Protein A, G, A/G, and L

Protein A, G, A/G, and L are native and recombinant proteins whose antibody-binding properties have been well characterized. The native proteins are replaced by the recombinant proteins produced in *E. coli* since the recombinant proteins have higher capacity, are highly robust, and have maximum specific antibody binding. The characteristics of these recombinant proteins are summarized in table 1.

Protein A, Protein G, or Protein A/G binds with high affinity to the Fc portion of various classes and subclasses of immunoglobulins from various species by independent and separate binding sites. Protein L binds the different antibody isotypes (IgG, IgM, IgA, IgE, and IgD) through the interaction with the variable domain of the Ig kappa light chain with no interference with an antibody's antigen-binding site. These proteins vary in their ability to bind to different subtypes and species antibodies. Therefore, choosing the *antibody*-binding proteins to match the corresponding antibody is essential. Refer to table 2 to select the antibody-binding protein that is best for your application.

	Protein A	Protein G	Protein A/G	Protein L
Original Source	*Staphylococcus aureus*	*Streptococcus* spp. (Group C and G)	*Staphylococcus aureus* & *Streptococcus* spp. (Group C and G)	*Peptostreptococcus magnus*
Recombinant Size (E.coli)	33 kDa	22 kDa	50 kDa	38 kDa
Number of Ig Binding Domains	5	2	6	5
Ig-binding site	heavy chain constant region (Fc) of IgG (CH2-CH3 region)	heavy chain constant region (Fc) of IgG (CH2-CH3 region)	heavy chain constant region (Fc) of IgG (CH2-CH3 region)	kappa light chains of Igs (VL-kappa)

Table 1. Characteristics of Protein A, Protein G, Protein A/G, Protein L

Source	Antibody	Protein L	Protein A	Protein G	Protein A/G
Mouse	IgG 1	++++	++	+++	+++
	IgG 3	++++	++++	++++	++++
	IgG 2a	++++	++++	++++	++++
	IgG 2b	++++	++++	++++	++++
	IgM	++++	-	-	-
	Total IgG	++++	++++	++++	++++
Human	IgG1	++++	++++	++++	++++
	IgG2	++++	++++	++++	++++
	IgG3	++++	++	++++	++++
	IgG4	++++	++++	++++	++++
	IgA	++++	++	-	++
	IgD	++++	-	-	-
	IgM	++++	++	-	++
	Fab	++++	++	++	++
	scFv	++++	++	-	++

	Total IgG	++++	++++	++++	++++
Rat	IgG 1	++++	++	+++	+++
	IgG 2a	++++	++++	++++	++++
	IgG 2b	++++	-	++	++
	IgG 2c	++++	++++	++++	++++
	Total IgG	++++	++	+++	+++
Sheep	IgG1	-	++	++++	++++
	IgG2	-	++++	++++	++++
	Total IgG	-	++	++++	++++
Horse	IgG(ab)	N/A	++	-	++
	IgG(c)	N/A	++	-	++
	IgG(T)	N/A	-	++++	++++
	Total IgG	N/A	++	++++	++++
Goat	IgG1	-	++	++++	++++
	IgG2	-	++++	++++	++++
	Total IgG	-	++	++++	++++
Cow	IgG1	-	++	++++	++++
	IgG2	-	++++	++++	++++
	Total IgG	-	++	++++	++++
Rabbit	Total IgG	++	++++	++++	++++
Guinea Pig	Total IgG	N/A	++++	++	++++
Pig	Total IgG	++++	++++	++	++++
Cat	Total IgG	N/A	++++	++	++++
Dog	Total IgG	N/A	++++	++	++++

++++ (Strong Binding); +++ (Medium Binding); ++ (Weak Binding);- (No Binding); N/A (No Information)

Table2. Antibody binding properties of Protein A, Protein G, Protein A/G, Protein L

Due to remarkable antibody binding characteristics, the proteins are widely used in antibody purification, immunoprecipitation (IP), chromatin immunoprecipitation (ChIP), immobilization or detection of immunoglobulins.

Bioclone develops a great antibody affinity chromatography matrix - Protein A, G, A/G, and L magnetic beads - used for antibody purification from serum, cell culture supernatant, or ascites, as well as antigen IP/Co-IP from cell or tissue extracts. The procedure for those Magnetic Beads has been improved to allow maximum recovery and purity of the recovered antibody or antigen. For antibody purification, the beads are incubated with the antibody solution, which is magnetically separated from the supernatant. For immunoprecipitation, the beads are delivered to an antigen-containing sample to which the antibody has been introduced and allowed to incubate to form the antibody-antigen complex. The attached antibodies or antigens are dissociated from the beads using an elution buffer and recovered from the solution manually using a magnetic stand or by using automation instruments.

BcMag™ Protein A Magnetic Beads

The BcMag™ Protein A Magnetic Beads are high-capacity, high-throughput affinity particles used in antibody purification and immunoprecipitation procedures with manual or robotic magnetic separators. The magnetic microspheres are covalently immobilized with a high density ultrapure (Purity>97%) recombinant protein A proteins. Protein A Magnetic Beads are utilized for antibody purification from serum, cell culture supernatant, or ascites, and antigen IP/Co-IP from cell or tissue extracts. The Protein A Magnetic Beads procedure has been improved to allow maximum recovery and purity of the recovered antibody or antigen. For antibody purification, the beads are incubated with the antibody solution, which is magnetically separated from the supernatant. For immunoprecipitation, the beads are delivered to an antigen-containing sample to which the antibody has been introduced and allowed to incubate to form the antibody-antigen complex. The attached antibodies or antigens are dissociated from the beads using an elution buffer and recovered from the solution manually using a magnetic stand or by using automation instruments.

Explore products.

- Protein A Magnetic Beads Purification Kit
- Protein A Europium Fluorescent Magnetic Beads
- Protein A Terbium Fluorescent Magnetic Beads
- Protein A Ruthenium Fluorescent Magnetic Beads

BcMag™ Protein G Magnetic Beads

BcMag™ Protein G Magnetic Beads are magnetic microspheres covalently immobilized with a high density ultrapure (Purity>97%) recombinant Protein G fusion protein. The beads are manufactured using nanometer-scale superparamagnetic iron oxide as core and entirely encapsulated by a high purity silica shell, ensuring no leaching problems with the iron oxide. Beads are specifically designed, tested, and quality controlled for immunoprecipitation and cell sorting when a selected primary antibody is used. Additionally, the beads are widely used for quick and efficient one-step purification of antibodies from Serum samples, ascites fluid, plasma, or tissue culture supernatant from several species.

Explore products.

- Protein G Magnetic Beads Purification Kit
- Protein G Europium Fluorescent Magnetic Beads
- Protein G Terbium Fluorescent Magnetic Beads
- Protein G Ruthenium Fluorescent Magnetic Beads

BcMag™ Protein A/G Magnetic Beads

BcMag™ Protein A/G Magnetic Beads are high-capacity, high-throughput affinity particles used in antibody purification and immunoprecipitation procedures with manual or robotic magnetic separators. The magnetic microspheres are covalently immobilized with a high density ultrapure (Purity>97%) recombinant protein A/G proteins. Protein A/G Magnetic Beads are utilized for antibody purification from serum, cell culture supernatant, or ascites, and antigen IP/Co-IP from cell or tissue extracts. The procedure for Protein A/G Magnetic Beads has been improved to allow maximum recovery and purity of the recovered antibody or antigen. For antibody purification, the beads are incubated with the antibody solution, after which they magnetically separated from the supernatant. For immunoprecipitation, the beads are added to an antigen-containing sample to which an antibody has been introduced and allowed to incubate to form the antibody-antigen complex. The attached antibodies or antigens are dissociated from the beads using an elution buffer and recovered from the solution manually using a magnetic stand or by using automation instruments.

Explore products.

- Protein A /G Purification Kit
- Protein A and G Europium Fluorescent Magnetic Beads
- Protein A and G Terbium Fluorescent Magnetic Beads
- Protein A and G Ruthenium Fluorescent Magnetic Beads

BcMag™ Protein L Magnetic Beads

BcMag™ Protein L Magnetic Beads are magnetic microspheres covalently immobilized with a high density ultrapure (Purity>95%) recombinant protein L. The beads are typically used for antibody isolation from serum, cell culture supernatant, ascites, immunoprecipitation, and co-immunoprecipitation of antigens from cell or tissue extracts. For antibody purification, the beads are incubated with the antibody solution, after which they magnetically separated from the supernatant. For immunoprecipitation, the beads catch the antigen-antibody complex from the sample. The attached antibodies and antigens are dissociated from the beads using an elution buffer and recovered from the solution manually using a magnetic stand or by using automation instruments.

Explore products.

- Protein L Purification Kit
- Protein L Europium Fluorescent Magnetic Beads
- Protein L Terbium Fluorescent Magnetic Beads
- Protein L-Ruthenium Fluorescent Magnetic Beads

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