Agilent Streptavidin, Phycobiliproteins and Conjugates

Bioanalytical proteins for diverse applications

Agilent

Trusted Answers

Partnering with Agilent

With the acquisition of ProZyme, Agilent now offers streptavidin, phycobiliproteins, and a wide selection of conjugate products. These include a family of ready-to-use streptavidin-phycobiliprotein conjugates, activated phycobiliproteins ready for conjugation, and conjugation kits. These products have established track records in a variety of applications where product quality and reproducibility are critical.

The selection of a reliable supplier is essential, and enables you to have the utmost confidence in every detail of your products.

Partnering with Agilent guarantees this confidence and offers you:

Supply management	Scheduled deliveries and worldwide logistics minimize expense and risk, ensuring your proteins are in the right place, at the right time. Inventory management provides batch specific ordering and lot pre-qualification when needed.
Flexibility	Custom quality and supply agreements. Small to large batch sizes. Ability to supply large quantities at short notice.
Quality	Bioanalytical proteins with proven performance, high purity, and reproducibility achieved through robust manufacturing processes.
Expertise	Access to 30 years experience in the development and manufacturing of high-performance, consistent streptavidin and phycobiliprotein products

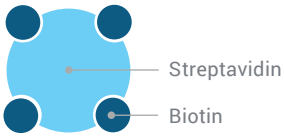
Streptavidin Products

Achieve maximum performance with Agilent Streptavidin, available in native and recombinant forms with exceptional lot-to-lot consistency.

Streptavidin
SA10 Streptavidin (native) Purified from large-scale fermentation cultures of *Streptomyces avidinii*
SA26 Streptavidin-plus (recombinant) Recombinant gene from *Streptomyces avidinii* expressed in *E. coli*, protein purified from fermentation culture

Agilent streptavidin is supplied lyophilized and is readily soluble in water or salt-containing buffers, at concentrations of up to 50 mg/mL or more.

Streptavidin is a tetramer, with each monomer containing a single biotin binding site. It may be used to bind biotinylated molecules in solution, as a capture agent for biotinylated molecules when immobilized (beads, microplates, membranes), or as a conjugation partner for other proteins to take advantage of the streptavidin-biotin interaction.



Streptavidin options

SA10 Streptavidin is our longest-established streptavidin product, being a widely-used workhorse of the industry for over 25 years. It is purified to a high degree from fermentations of *Streptomyces avidinii* and has a molecular weight of 52 kDa. SA10 is also known as 'core' streptavidin, due to the processing of full-length streptavidin protein that occurs in cell culture.[1]

SA26 Streptavidin-plus is a recombinant form of streptavidin made in *E. coli* and has a molecular weight of 55 kDa. Streptavidin-plus has been found to have superior performance in certain applications, such as when immobilized as an ELISA capture agent.

Visit the Agilent streptavidin webpage for ordering information.

Don't know which streptavidin would work for your application? If you require a sample to test, please contact Agilent.

Product Description	Part Number	Pack size*	Tetramer Size	Specific Activity**	Applications
Streptavidin Native from *Streptomyces avidinii* ('core' streptavidin)	SA10-10	10 mg	~52 kDa	≥ 14.0 U/mg	Conjugation, ELISA
	SA10-100	100 mg			
	SA10	1000 mg			
Streptavidin-plus Recombinant gene from *Streptomyces avidinii* expressed in *E. coli*	SA26-10	10 mg	~55 kDa	≥ 15.0 U/mg	Conjugation, ELISA, performs well in applications where streptavidin is immobilized
	SA26-100	100 mg			

** These streptavidin products are available in various pack sizes and are supplied lyophilized. Large quantities are available from single lots, with exceptional lot-to-lot consistency.*

*** Specific activity is measured by the industry-standard HABA dye-binding assay. The specific activity measurement is higher still when measured by the alternative biotin-titration assay used by some suppliers.*

1. *Pähler A. et al. Characterization and crystallization of core streptavidin. J. Biol. Chem. 1987, 262(29), 13933-37.*

Immobilized streptavidin

Streptavidin-Agarose is streptavidin attached to beads of cross-linked 4.3% agarose with a bead size distribution of 75–300 microns.

The biotin binding capacity enables immobilization of biotinylated molecules. Applications include immobilization of biotinylated antibodies for affinity purification of associated antigens.

Streptavidin is attached to the beads through a stable amide linkage with a 15-carbon spacer arm. The linkage is stable through a wide pH range (4–11). The streptavidin content is >1 mg/mL of packed beads.

Visit the Agilent immobilized streptavidin webpage for ordering information.

Product Description	Part Number	Pack Size
Streptavidin-Agarose	CJ30R-10	10 mL
	CJ30R-20	20 mL
	CJ30R	100 mL

Streptavidin enzyme conjugates

Streptavidin-HRP (horseradish peroxidase) conjugate is optimized for ELISA procedures and applications requiring a high signal-to-noise ratio. The conjugate is made with an improved non-mercury stabilizer ensuring long-term stability.

We also offer HRP and AP (alkaline phosphatase) conjugate stabilizers.

Visit the Agilent streptavidin enzyme conjugate webpage for ordering information.

Product Description	Part Number	Pack Size
Streptavidin-HRP conjugate ELISA Optimized for applications that require high signal-to-noise ratios. Made with improved non-mercury stabilizer.	CJ30H-3	3 x 1 mL
	CJ30H-10	10 mL
	CJ30H-100	100 mL
HRP conjugate stabilizer For dilution (up to 1,000-fold) of HRP conjugates (50% with deionized water). Contains a mercury-free azide-free preservative.	CJ95	500 mL
	CJ95-1000	1000 mL
AP conjugate stabilizer For dilution (up to 1,000-fold) of AP conjugates (50% with deionized water). Contains a mercury-free azide-free preservative	CJ90	500 mL
	CJ90-1000	1000 mL

Phycobiliproteins

Agilent phycobiliproteins are manufactured from proprietary natural sources grown in continuous culture in California, and highly purified for the best possible product quality. R-Phycoerythrin and Allophycocyanin are workhorse fluorescent detection reagents in a wide range of biotechnology applications.

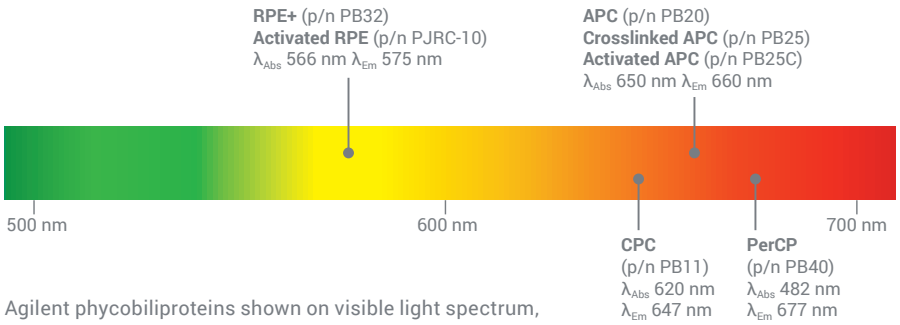
Fluorescent proteins manufactured from native sources in continuous culture (red algae, cyanobacteria)

The Agilent advantage:

- Consistent lot-to-lot performance resulting from continuous culture of source organisms and high purity.
- Superior quantum efficiency compared to small molecule dyes (Cy Dyes, Alexa Dyes, FITC).
- Very high water solubility.
- Homogeneous structure with defined molecular weights.
- Multiple sites for stable conjugation to many biological and synthetic materials.
- Total control on growth conditions and nutrition, which avoids contamination from extraneous organisms and waste found in the open ocean. Proteins are harvested at the optimal stage of the growth cycle to assure uniform product characteristics. The pigment is extracted and stabilized within minutes of harvest, virtually eliminating risks from the action of proteases.

Applications: typically conjugated to monoclonal or polyclonal secondary antibodies, used for detection in flow cytometry or bead-based assays.

Phycobiliproteins
R-Phycoerythrin (RPE) – Purified from red algae ('Porphyra-like' strain) grown in continuous culture – Used to conjugate directly to antibodies or streptavidin, or for tandem labels
Allophycocyanin (APC) – Purified from *Spirulina* sp cyanobacteria grown in continuous culture – Available crosslinked to provide increased structural integrity in the presence of chaotropic salts
C-Phycocyanin (CPC) – Purified from *Spirulina* sp cyanobacteria grown in continuous culture – Conjugation to antibodies for flow cytometry
PerCP – Purified from a dinoflagellate grown in continuous culture (*Dinophyceae* sp) – Conjugation to antibodies for flow cytometry

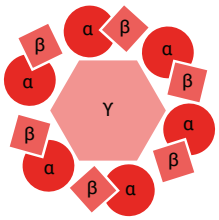


Agilent phycobiliproteins shown on visible light spectrum, including excitation and emission wavelengths.

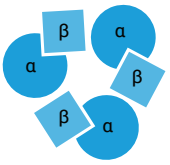
Phycobiliprotein options

Agilent phycobiliproteins can be easily linked to antibodies and other proteins through conventional protein cross-linking techniques without altering their spectral characteristics.

Visit the Agilent phycobiliprotein webpage for ordering information.



RPE subunit structure, $(\alpha\beta)_6\gamma$



APC subunit structure, $(\alpha\beta)_3$

Product Description	Part Number	Pack Size*	Applications	Absorbance Maximum (nm)	Fluorescence emission (nm)	Molecular Weight (kDa)
R-Phycoerythrin (RPE+) Isolated from a species of red algae chosen specifically because it yields one of the most highly fluorescent of the RPEs.	PB32-10	10 mg	Fluorescent immunolabeling, flow cytometry, Luminex or other bead-based applications.	566 (496 secondary)	575	240
	PB32-100	100 mg				
	PB32	500 mg				
Allophycocyanin (*Spirulina* sp) Isolated from *Spirulina* sp., a blue-green alga, APC has extremely high absorptivity and a high quantum efficiency. Can be easily linked to antibodies and other proteins.	PB20-10	10 mg	Fluorescent immunolabeling, particularly in applications involving fluorescent-activated cell sorting (FACS) or time-resolved fluorescence resonance transfer (TR-FRET).	648 - 652	~660	104
	PB20-100	100 mg				
	PB20	500 mg				
Cross-linked Allophycocyanin Cross-linking APC creates the most stable form available as the crosslinked αβ subunits provide increased structural integrity in the presence of chaotropic salts. There are one or two crosslinks created per APC molecule.	PB25-10	10 mg	Fluorescent immunolabeling, particularly in applications involving FACS or TR-FRET.	64–652	~660	104
	PB25-50	50 mg				
	PB25-100	100 mg				
	PB25	500 mg				
C-Phycocyanin (*Spirulina* sp) Isolated from *Spirulina* sp., a blue-green alga. Like other phycobiliproteins, CPC is fluorescent, with an extremely high absorptivity and a high quantum efficiency.	PB11	10 mg	Used in a variety of immunological assays and as fluorescent labels for cell-sorting. Because of the high molar absorbtivity of CPC and other phycobiliproteins at visible wavelength, they are convenient markers in such applications as gel electrophoresis, isoelectric focusing and gel exclusion chromatography.	620	647	232
	PB11-500	500 mg				
PerCP (*Dinophyceae* sp) Peridinin-chlorophyll-protein complex (PerCP) is isolated from *Dinophyceae* sp.	PB40-10	10 mg	Fluorescent immunolabeling, particularly in applications involving FACS.	482	677	35.5
	PB40-50	50 mg				
	PB40-100	100 mg				
	PB40	500 mg				

* *These phycobiliprotein products are available in various pack sizes. Large quantities are available from single lots, with exceptional lot-to-lot consistency. Please contact us if you are interested in a sample to test.*

Activated Phycobiliproteins

Activated Phycobiliproteins can be easily conjugated to antibodies and other proteins without the use of added chemical crosslinking agents. These highly purified phycobiliproteins maintain their spectral characteristics when conjugated. Agilent Activated Phycobiliproteins have been treated with succinimidyl 4-[N-maleimidomethyl]-cyclohexane-1-carboxylate (SMCC) which reacts with lysine groups, leaving maleimide groups available to react with free sulfhydryl groups of conjugate partner proteins. They are ready to use and will conjugate without further preparation upon mixing with sulfhydryl-containing targets.

Product Description	Part Number	Pack Size*	Application	Absorbance Maximum (nm)	Fluorescence emission (nm)	Molecular Weight (kDa)
Activated R-Phycoerythrin RPE activated with SMCC then goes through a buffer exchange step and filtered using a 0.45 µm membrane.	PJRC10-5	5 mg	Conjugation of antibodies and other proteins.	566 (496 secondary)	575	240
	PJRC10	100 mg				
Activated Allophycocyanin APC crosslinked and then activated with SMCC. After a buffer exchange step, the product is filtered using a 0.45 µm membrane.	PJ25C-5	5 mg	Conjugation of APC antibodies and other proteins.	648–652	~660	104
	PJ25C-10	10 mg				
	PJ25C	100 mg				

RPE Conjugation Kit

Our R-Phycoerythrin (RPE) Conjugation Kit contains everything you need to conjugate up to 1 mg of your antibody to RPE. The kit method employs reduction of disulfides in your antibody to produce free sulfhydryl groups which are then reacted with maleimide groups on SMCC-RPE. Complete step-by-step protocols are included and allow small scale conjugations down to 50 µg of antibody. The kit is suitable for conjugation of other sulfhydryl-containing proteins as well. It utilizes a widely used and reliable conjugation chemistry and the highest-purity RPE available. Conjugates can be ready in as little as two hours.

Product Description	Part Number	Pack Size*	Application	Absorbance Maximum (nm)	Fluorescence emission (nm)	Molecular Weight (kDa)
R-Phycoerythrin Conjugation Kit Contains everything you need to conjugate up to 1 mg of your antibody to RPE, including 3.2 mg activated RPE.	PJ31K	1 kit	Conjugation of RPE to antibodies or other proteins. Reaction may be scaled up by utilizing additional activated RPE (p/n PJRC10).	566 (496 secondary)	575	240

* *These phycobiliprotein products are available in various pack sizes. Large quantities are available from single lots, with exceptional lot-to-lot consistency. Please contact us if you are interested in a sample to test.*

Phycobiliprotein Conjugates

Agilent makes a series of streptavidin-RPE and streptavidin-APC conjugates to meet the special requirements of customer applications. As Agilent manufactures both the streptavidin and phycobiliprotein components of the conjugates, as well as the conjugates themselves, we are able to better control the elements of Quality and manufacturing.

Phycobiliprotein Conjugates
Streptavidin-R-Phycoerythrin Multiple variations of this conjugate offered: – 'Small' conjugates used for flow cytometry or tetramer assays (T-cell analysis) – 'Large' conjugates used for bead-based assays
Streptavidin-Allophycocyanin (SA-APC) Main application is tetramer assay (T-cell analysis by flow cytometry)

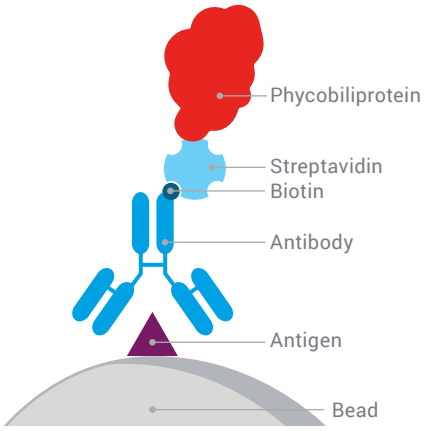
Identify the optimal conjugate for your application

Using our highly purified phycobiliproteins and streptavidins, we manufacture a variety of Streptavidin R-Phycoerythrin and Allophycocyanin conjugates for bead-based, flow cytometry, tetramer and FRET applications. We also offer kits and SMCC-activated phycobiliproteins for simplified conjugation of your antibody of interest.

Our products include:

- A range of Streptavidin R-Phycoerythrin conjugates, including a sampler kit to test in your application(s)
- Streptavidin-Allophycocyanin conjugates for tetramer, multimer and FRET applications
- An R-Phycoerythrin conjugation kit which contains everything you need to conjugate up to 1 mg of your antibody to RPE
- SMCC-activated R-Phycoerythrin and Allophycocyanin to easily conjugate to antibodies and other proteins of interest

Please visit the Agilent website, and contact us for more information.



Example of an flow cytometry setup including streptavidin-phycobiliprotein conjugate

Streptavidin-RPE conjugates

R-Phycoerythrin (RPE) conjugates are used in flow cytometry, immunoassays, MHC tetramer assays and bead-based assays. RPE is a highly absorptive fluorescent molecule that has excellent detectability. It is the fluorochrome of choice when the brightest signal is needed and is therefore used most often when high sensitivity is essential for detectability and/or accuracy. Using our streptavidin and highly purified RPE we manufacture a variety of conjugates for different applications. These have different properties that make them especially suitable for one application or another (for instance, the optimal conjugates for bead-based assays are not usually the same as the optimal conjugates for MHC tetramer assays).

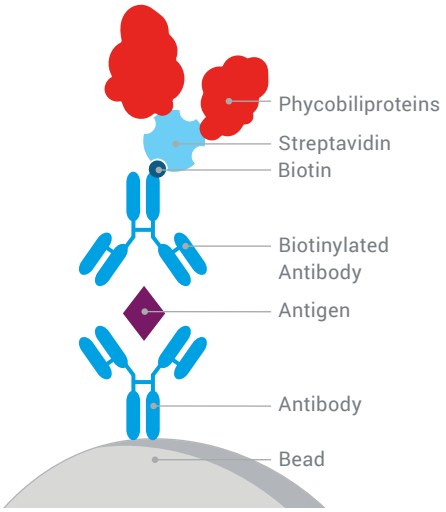
Streptavidin-RPE conjugate selection guide

We have a range of Streptavidin-R-Phycoerythrin (SA-RPE) conjugates that differ in overall size. We recommend that you test our conjugates to find out which is the best for your system.

The easiest way to get started is with our PJ3SX Streptavidin-RPE Sampler kit, which contains all of the conjugates listed in the selection guide below.

Part Number	Conjugate Size	Application
PJRS301*; PJRS20; PJRS34	Large	Luminex and other bead-based assays
PJRS25**; PJRS27	Medium	Tetramer
PJ39S	Small	Flow cytometry

** PJRS301 is our newest conjugate, developed for long-term signal consistency.*
*** PJRS25 is used in the NIH (Emory) Tetramer Core Facility protocol[1], along with our streptavidin-APC conjugate PJ27S.*



Example of an immunoassay setup including streptavidin-phycobiliprotein conjugate

Streptavidin-RPE conjugate sampler kit

Agilent makes a series of Streptavidin-R-Phycoerythrin conjugates to meet the special requirements of customer applications. Try our PJ3SX Sampler kit, and test a variety of conjugates. Share the results for your application, and we will apply the price paid for the kit against your first 1 mg purchase of any one of the component conjugates.

Product Description	Part Number	Pack size
Streptavidin-Phycoerythrin, sampler kit	PJ3SX	1 ea PJRS20 (0.25 mg), 1 ea PJRS25 (0.25 mg), 1 ea PJRS27 (0.25 mg), 1 ea PJRS301 (0.25 mg), 1 ea PJ39S (0.25 mg), 1 ea PJRS34 (0.25 mg)

[1] *NIH Tetramer Core Facility. [Internet]. Atlanta, GA: Emory University; c2006-2010. Class I MHC Tetramer Preparation: Overview; [cited 2020 Oct 21]. Available from: http://tetramer.yerkes.emory.edu/support/protocols*

What is meant by “conjugate size”?

Our SA-RPE conjugates differ in overall average size, due to differences in the way the conjugation is performed. For example, our PJ39S SA-RPE is likely monomorphic (approx. 2–3 SA molecules conjugated to a single RPE molecule), the other conjugates are larger structures containing more than 1 RPE molecule. We include the molar concentrations of streptavidin and RPE on the Certificates of Analysis.

Streptavidin-RPE conjugates

Product Description	Part Number	Pack Size	Application	Conjugate Size
Streptavidin-R-Phycoerythrin	PJ31S-1	1 mg	PJ31S is a conjugate specifically manufactured for optimum performance in bead-based assays such as the Luminex platform. Superceded by newer conjugates PJRS20 and PJRS301.	Large
	PJ31S-5	5 mg		
	PJ31S	50 mg		
Streptavidin-R-Phycoerythrin (ver 2)	PJ39S-1	1 mg	A conjugate that is predominantly a single peak on an HPLC/SEC chromatogram, consistent with approximately two streptavidin molecules conjugated to a single R-phycoerythrin molecule. Potential applications include single molecule detection systems and quantitative analysis in flow cytometry.	Small
	PJ39S	50 mg		
Streptavidin-R-Phycoerythrin (ver 4)	PJRS20-1	1 mg	PJRS20 is manufactured for optimum performance in bead-based assays.	Large
	PJRS20-10	10 mg		
	PJRS20	50 mg		
Streptavidin-R-Phycoerythrin (ver 5)	PJRS25-1	1 mg	PJRS25 is one of several unique Streptavidin-RPE conjugates that has shown to improve performance of some bead-based assays such as the Luminex platform.	Med
	PJRS25-10	10 mg		
	PJRS25	50 mg		
Streptavidin-R-Phycoerythrin (ver 6)	PJRS27-1	1 mg	PJRS27 is manufactured for optimum performance in tetramer and multimer applications[1] as well as flow cytometry and bead-based assays such as the Luminex platform.	Med
	PJRS27-10	10 mg		
	PJRS27	50 mg		
Streptavidin-R-Phycoerythrin (ver 7)	PJRS301-1	1 mg	PJRS301 is our newest streptavidin-RPE conjugate and is specifically manufactured for optimum performance in bead-based assays. PJRS301 manufacture includes additional steps designed to ensure consistent lot performance over time.	Large
	PJRS-301-10	10 mg		
	PJRS-301	50 mg		
Streptavidin-R-Phycoerythrin (ver 9)	PJRS34-1	1 mg	PJRS34 is manufactured as a low background conjugate for research applications utilizing bead-based assays.	Large
	PJRS34-10	10 mg		
	PJRS34	50 mg		

1. *NIH Tetramer Core Facility. [Internet]. Atlanta, GA: Emory University; c2006-2010. Class I MHC Tetramer Preparation: Overview; [cited 2020 Oct 21]. Available from: http://tetramer.yerkes.emory.edu/support/protocols*

Streptavidin-APC conjugates

Allophycocyanin (APC) conjugates are used in FRET screening, flow cytometry, immunoassays and MHC tetramer assays. APC is a highly absorptive fluorescent molecule that has excellent detectability. APC is usually used in an internally crosslinked form which is stable at the low concentrations required for most uses. Conventional conjugation techniques will not alter the spectral characteristics of this product. Using our highly purified crosslinked APC, we manufacture a variety of APC conjugates for different applications. We also offer SMCC-activated APC for simplified conjugation to antibodies and other sulfhydryl-containing proteins of interest.

Product Description	Part Number	Pack Size	Application
Streptavidin-Allophycocyanin	PJ25S	0.25 mg	PJ25S is a larger conjugate than PJ27S, and is better suited for FRET assays.
	PJ25S-1	1 mg	
	PJ25S-10	10 mg	
Streptavidin-Allophycocyanin (ver 2)	PJ27S	0.25 mg	PJ27S is specifically designed for use in tetramer and multimer applications[1].
	PJ27S-1	1 mg	

[1] *NIH Tetramer Core Facility. [Internet]. Atlanta, GA: Emory University; c2006-2010. Class I MHC Tetramer Preparation: Overview; [cited 2020 Oct 21]. Available from: http://tetramer.yerkes.emory.edu/support/protocols*

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CrossLab is an Agilent capability that integrates services and consumables to support workflow success, improve productivity, and enhance operational efficiency. In every interaction, we strive to provide insight that help you achieve your goals. We offer a wide range of products and services – from method optimization and training to full-lab relocations and operations analytics – to help you manage your instruments and your lab for best performance.

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