and particle concentration. Stunner always tells the whole lipid nanoparticle story.



# Specifications

| Stunner instrument specifications                                      |                                                                                                                                          |                  |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Dimensions                                                             | Stunner: 37 cm W x 54 cm D x 33 cm H; 30.4 kg<br>Stunner AF: 37 cm W x 58 cm D x 33 cm H; 30 kg                                          |                  |
| Electrical                                                             | Universal input voltage 100–240 V AC, 50–60 Hz                                                                                           |                  |
| Computer                                                               | Separate computer with Windows 11 included                                                                                               |                  |
| Connection                                                             | USB, TCP/IP (Service)                                                                                                                    |                  |
| Approval                                                               | CE, FCC, CSA                                                                                                                             |                  |
| Regulatory compliance                                                  | Optional 21CFR11 software package; USP and Ph. Eur. Performance verification standards                                                   |                  |
| UV/Vis                                                                 |                                                                                                                                          |                  |
| Light source                                                           | Xenon flash lamp                                                                                                                         |                  |
| Detectors                                                              | UV/Vis polychromatic spectrophotometer                                                                                                   |                  |
| Wavelength range                                                       | 230–750 nm                                                                                                                               |                  |
| Wavelength accuracy                                                    | ≤400 nm: ±1 nm; ≥400 nm: ±2 nm                                                                                                           |                  |
| Spectral resolution                                                    | Better than 2 nm (toluene in hexane)                                                                                                     |                  |
| Absorbance precision (1 cm quartz cuvette)                             | <1 OD: ±0.005 OD st dev                                                                                                                  | 1–2 OD: ±0.5% CV |
| Absorbance accuracy (1 cm quartz cuvette)                              | <1 OD: ±0.01 OD                                                                                                                          | 1–2 OD: ±1%      |
| Fluorescence (Stunner AF only)                                         |                                                                                                                                          |                  |
| Channels                                                               | Blue/Green (Ex. 475 nm LED/Em. 515–565 nm)<br>Red/Far Red (Ex. 624 nm LED/Em. 672–712 nm)                                                |                  |
| DLS and rotating angle DLS                                             |                                                                                                                                          |                  |
| Light source                                                           | 2 x 660 nm laser diodes                                                                                                                  |                  |
| Detection                                                              | Avalanche photodiode module                                                                                                              |                  |
| Number of angles                                                       | 1 (DLS), 5–30 (RADLS)                                                                                                                    |                  |
| Angular range                                                          | 30–42° & 110–162°                                                                                                                        |                  |
| Size accuracy                                                          | ±2%                                                                                                                                      |                  |
| Minimum sample concentration                                           | 0.1 mg/mL lysozyme                                                                                                                       |                  |
| Hydrodynamic diameter range                                            | 0.3–1000 nm                                                                                                                              |                  |
| Particle concentration range                                           | 10 <sup>9</sup> –5x10 <sup>13</sup> particles/mL (dependent on particle size, determined on 80 nm beads)                                 |                  |
| Stunner plate specifications                                           |                                                                                                                                          |                  |
| Samples per plate                                                      | 96 (12 x 8 microplate format)                                                                                                            |                  |
| Sample retention time                                                  | Up to 2 hours                                                                                                                            |                  |
| Recommended sample volume                                              | 2 µL                                                                                                                                     |                  |
| Pathlength(s)                                                          | 0.1 mm & 0.7 mm path                                                                                                                     |                  |
| Measurement time for full plate                                        | ~10 minutes for UV/Vis only<br>~1 hour for UV/Vis and DLS (5 x 4s x 1 angle)<br>~2 h 15 minutes for UV/Vis and RADLS (5 x 1s x 7 angles) |                  |
| Measurement range:<br>OD 10 mm<br>ng/µL dsDNA<br>mg/mL ave protein mix | 0.03–275 OD 10 mm<br>1.5–13750 ng/µL<br>0.03–275 mg/mL                                                                                   |                  |
| Absorbance precision (10 mm pathlength)                                | <1 OD: ±0.01 OD st dev                                                                                                                   | 1–200 OD: ±1% CV |
| Absorbance accuracy (10 mm pathlength)                                 | <1 OD: ±0.02 OD                                                                                                                          | 1–200 OD: ±2%    |



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