

Swine Albumin ELISA Kit

(Urine, Cell Culture Supernatant Samples)

Introduction

Albumin is serum hepatic protein, the most abundant protein in serum and contributes to the maintenance of oncotic pressure as well as to transport of hydrophobic molecules (1). Serum albumin level has been linked in clinical practice to several diseases. Low albumin levels can suggest liver (2), kidneys disease (3), inflammation (4), shock (5), and malnutrition (6). On the other hand, high albumin levels usually reflect dehydration (7).

Principal of the Assay

The Swine Albumin ELISA (Enzyme-Linked Immunosorbent Assay) kit employs a quantitative sandwich enzyme immunoassay technique that measures swine albumin in urine and cell culture supernatant in less than 4 hours. A polyclonal antibody specific for swine albumin has been pre-coated onto a 96-well microplate with removable strips. Albumin in standards and samples is sandwiched by the immobilized polyclonal antibody and biotinylated polyclonal antibody specific for swine albumin, which is recognized by a streptavidin-peroxidase conjugate. All unbound material is then washed away and a peroxidase enzyme substrate is added. The color development is stopped and the intensity of the color is measured.

Caution and Warning

- **Prepare all reagents (working diluent buffer, wash buffer, standards, biotinylated-antibody, and SP conjugate) as instructed, prior to running the assay.**
- **Prepare all samples prior to running the assay. The dilution factors for the samples are suggested in this protocol. However, the user should determine the optimal dilution factor.**
- **Spin down the SP conjugate vial and the biotinylated-antibody vial before opening and using contents.**
- This kit is for research use only.
- The kit should not be used beyond the expiration date.
- The Stop Solution is an acid solution

Reagents

- **Swine Albumin Microplate:** A 96-well polystyrene microplate (12 strips of 8 wells) coated with a polyclonal antibody against swine albumin.

- **Sealing Tapes:** Each kit contains 3 pre-cut, pressure-sensitive sealing tapes that can be cut to fit the format of the individual assay.
- **Swine Albumin Standard:** Swine albumin in a buffered protein base (3.2 µg, lyophilized).
- **Biotinylated Swine Albumin Antibody (100x):** A 100-fold concentrated biotinylated polyclonal antibody against swine albumin (80 µl).
- **MIX Diluent Concentrate (10x):** A 10-fold concentrated buffered protein base (30 ml).
- **Wash Buffer Concentrate (20x):** A 20-fold concentrated buffered surfactant (30 ml, 2 bottles).
- **Streptavidin-Peroxidase Conjugate (SP Conjugate):** A 100-fold concentrate (80 µl).
- **Chromogen Substrate:** A ready-to-use stabilized peroxidase chromogen substrate tetramethylbenzidine (8 ml).
- **Stop Solution:** A 0.5 N hydrochloric acid to stop the chromogen substrate reaction (12 ml).

Storage Condition

- Store components of the kit at 2-8⁰C or -20⁰C upon arrival up to the expiration date.
- Store SP Conjugate and Biotinylated Antibody at -20⁰C
- Store Microplate, Diluent Concentrate (10x), Wash Buffer, Stop Solution, and Chromogen Substrate at 2-8⁰C
- Opened unused microplate wells may be returned to the foil pouch with the desiccant packs. Reseal along zip-seal. May be stored for up to 1 month in a vacuum desiccator.
- Diluent (1x) may be stored for up to 1 month at 2-8⁰C.
- Store Standard at 2-8⁰C before reconstituting with Diluent and at -20⁰C after reconstituting with Diluent.

Other Supplies Required

- Microplate reader capable of measuring absorbance at 450 nm.
- Pipettes (1-20 µl, 20-200 µl, 200-1000 µl and multiple channel).
- Deionized or distilled reagent grade water.

Sample Collection, Preparation and Storage

- **Urine:** Collect urine using sample pot. Centrifuge samples at 800 x g for 10 minutes and assay. Dilute samples 1:8000 into MIX Diluent. Store samples at -20⁰C or below for up to 3 months. Avoid repeated freeze-thaw cycles.
- **Cell Culture Supernatants:** Centrifuge cell culture media at 3,000 x g for 10 minutes to remove debris. Collect supernatants and assay. Store samples at -20⁰C or below. Avoid repeated freeze-thaw cycles.

Reagent Preparation

- Freshly dilute all reagents and bring all reagents to room temperature before use. If crystals have formed in the concentrate, mix gently until the crystals have completely dissolved.
- **MIX Diluent Concentrate (10x):** Dilute the MIX Diluent 1:10 with reagent grade water. Store for up to 1 month at 2-8⁰C.
- **Standard Curve:** Reconstitute the 3.2 µg of albumin standard with 4 ml of MIX Diluent to generate a stock solution of 800 ng/ml. Allow the standard to sit for 10 minutes with gentle agitation prior to making dilutions. The 800 ng/ml stock solution can be further dilute 1:8 with MIX Diluent to produce 100 ng/ml standard solution. Prepare duplicate or triplicate standard points by serially diluting the standard solution (100 ng/ml) 1:2 with MIX Diluent

to generate 50, 25, 12.5, 6.25, 3.125, and 1.56 µg/ml solutions. MIX Diluent serves as the zero standard (0 µg/ml). Any remaining solution should be frozen at -20°C.

Standard Point	Dilution	[S. Albumin] (ng/ml)
P1	Stock (800 ng/ml) + 7 parts MIX Diluent	100.00
P2	1 part P1 + 1 part MIX Diluent	50.00
P3	1 part P2 + 1 part MIX Diluent	25.00
P4	1 part P3 + 1 part MIX Diluent	12.50
P5	1 part P4 + 1 part MIX Diluent	6.25
P6	1 part P5 + 1 part MIX Diluent	3.13
P7	1 part P6 + 1 part MIX Diluent	1.56
P8	MIX Diluent	0.00

- **Biotinylated Swine Albumin Antibody (100x):** Spin down the antibody briefly and dilute the desired amount of the antibody 1:100 with MIX Diluent. Any remaining solution should be frozen at -20°C.
- **Wash Buffer Concentrate (20x):** Dilute the Wash Buffer Concentrate 1:20 with reagent grade water.
- **SP Conjugate (100x):** Spin down the SP Conjugate briefly and dilute the desired amount of the conjugate 1:100 with MIX Diluent. Any remaining solution should be frozen at -20°C.

Assay Procedure

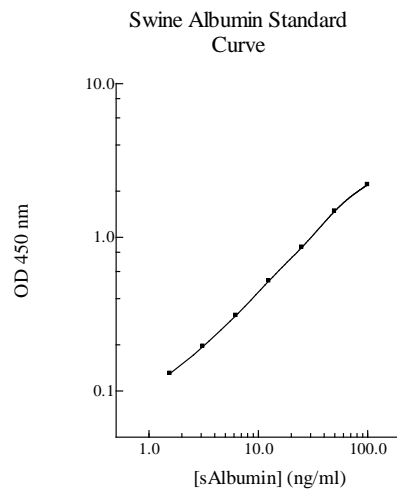
- Prepare all reagents, working standards and samples as instructed. Bring all reagents to room temperature before use. The assay is performed at room temperature (20-30°C).
- Remove excess microplate strips from the plate frame and return them immediately to the foil pouch with desiccant inside. Reseal the pouch securely to minimize exposure to water vapor and store in a vacuum desiccator.
- Add 50 µl of standard or sample per well. Cover wells with a sealing tape and incubate for two hours. Start the timer after the last sample addition.
- Wash five times with 200 µl of Wash Buffer manually. Invert the plate each time and decant the contents; hit it 4-5 times on absorbent paper towel to completely remove the liquid. If using a machine wash six times with 300 µl of Wash Buffer and then invert the plate, decant the contents; hit it 4-5 times on absorbent paper towel to completely remove the liquid.
- Add 50 µl of Biotinylated Swine Albumin Antibody to each well and incubate for one hour.
- Wash the microplate as described above.
- Add 50 µl of Streptavidin-Peroxidase Conjugate to each well and incubate for 30 minutes. Turn on the microplate reader and set up the program in advance.
- Wash the microplate as described above.
- Add 50 µl of Chromogen Substrate per well and incubate for about 7 minutes or till the optimal blue color density develops. Gently tap plate to ensure thorough mixing and break the bubbles in the well with pipette tip.
- Add 50 µl of Stop Solution to each well. The color will change from blue to yellow.
- Read the absorbance on a microplate reader at a wavelength of 450 nm **immediately**. If wavelength correction is available, subtract readings at 570 nm from those at 450 nm to correct optical imperfections. Otherwise, read the plate at 450 nm only. Please note that some unstable black particles may be generated at high concentration points after stopping the reaction for about 10 minutes, which will reduce the readings.

Data Analysis

- Calculate the mean value of the duplicate or triplicate readings for each standard and sample.
- To generate a Standard Curve, plot the graph using the standard concentrations on the x-axis and the corresponding mean 450 nm absorbance on the y-axis. The best-fit line can be determined by regression analysis using log-log or four-parameter logistic curve-fit.
- Determine the unknown sample concentration from the Standard Curve and multiply the value by the dilution factor.

Standard Curve

- The curve is provided for illustration only. A standard curve should be generated each time the assay is performed.



Precision, Sensitivity and Specificity

- The minimum detectable dose of Albumin is typically 1 ng/ml.
- Intra-assay and inter-assay coefficients of variation were 4.7 % and 7.5 % respectively.

Linearity

Sample Dilution	Average Percentage of Expected Value
	Urine
1:4000	98%
1:8000	100%
1:16000	102%

Recovery

Standard Added Value	2 - 20 ng/ml
Recovery %	90-106 %
Average Recovery %	99 %

Cross Reactivity

Name	% Cross Reactivity
Human	< 0.01
Mouse	None
Rat	< 0.01
Monkey	< 0.01
Bovine	< 0.01
Rabbit	< 0.01
Beagle	< 0.01

- 10% FBS in culture media will not affect the assay.

References

- (1) Gekle M. (2004) *Annu Rev Physiol.*
- (2) Schindler C *et al.* (1999) *J Hepatol.* 31(6): 1132
- (3) Hemmelder MH *et al.* (1997) *Nephrol Dial Transplant.* 12 Suppl 2:57-62
- (4) Sesmilo G *et al.* (2004) *Ann Intern Med.* 133(2): 111-22
- (5) Wettstein R *et al.* (2004) *Shock.* 22(4): 351-357
- (6) Saito T *et al.* (1991) *Jpn J Surg.* 21(4): 402-11
- (7) Strand TA (2004) *Am J Clin Nutr.* 79(3): 451-6

Version 2.2R