

Catalog Number: 100117, 100152, 100153, 103700, 103703, 105033, 151429, 152401, 160069, 194120, 194771, 194772, 194773, 194774, 194775, 194776, 199896, 199897, 55897, 55918, 622011, 810012, 810013, 810014, 810015, 810032, 810033, 810034, 810035, 810036, 810282, 810532, 810533, 810534, 810531, 810535, 810661, 810662, 810667, 810663, 810682, 810684, 810683, 810685, 810951, 820012, 820013, 820015, 820016, 820022, 820024, 820025, 820026, 820451, 820452, 820471, 820472, 840042, 840043, 840044, 840045, 840052, 840053, 840054, 840055, 840532, 840533, 840534, 840535, 841032, 841033, 841034, 841035

Albumin, Bovine

Molecular Weight: The molecular weight has been published at 66,338.¹ Other reported weights range from 66,120 to 66,430.²⁻⁴

CAS # : 9048-46-8

Physical Appearance: White to light tan with a greenish cast.

pI in Water at 25°C: Endogenous material^{5,6,7} - 4.7, 4.9; Fatty acid depleted⁸ - 5.3

pH (1% aqueous solution): 5.2-7²

"Albumin loses its helical structure rapidly in 2-4 M urea and 4 M guanidinium chloride. The unfolding is reversible, even, to some extent, after concomitant reduction of all disulfide bonds. Reduced albumin can reform into structures capable of binding antibodies and other ligands. Formation of SS bonds is rapid but the return of native structure is slow and some wrong disulfide pairings may persist. After oxidation of the cystine bridges, however, native structure is irreversibly lost.

In anionic detergents helical structure is lost as the molecule unfolds, whereas a cationic detergent caused little effect, and 2-chloroethanol induced helical content beyond the usual 60 percent."¹

Description: Albumins are a group of acidic proteins which occur in the body fluids and tissues of mammals and in some plant seeds. Serum and plasma albumin is carbohydrate free and comprises 55-62% of the protein present. However, only about 40% of the total albumin in the body is in the circulating plasma at one time with the remainder being in extracellular spaces with which there is, in general, equilibration about every 24 hours.¹

Bovine albumin is a single polypeptide chain consisting of approximately 583 to 595 amino acid residues and no carbohydrates. At pH 5-7 it contains 17 intrachain disulfide bridges and 1 sulfhydryl group.^{1,2,4}

E.J. Cohn and associates developed one of the first commercial precipitation procedures using an alcohol precipitation.¹² Additional removal of impurities can be accomplished by crystallization, preparative electrophoresis, ion exchange chromatography, affinity chromatography (e.g., ConA-agarose removes glycoproteins), heat treatment (removes globulins), low pH treatment, charcoal treatment, organic solvent precipitation (i.e. isooctane) and low temperature treatment.^{2,3,13} Charcoal treatment and organic solvent precipitation remove fatty acids.¹³

Albumin binds water, Ca²⁺, Na⁺ and K⁺. Due to a hydrophobic cleft, albumin binds fatty acids, bilirubin, hormones and drugs. The main biological function of albumin is to regulate the colloidal osmotic pressure of blood and to a lesser degree to provide cellular nutrition.¹ Human and bovine albumins contain 16% nitrogen and are often used as standards in protein calibration studies. Albumin is used to solubilize lipids, stabilize protein solutions, and is also used as a blocking agent in Western blots or ELISA applications. Globulin free albumins are suitable for use in applications where no other proteins should be present such as electrophoresis.

Solubility: Albumins are readily soluble in water and can only be precipitated by high concentrations of neutral salts such as ammonium sulfate. The solution stability of albumin is very good (especially if the solutions are stored aliquoted and frozen). Albumin is readily coagulated by heat.¹¹ When heated to 50°C or above, albumin quite rapidly forms hydrophobic aggregates which do not revert to monomers upon cooling.

Typical Applications:

Please note that the listed catalog numbers are only suggestions. Any similar albumin to the one listed can usually be substituted.

Application	Recommend Catalog Number
Antibody Purification	194774, 199897
Binding and transport studies	103700
Blood banking reagents	103703, 105033
Culture media, microbial	103703, 199896
Cell culture, general	194771, 199896, 810101, 810111
Density Gradient Studies	810101, 810111
Electrophoresis standard	194774
ELISA, general blocking reagent	103703, 105700, 160069, 199897, 820451, 820452, 194120

ELISA, non-specific binding	194120, 199897, 820451, 820452
Enzyme systems	103703, 105033, 103700, 194120, 820451, 820452
Hapten carrier	810951, 105033
Immunocytochemistry	810032, 810033, 810034, 810035, 810036
Immunoematology	103703, 103700
Mitogenic assays	194774
Protein base or filler	103703, 103700
Protein Supplement (controls)	103703, 103700
Protein Standard	103703, 103700
RIA systems	105033, 103700, 810951
Serology	103700, 810783, 810784

Powders Available:

Catalog Number	Description	Size
55918	Albumin, bovine, purified antigen	50 mg
55897	Albumin, bovine, Rhodamine conjugated	25 mg
103700	Albumin, bovine, purity 98-99%	1 g, 5 g, 10 g, 25 g, 100 g
194771	Albumin, bovine, cell culture reagent, purity 96-99%	5 g, 10 g, 50 g, 100 g, 500 g
194773	Albumin, bovine, cell culture reagent, gamma-irradiated, purity 98-99%	5 g
194120	Albumin, bovine, purity not less than 90%, nuclease-free	25 mg, 100 mg, 250 mg
105033	Albumin, bovine, clinical reagent grade, purity 98-99%, RIA grade, fatty acid free	10 g, 25 g, 100 g, 500 g
194774	Albumin, bovine, cell culture reagent, essentially globulin-free	250 mg, 1 g, 5 g, 10 g
194775	Albumin, bovine, cell culture reagent, low endotoxin	1 g, 5 g, 25 g, 100 g
194776	Albumin, bovine, cell culture reagent, low endotoxin, ion exchange purified	1 g, 5 g, 25 g
810661 810662 810667 810663	Albumin, bovine, heat shocked fractionate, pH ~7.0	50 g 500 g 1 kg 5 kg
810682 810684 810683 810685	Albumin, bovine, heat shocked fractionate, low endotoxin	1 g 10 g 100 g 1 kg
840052 840053 840054 840055	Albumin, bovine, microbiological grade	50 g 100 g 500 g 1 kg
820471 820472	Albumin, bovine, fatty acid free, low endotoxin	1 g 10 g
810012 810013 810014 810015	Albumin, bovine, crystalline powder	5 g 10 g 100 g 1 kg
103703	Albumin, bovine, Cohn Fraction V powder, purity 95-98%, prepared by true Cohn fractionation	10 g, 25 g, 100 g, 500 g
840532 840533 840534 840535	Albumin, bovine, Cohn fraction V powder, pH ~5.2	50 g 100 g 500 g 1 kg
841032 841033 841034 841035	Albumin, bovine, Cohn Fraction V powder, pH ~ 7.0	50 g 100 g 500 g 1 kg
840042 840043 840044 840045	Albumin, bovine, Cohn Fraction V modified powder, heat shocked fractionate, purity 96-99%	50 g 100 g 500 g 1 kg
160069	Albumin, bovine, Fraction V, purity 98-99%	10 g, 25 g, 50 g, 100 g, 500 g, 1 kg
100153	Albumin, bovine, Fraction V, Microbiological Grade	10 g, 25 g, 100 g, 500 g, 1 kg
152401	Albumin, bovine, Fraction V, Fatty acid free, purity 98-99%	5 g, 10 g, 50 g, 100 g
194772	Albumin, bovine, Fraction V, cell culture reagent, fatty acid free, low endotoxin	1 g, 5 g
820022 820024 820025 820026	Albumin, bovine, Fraction V powder, Fatty acid free	10 g 100 g 500 g 5 kg

100152	Albumin, bovine, Fraction V, Fatty Acid poor, purity 98-99%	5 g, 10 g, 50 g, 100 g, 500 g
820012 820013 820015 820016	Albumin, bovine, Fraction V powder, fatty acid poor	10 g 100 g 500 g 5 kg
151429	Albumin, bovine, Fraction V, protease free, purity > 97%	25 g, 50 g, 100 g, 250 g
820451 820452	Albumin, bovine, Fraction V powder; protease, HRP and alkaline phosphatase free	100 g 1 kg
810532 810533 810534 810531 810535	Albumin, bovine, Fraction V powder, pH ~5.2	50 g 100 g 500 g 1 kg 5 kg
810032 810033 810034 810035 810036	Albumin, bovine, Fraction V powder, pH ~7.0	50 g 100 g 500 g 1 kg 5 kg
810282	Albumin, bovine, Monomer Standard	1 g
810951	Albumin, bovine, RIA Insulin Grade, purity not less than 98%, contains less than 10 uU of insulin per gram powder	10 g

Solutions Available:

Catalog Number	Description	Size
622011	Albumin, bovine, RITC Conjugated	2 ml
810301	Albumin, bovine, 7% Monomer Reference Solution, no preservatives	2 ml
810101	Albumin, bovine, Path-O-Cyte® 4 Solution	50 ml
810111	Albumin, bovine, Path-O-Cyte® 5 Solution	50 ml
810783 810784	Albumin, bovine, 30% Polymer Enhanced Solution	50 ml 1 liter
150269	Albumin, bovine, 30% Solution, stabilized with octanoic acid; contains 0.1% sodium azide	10 ml, 50 ml, 250 ml
150270	Albumin, bovine, 30% Solution, Stabilizer free; contains 0.1% sodium azide	10 ml, 50 ml, 250 ml
810133	Albumin, bovine, 30% Solution CAP Free, sterile	50 ml
810706	Albumin, bovine, 30% Solution, non-sterile	1 liter
100117	Albumin, bovine, 35% Solution, sterile	50 ml
810061	Albumin, bovine, 35% Solution, Sterile	50 ml

Antibodies Available:

Catalog Number	Description	Size
654361	Albumin, bovine, polyclonal antibody; host: chicken, whole serum	1 ml
654371	Albumin, bovine, polyclonal antibody; host: chicken, affinity purified	1 ml
654381	Albumin, bovine, polyclonal antibody; host: chicken, affinity purified, FITC conjugated	1 ml
654391	Albumin, bovine, polyclonal antibody; host: chicken, affinity purified, HRP Conjugated	1 ml
651111	Albumin, bovine, polyclonal antibody; host: rabbit, lyophilized	2 ml
55269	Albumin, bovine, polyclonal antibody; host: rabbit, whole serum	2 ml
55275	Albumin, bovine, polyclonal antibody; host: rabbit, IgG fractionation	5 ml
55283	Albumin, bovine, polyclonal antibody; host: rabbit, IgG fractionation, Rhodamine conjugated	2 ml
55285	Albumin, bovine, polyclonal antibody; host: rabbit, IgG fractionation, HRP Conjugated	2 ml
56963	Albumin, bovine, polyclonal antibody; host: rabbit, affinity purified	2 mg

References:

- Peters, T., *Albumin: an overview and bibliography*, Miles Laboratory, Research Products Division: Elkhart, IN. (1980).
- The Plasma Proteins: Structure, Function and Genetic Control*, **2nd Ed.**, Frank W. Putnam, ed., Academic Press, New York **vol. 1**, p. 141, 147 (1975).
- Reed, R.G., et al., *Biochem. J.*, **v. 191**, 867 (1980).
- Hirayam, K., *BBRC*, **v. 173(2)**, 639 (1990).
- Dawson, R.M.C., et al., *Data for Biochemical Research*, **3rd Ed.**, p. 381, Clarendon 151430 Press, Oxford (1993).
- Malamud, D. and Drysdale, J.W., *Anal. Biochem.*, **v. 86**, 620 (1978).
- Righetti, P.G. and Caravaggio, T., *J. Chromatog.*, **v. 127**, 1 (1976).
- Steinhardt, J., et al., *Biochem.*, **v. 10(22)**, 630 (1971).
- CRC Handbook of Biochemistry: Selected Data from Molecular Biology*, H.A. Sober, ed., p. C-56, The Chemical Rubber

Company, Cleveland (1968).

11. Axelsson, I., *J. Chromatog.*, **v. 152**, 21 (1978).
12. Lewis, Sr., R.J., *Hawley's Condensed Chemical Dictionary*, **12th Ed.**, p. 30, Van Nostrand Reinhold Co., New York (1993).
13. Cohn, E.J., et al., "Preparation and properties of serum and plasma proteins. IV. A system for the separation into fractions of the protein and lipoprotein components of biological tissues and fluids." *J. Am. Chem. Soc.*, **v. 68**, 459-75 (1946).
14. Saifer, A. and Goldman, L., *J. Lipid Res.*, **v. 2(3)**, 268 (1961).
15. Scott, T. and Eagleson, M., *Concise Encyclopedia: Biochemistry*, **2nd Ed.**, pp. 19-20, Walter de Gruyter, New York (1988).
16. Basset, M., Defaye, G. and Chambaz, E.M., "Study of steroid-protein interactions by electron spin resonance spectroscopy. Binding of a spin-labelled dihydrotestosterone to bovine serum albumin." *Biochim. Biophys. Acta.*, **v. 491**, 434-436 (1977).
17. Brown, P.C. and Papaconstantinou, J., "Coordinating modulation of albumin synthesis and mRNA levels in cultured hepatoma cells by hydrocortisone and cyclic AMP analogs." *J. Biol. Chem.*, **v. 254**, 9379-84 (1979).
18. Glaumann, H., "Studies on the synthesis and transport of albumin in microsomal subfractions from rat liver." *Biochim. Biophys. Acta*, **v. 224**, 206-218 (1970).
19. Wallewick, K., "Spontaneous in vivo isomerization of bovine serum albumin as a determinant of its normal catabolism." *J. Clin. Invest.*, **v. 57**, 398-407 (1976).
20. Zurawski, V.R. Jr., Kohr, W.J. and Foster, J.F., "Conformational properties of bovine plasma albumin with a cleaved internal peptide bond." *Biochemistry*, **v. 14**, 5579-5586 (1975).