



Human Protein S ELISA Kit

Vertrieb:

L O X O GmbH Immunbiologie Biochemie, Produkte und Systeme
Postfach 11 30 69215 Dossenheim
Telefon +49 (0) 62 21 - 86 80 23 **FAX** +49 (0) 62 21 - 86 80 255
E-Mail: info@loxo.de **Internet:** www.loxo.de

Assaypro LLC
30 Triad South Drive
St. Charles, MO 63304
T (636) 447-9175
F (636) 447-9475
www.assaypro.com

Hinweis/Note:

Der Packungsbeileger dient nur als erste Information.
Der relevante Packungsbeileger liegt der Ware bei.

The datasheet is only a first information.
The relevant datasheet is included with the product.

For any questions regarding troubleshooting or performing the assay, please contact our support team at support@assaypro.com.

Thank you for choosing Assaypro.

Symbol Key



Consult instructions for use.

Assay Summary

Add 25 μ l of Standard/ Sample and
25 μ l of Biotinylated Protein per well.
Incubate 2 hours.



Wash, then add
50 μ l of SP Conjugate per well.
Incubate 30 minutes.



Wash, then add
50 μ l of Chromogen Substrate per well.
Incubate 10 minutes.



Add 50 μ l of Stop Solution per well.
Read at 450 nm immediately.

AssayMax Human Protein S ELISA Kit

Catalog No. EP1331-1
Sample Insert/Reference Only

Introduction

Protein S is a single-chain vitamin K-dependent plasma glycoprotein consisting of 635 amino acids with a molecular weight of about 70 kDa (1-3). It functions as a cofactor for the anticoagulant activated protein C to inhibit blood coagulation. In plasma, it is both in a free cofactor active form and in an inactive form complexed with C4b-binding protein [C4BP] (4). The complex acts as a bridge between coagulation and inflammation due to the involvement of C4BP in regulating complement activation. Hereditary protein S deficiency causes recurrent venous thrombosis (5). Acquired protein S deficiency is associated with nephrotic syndrome, disseminated intravascular coagulation, liver disease and the use of oral anticoagulants, leading to increased thrombotic risk (6).

Principle of the Assay

The AssayMax Human Protein S ELISA (Enzyme-Linked Immunosorbent Assay) kit is designed for detection of human protein S in plasma, serum, and cell culture samples. This assay employs a quantitative competitive enzyme immunoassay technique that measures human protein S in less than 3 hours. A polyclonal antibody specific for human protein S has been pre-coated onto a 96-well microplate with removable strips. Protein S in standards and samples is competed by a biotinylated protein S sandwiched by the immobilized antibody and 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, standard, biotinylated protein, 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 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 acidic solution.

Reagents

- **Human Protein S Microplate:** A 96-well polystyrene microplate (12 strips of 8 wells) coated with a polyclonal antibody against human protein S.
- **Sealing Tapes:** Each kit contains 3 precut, pressure sensitive sealing tapes that can be cut to fit the format of the individual assay.
- **Human Protein S Standard:** Human protein S in a buffered protein base (8 µg, lyophilized).
- **Biotinylated Human Protein S:** 1 vial, lyophilized.
- **EIA Diluent Concentrate (10x):** A 10-fold concentrated buffered protein base (20 ml).
- **Wash Buffer Concentrate (20x):** A 20-fold concentrated buffered surfactant (30 ml).
- **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

- Upon arrival, immediately store components of the kit at recommended temperatures up to the expiration date.
- Store SP Conjugate at -20°C.
- Store Microplate, Diluent Concentrate (10x), Wash Buffer, Stop Solution, and Chromogen Substrate at 2-8°C.
- Unused microplate wells may be returned to the foil pouch with the desiccant packs and resealed. May be stored for up to 30 days in a vacuum desiccator.
- Diluent (1x) may be stored for up to 30 days at 2-8°C.
- Store Standard and Biotinylated Protein at 2-8°C before reconstituting with Diluent and at -20°C 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

- **Plasma:** Collect plasma using one-tenth volume of 0.1 M sodium citrate as an anticoagulant. Centrifuge samples at 3000 x *g* for 10 minutes. Dilute samples 1:10 into EIA Diluent and assay. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles (EDTA or Heparin can also be used as an anticoagulant).
- **Serum:** Samples should be collected into a serum separator tube. After clot formation, centrifuge samples at 3000 x *g* for 10 minutes, and remove serum. Dilute samples 1:10 into EIA Diluent and assay. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.
- **Cell Culture Supernatants:** Centrifuge cell culture media at 3000 x *g* for 10 minutes to remove debris. Collect supernatants and assay. Store samples at -20°C or below. Avoid repeated freeze-thaw cycles.

Reagent Preparation

- Freshly dilute all reagents and bring all reagents to room temperature before use.
- **EIA Diluent Concentrate (10x):** If crystals have formed in the concentrate, mix gently until the crystals have completely dissolved. Dilute the EIA Diluent Concentrate 1:10 with reagent grade water. Store for up to 30 days at 2-8°C.
- **Standard Curve:** Reconstitute the 8 µg (208 mU) of Human Protein S Standard with 1 ml of EIA Diluent to generate an 8 µg/ml (208 mU/ml) standard solution. Allow the standard to sit for 10 minutes with gentle agitation prior to making dilutions. Prepare duplicate or triplicate standard points by serially diluting the standard solution (8 µg/ml) 1:2 with EIA Diluent to produce 4, 2, 1, 0.5, and 0.25 µg/ml solutions. EIA Diluent serves as the zero standard (0 µg/ml). Any remaining solution should be frozen at -20°C and used within 30 days.

Standard Point	Dilution	[Protein S] (µg/ml)	[Protein S] (mU/ml)
P1	Standard (8 µg/ml)	8.00	208.0
P2	1 part P1 + 1 part EIA Diluent	4.00	104.0
P3	1 part P2 + 1 part EIA Diluent	2.00	52.00
P4	1 part P3 + 1 part EIA Diluent	1.00	26.00
P5	1 part P4 + 1 part EIA Diluent	0.50	13.00
P6	1 part P5 + 1 part EIA Diluent	0.25	6.500
P7	EIA Diluent	0.00	0.000

- **Biotinylated Human Protein S (4x):** Reconstitute Biotinylated Human Protein S with 4 ml EIA Diluent to produce a 4-fold stock solution. Allow the biotin to sit for 10 minutes with gentle agitation prior to making dilutions. The stock solution should be further diluted 1:4 with EIA Diluent. Any remaining solution should be frozen at -20°C and used within 30 days.
- **Wash Buffer Concentrate (20x):** If crystals have formed in the concentrate, mix gently until the crystals have completely dissolved. 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 EIA Diluent. Any remaining solution should be frozen at -20°C.

Assay Procedure

- Prepare all reagents, standard solutions, and samples as instructed. Bring all reagents to room temperature before use. The assay is performed at room temperature (20-25°C).
- Remove excess microplate strips from the plate frame and return them immediately to the foil pouch with desiccants inside. Reseal the pouch securely to minimize exposure to water vapor and store in a vacuum desiccator.
- Add 25 µl of Human Protein S Standard or sample per well, and immediately add 25 µl of Biotinylated Human Protein S to each well (on top of the standard or sample) and mix gently. Cover wells with a sealing tape and incubate for 2 hours. Start the timer after the last addition.
- Wash five times with 200 µl of Wash Buffer manually. Invert the plate each time and decant the contents; hit 4-5 times on absorbent material to completely remove the liquid. If using a machine, wash six times with 300 µl of Wash Buffer and then invert the plate, decanting the contents; hit 4-5 times on absorbent material to completely remove the liquid.
- 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 10 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 low concentration points

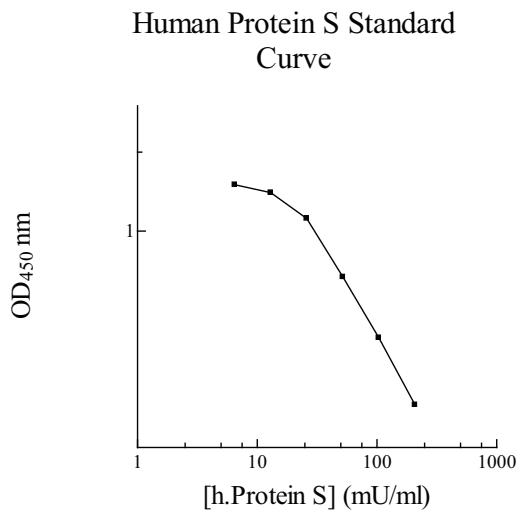
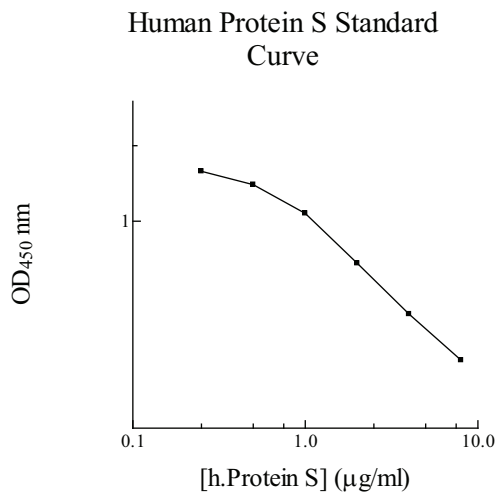
after stopping the reaction for about 10 minutes, which will reduce the readings.

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.



Performance Characteristics

- The minimum detectable dose of protein S is typically ~ 0.2 µg/ml.
- Intra-assay and inter-assay coefficients of variation were 5.0% and 7.4% respectively.
- **Kit standard has been calibrated against WHO International Standard.**

Linearity

Sample Dilution	Average Percentage of Expected Value	
	Plasma	Serum
1:5	105%	104%
1:10	100%	98%
1:20	91%	92%

Recovery

Standard Added Value	0.5 – 4.0 µg/ml
Recovery %	84 – 115%
Average Recovery %	98.5%

Cross-Reactivity

Species	% Cross Reactivity
Canine	<50%
Bovine	None
Monkey	<20%
Mouse	None
Rat	None
Swine	<20%
Rabbit	None

Reference Value

- On average, normal human protein s plasma level is 25 µg/ml.

References

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- (3) Suzuki K *et al.* (1983) *J. Biochem.* 94:699-705
- (4) Dahlback B and Stenflo J (1981) *Proc. Natl. Acad. Sci. USA* 78:2512-2516
- (5) Schwarz HP *et al.* (1984) *Blood* 64:1297-1300
- (6) Rezende SM *et al.* (2004) *Blood* 103(4):1192-1201

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