

Selection Guide: Gator Streptavidin Probes for Biotin Tag Capture

Choosing the right probe

Gator® Bio offers five different streptavidin biosensor probe options including three traditional single-use probes (SA, SMAP, SA XT), and two reusable kits (Flex SA, Regen SA). No other BLI platform on the market offers a regenerable streptavidin biosensor surface.

As each probe has different surface properties and optical performance, the best choice can depend on your specific experimental system. Factors including sample molecular weights, charge, hydrophobicity, protein stability, and sample complexity (e.g., serum, lysate, nanodiscs) can all influence performance. For this reason, it is often helpful to evaluate more than one probe type during method development to identify what works best for an assay. The sections below will help guide which streptavidin probe types are the best fit.

Sensitivity

One of the key discriminators for probe selection is the size of analytes that need to be detected. Gator Bio offers streptavidin probes with different sensitivity performance to suit a wide variety of analyte molecular weight ranges and sample types.

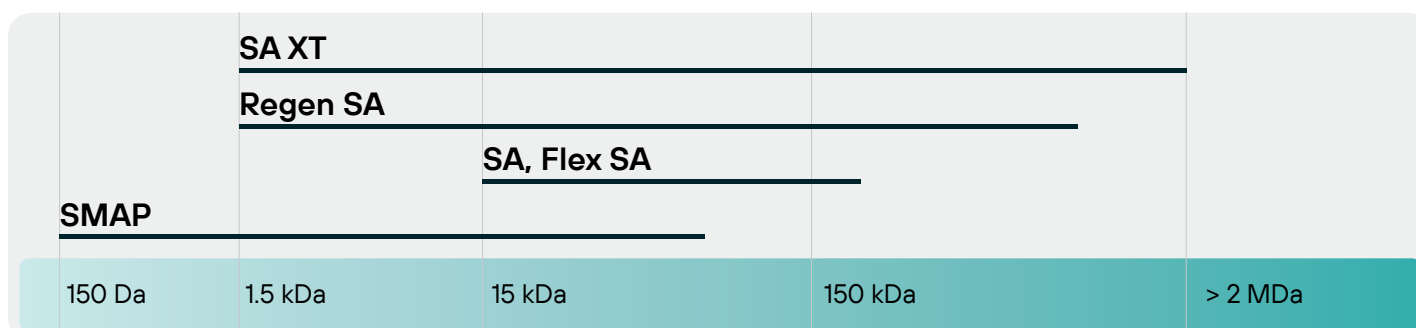


Figure 1: Recommended analyte molecular weight ranges for different streptavidin biosensor probes offered by Gator Bio.

Analyte Type	Recommended probes to evaluate
Small molecules $\geq$ 150 Da	SMAP
Oligomers/peptides $\geq$ 1.5 kDa	SMAP, SA XT, Regen SA
Proteins/antibodies 15 – 150 kDa	SA, SA XT, Flex SA, Regen SA
LNPs, VLPs, large complexes $\leq$ 2 MDa	SA XT

Table 1: Recommended streptavidin probe options to evaluate for common analyte types and size ranges.

Gator probe key features

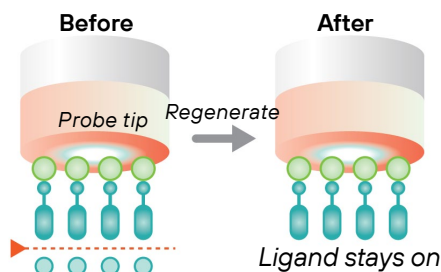
Probe	Description	Details	
SA Probes PN: 160002	Most used streptavidin biosensor for capture of biotinylated proteins in the molecular weight range 15 - 150 kDa. Offers best precision in biotinylated ligand capture with $CV \leq 6\%$ within-tray for most sample types as well as highly reproducible kinetics. Recommended probe for use with crude samples (serum, lysates).	Recommended for	Proteins, antibodies
		Assays	K / EP
		Regenerability	Analyte only
		Tag compatibility	Biotin, AviTag
SA XT Probes PN: 160029	The SA XT streptavidin surface paired with XT optics provides up to 3x signal-to-noise enhancement, enabling detection of both larger and smaller analytes. Recommended analyte molecular weight range is from 1.5 - 2000 kDa. Polymer-free surface reduces mass transport from very large analytes.	Recommended for	Proteins, antibodies, VLPs, LNPs, nanodiscs, peptides
		Assays	K / EP
		Regenerability	Analyte only
		Tag compatibility	Biotin, AviTag
SMAP Probes PN: 160011	Small Molecule Analysis Probes (SMAP) combines a high-density streptavidin surface with XT Optics to enhance detection of small molecular weight analytes ≥ 150 Da. Ideal for peptide kinetics.	Recommended for	Peptides, small molecules, nanobodies
		Assays	K / EP
		Regenerability	Analyte only
		Tag compatibility	Biotin, AviTag
Flex SA Probes PN: 350001	Re-usable kit that removes and reactivates the streptavidin layer between experiments to provide a clean biosensor surface for each assay. Ideal for repeated experiments featuring crude samples or for moderate-throughput biotinylated protein screening (15 - 150 kDa). Note the Flex SA quick setup workflow is only supported in software for Gator Prime, Gator Plus, and Gator Plus+ instruments.	Recommended for	Proteins, antibodies
		Assays	K
		Regenerability	Yes, 10+ times
		Tag compatibility	Biotin, AviTag
Regen SA (RSA) Probes PN: 350009 (full kit) PN: 350012 (trial kit)	Features an engineered streptavidin surface that can be regenerated with a standard regeneration protocol using the provided proprietary solution. Ideal for high throughput screening of multiple biotinylated ligands. Built on XT optics, these biosensors have the sensitivity for low molecular weight analytes and larger proteins alike. Due to the regenerable nature, the engineered surface has a lower affinity to biotin and is not recommended for analysis of kinetic interactions with $K_D < 100$ pM.	Recommended for	Proteins, antibodies, peptides
		Assays	K / EP
		Regenerability	Yes, up to 10 times
		Tag compatibility	Biotin tags with longer spacing to biomolecule are recommended, such as LC-LC-Biotin, PEG4-Biotin, biotin-dT. AviTags are not recommended.

K = Kinetics, EP = Epitope Binning

Regenerability

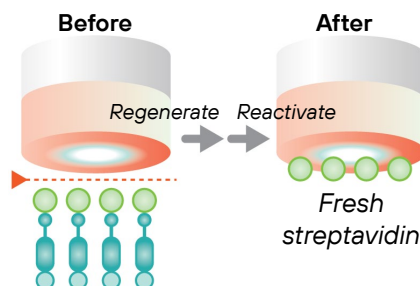
The biotin-streptavidin bond is nearly covalent, so streptavidin surfaces are typically considered single-use. Gator Bio offers three ways to reuse streptavidin probes.

Streptavidin Biotin-tagged ligand Analyte



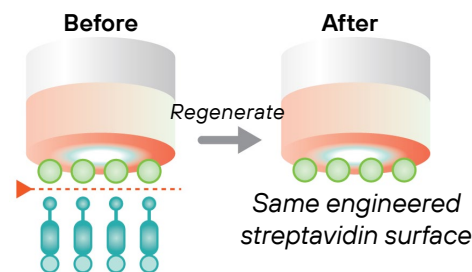
Analyte-only regeneration

With SA, SA XT, and SMAP probes, you can remove only the analyte and leave the ligand on the probe, so the same ligand surface can be used to test the next analyte. Regeneration conditions must be optimized for each analyte-ligand interaction.



Flex SA regeneration

The Flex SA Kit removes the entire streptavidin layer, including the ligand, and then reactivates the surface. Each assay starts on a clean capture surface.



Regen SA regeneration

Regen SA probes use the supplied proprietary regeneration solution to strip the biotinylated ligand from the probe. The engineered streptavidin layer stays in place, so the probe can capture the next ligand without reactivation.

Recommendations for biotinylation linkers

The binding affinity of streptavidin to biotin is the strongest non-covalent interaction known, but accessibility of biotin into the streptavidin binding pocket can be reduced by steric hinderance. When using avi-tagged proteins, which include no spacer or linker, some dissociation on the sensorgram is to be expected, particularly with the engineered streptavidin used on Regen SA (RSA) probes.

To improve affinity to the biosensor surface, using a biotinylation kit can improve performance. Longer, hydrophilic linkers (e.g., PEG4 or LC/LC-LC) are generally preferred for larger proteins, complexes, or membrane systems, as they improve accessibility. A molar coupling ratio (MCR) of 3 is recommended for most applications. Shorter linkers may work for smaller or well-exposed targets but can limit binding if the ligand's interactive surface is too close to the probe.

Still not sure which probe fits your application?

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