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# STUNNER

Biologics Characterization



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## Conquer protein characterization

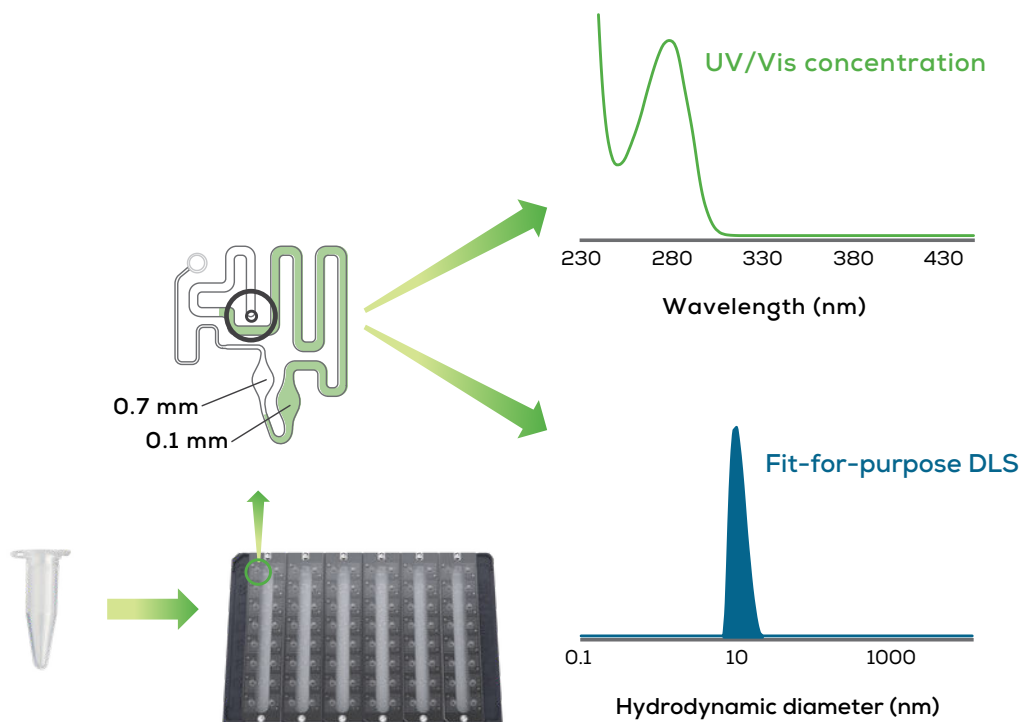
Stunner is the only system that pulls together UV/Vis concentration and fit-for-purpose dynamic light scattering (DLS) data on the same 2  $\mu\text{L}$  sample. Rack up protein concentration, sizing, and aggregate detection, all at once. Without skipping a beat, you'll know if your protein is good to go.

- Protein quant
- Sizing & polydispersity
- Aggregation detection
- B22 &  $k_D$
- ADC and DAR quant



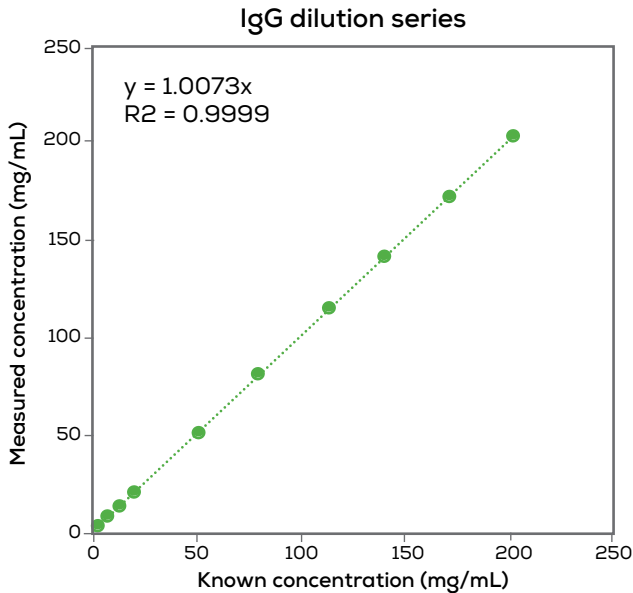
## Teeny sample, tons of info

Just load 2  $\mu\text{L}$  of sample in a Stunner plate – don't bother with sample prep or dilution. Each microfluidic circuit has two fixed pathlengths built-in to cover a wide dynamic range of 0.03-275 OD. If you're dealing with a full plate, get 96 concentration measurements in 10 minutes – add on sizing and have it all done in an hour. For even heavier workflows, hook it up to your favorite robot to add more oomph.



## Ridiculously accurate quant

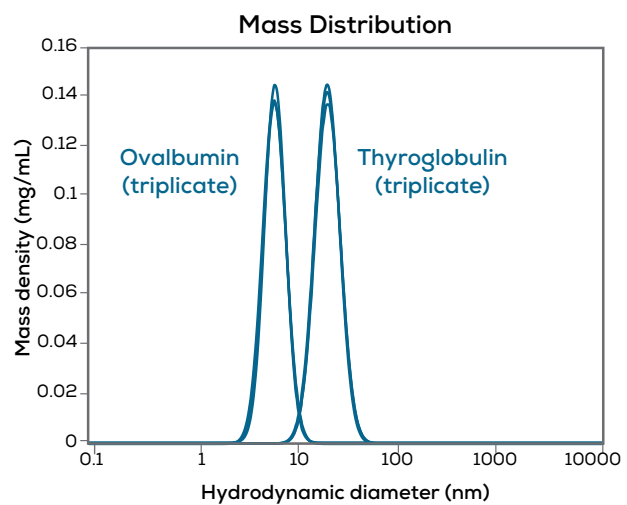
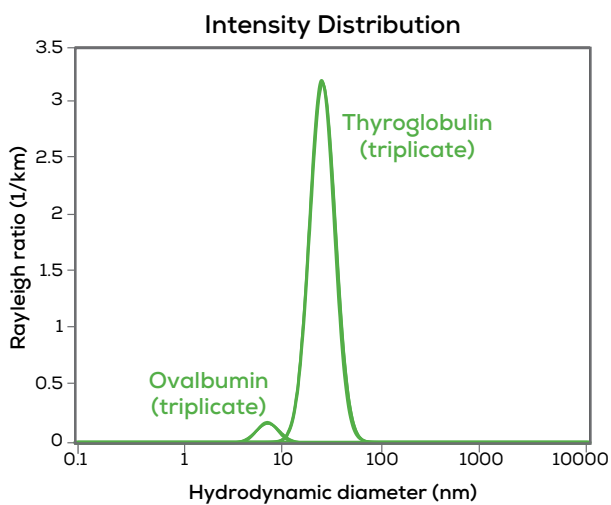
Get spot-on precision within 1% and accuracy within 2%. Using two fixed pathlengths, Stunner gets you jaw-dropping data at both low and high protein concentrations and nails the expected concentrations every time. With the smallest sample size, the highest throughput and crazy accurate results, Stunner is hands down the best tool out there for protein quantification.



Known Conc. (mg/mL)	Average Conc. (mg/mL)	CV (%)
201.4	201.7	0.7%
169.9	171.1	0.7%
139.4	140.7	0.4%
113.1	115.0	0.6%
79.4	80.7	0.2%
50.2	51.2	0.2%
19.9	20.3	0.3%
12.1	12.2	0.2%
7.21	7.28	0.2%
2.35	2.37	0.2%

## Get the skinny on proteins

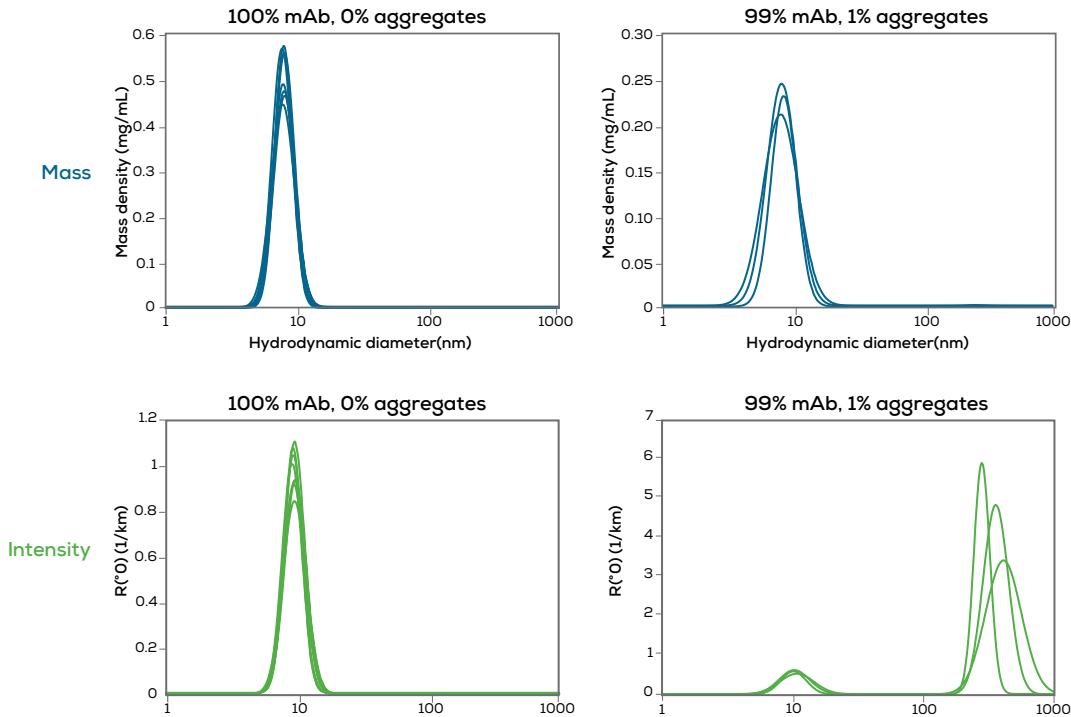
Stunner serves up spot-on light scattering data for proteins, so you can compare samples head-to-head based on size, intensity, mass and number. Measure the hydrodynamic size, grab polydispersity when you need to check uniformity, and watch your replicates stack up right on top of each other.



Protein	Z-Avg Dia (nm)	PDI
Ovalbumin	6.6 ± 0.1	0.09 ± 0.01
Thyroglobulin	22.0 ± 0.7	0.12 ± 0.01

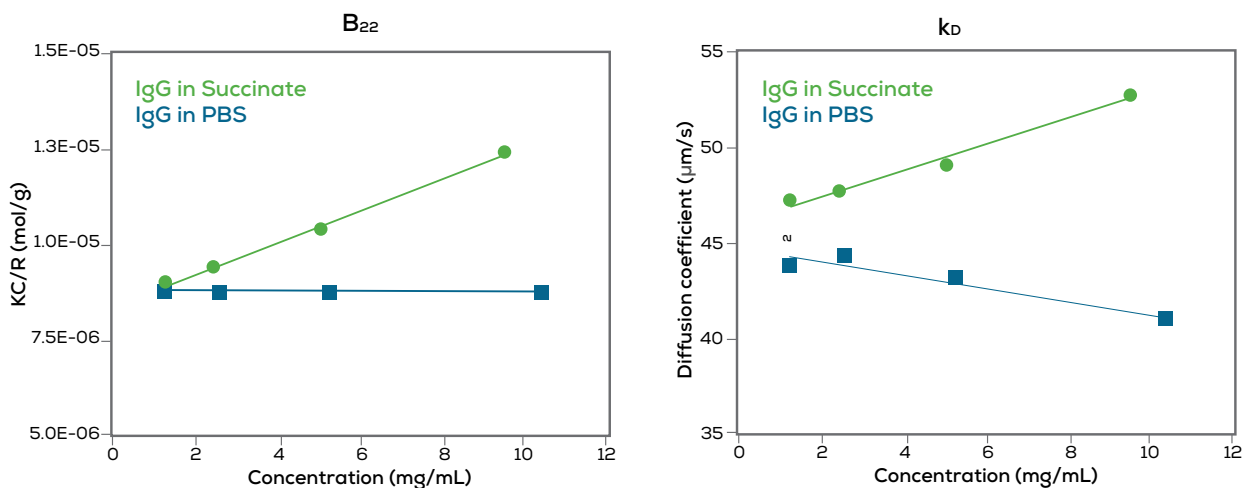
## Track down the big boys

When it comes to the quick and easy detection of aggregates, Stunner pulls rank. See your monomer based on mass, then switch over to intensity to spot even the tiniest bit of aggregation. QC your protein at every step of your process and catch aggregation before it becomes a bigger problem.



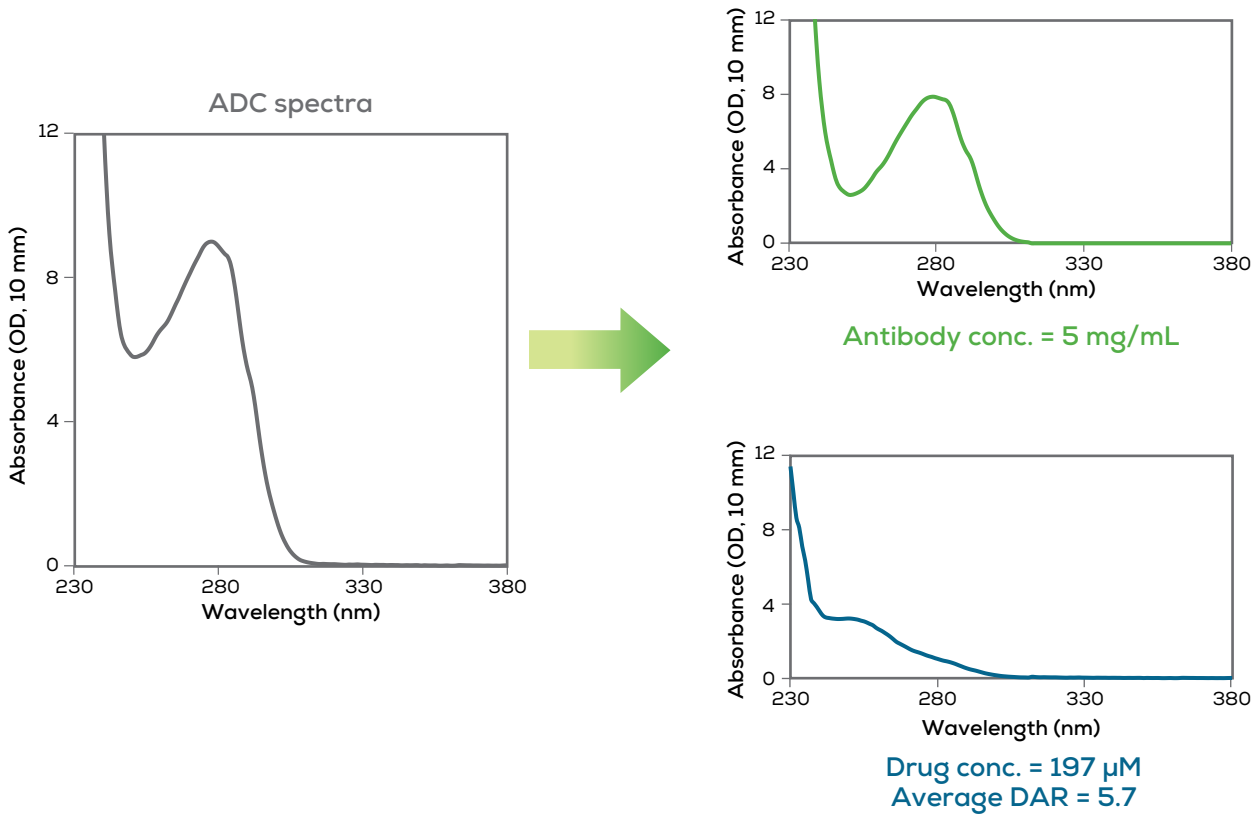
## Feel the attraction

Stopping aggregation in its tracks is critical. Stunner deals out  $B_{22}$  and  $k_D$ , indicators of a potentially looming problem, in one simple experiment. All you do is create a quick dilutions series, load it on a plate and you're good to go. Stunner checks the exact concentrations while light scattering figures out if your protein is attractive (negative slope) or repulsive (positive slope) to itself.



## Decode any ADC spectra

Measuring ADCs by UV/Vis gets tricky when drug spectra interfere in the UV range. Stunner's Unmix separates ADC absorbance into the spectra from your antibody and from your drug or linker – even for overlapping spectra. Decode your ADC spectra automatically for a simple, high-throughput method to quantify antibody concentration, conjugate concentration and DAR.



## Specifications

Stunner instrument specifications		
Dimensions	37 cm W x 58 cm D x 33 cm H; 29.3 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%
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	
Molecular weight range	1 kDa - 10 GDa	
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 ~1 hour for UV/Vis and DLS (5 x 4s x 1 angle) ~2 h 15 min for UV/Vis and RADLS (5 x 1s x 7 angles)	
Measurement range: OD 10 mm ng/µL dsDNA mg/mL ave protein mix	0.03-275 OD 10 mm 1.5-13750 ng/µL 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%	