
Human Surfactant Protein D, SP-D ELISA kit

Catalog No.E1039h

(96 tests)

Operating instruction



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**FOR RESEARCH USE ONLY; NOT FOR THERAPEUTIC OR DIAGNOSTIC APPLICATIONS!
PLEASE READ THROUGH ENTIRE PROCEDURE BEFORE BEGINNING!**

Intended use

This immunoassay kit allows for the specific measurement of human Surfactant Protein D, SP-D concentrations in tissue homogenates, cell culture supernates, serum, and plasma and other relevant liquid.

Introduction

Surfactant protein D (SP-D) belongs to the collectin family. These proteins are oligomeric proteins composed of carbohydrate-recognition domains (CRD) attached to collagenous regions. Collectins are structurally similar to the ficolins although they make use of different CRD structures: C-type lectin domain for the collectins. The lung is the major site of synthesis of SP-D, where the molecules are produced and secreted onto the epithelial surface by alveolar type II cells and unciliated bronchial epithelial cells. SP-D is also found in different epithelial cells of the gastrointestinal tract and in epithelial cells of various exocrine glands. SP-D is an important factor in the pulmonary anti-microbial defense. The anti-microbial defense mechanisms of SP-D are direct opsonization, neutralization and agglutination. This results in limiting the infection and concurrently orchestrating the subsequent adaptive immune response. SP-D synthesis and secretion increase significantly during inflammatory stress. The localization of SP-D in endocytic vesicles and in lysosomal granules of alveolar macrophages suggests a receptor-mediated uptake. SP-D is also involved in the apoptotic process. SP-D binds to apoptotic neutrophils and enhances their clearance by alveolar macrophages.

Test principle

This assay employs the quantitative sandwich enzyme immunoassay technique. A monoclonal antibody specific for SP-D has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any SP-D present is bound by the immobilized antibody. An biotinylated polyclonal antibody specific for SP-D is added to the wells. Following a wash to remove any unbound reagent, an enzyme complex is added to the wells. After incubation and washing, a substrate solution is added to the wells and color develops in proportion to the amount of SP-D bound in the initial step. The color development is stopped and the intensity of the color is measured.

Materials and components

Reagent

Quantity

Assay plate	1
Standard	2
Sample Diluent	1 x 20ml
Assay Diluent A	1 x 10ml
Assay Diluent B	1 x 10ml
Detection Reagent A	1 x 120ul
Detection Reagent B	1 x 120ul
Wash Buffer	1 x 30ml
(25 x concentrate)	
Substrate	1 x 10ml
Stop Solution	1 x 10ml

Sample collection and storage

Cell culture supernates - Remove particulates by centrifugation and assay immediately or aliquot and store samples at $\leq -20^{\circ}\text{C}$. Avoid repeated freeze-thaw cycles.

Serum - Use a serum separator tube (SST) and allow samples to clot for 30 minutes before centrifugation for 15 minutes at approximately 1000 x g. Remove serum and assay immediately or aliquot and store samples at -20°C .

Plasma - Collect plasma using EDTA or heparin as an anticoagulant. Centrifuge samples for 15 minutes at 1000 x g at $2 - 8^{\circ}\text{C}$ within 30 minutes of collection. Store samples at $\leq -20^{\circ}\text{C}$. Avoid repeated freeze-thaw cycles.

Tissue homogenates - The preparation of tissue homogenates will vary depending upon tissue type. For this assay, heart and lung tissue from one human was rinsed with 1X PBS to remove excess blood, homogenized in 20 mL of 1X PBS and stored overnight at $\leq -20^{\circ}\text{C}$. After two freeze-thaw cycles were performed to break the cell membranes, the homogenates were centrifuged for 5 minutes at 5000 x g. Remove the supernate and assay immediately or aliquot and store at $\leq -20^{\circ}\text{C}$.

Note: Citrate plasma has not been validated for use in this assay.

Limitations of the procedure

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1. The kit should not be used beyond the expiration date on the kit label.
2. Do not mix or substitute reagents with those from other lots or sources.
3. If samples generate values higher than the highest standard, further dilute the samples with the Assay Diluent and repeat the assay. Any variation in standard diluent, operator, pipetting technique, washing technique, incubation time or temperature, and kit age can cause variation in binding.
4. This assay is designed to eliminate interference by soluble receptors, ligands, binding proteins, and other factors present in biological samples. Until all factors have been tested in the Quantikine Immunoassay, the possibility of interference cannot be excluded.

Reagent preparation

Bring all reagents to room temperature before use.

Wash Buffer - If crystals have formed in the concentrate, warm to room temperature and mix

gently until the crystals have completely dissolved. Dilute 20 mL of Wash Buffer Concentrate into deionized or distilled water to prepare 500 mL of Wash Buffer.

Standard - Reconstitute the **Standard** with 1.0 mL of **Sample Diluent**. This reconstitution produces a stock solution of 400 ng/mL. Allow the standard to sit for a minimum of 15 minutes with gentle agitation prior to making serial dilutions. The undiluted standard serves as the high standard (400 ng/mL). The **Sample Diluent** serves as the zero standard (0 ng/mL).

Detection Reagent A and B - Dilute to the working concentration specified on the vial label using **Assay Diluent A and B** (1:100), respectively.

Assay procedure

Allow all reagents to reach room temperature. Arrange and label required number of strips.

1. Prepare all reagents, working standards and samples as directed in the previous sections.
2. Add 100 uL of **Standard**, Control, or sample* per well. Cover with the adhesive strip. Incubate for 2 hours at 37° C.
3. Remove the liquid of each well, don't wash.
4. Add 100 uL of **Detection Reagent A** to each well. Incubate for 1 hour at 37°C. **Detection Reagent A** may appear cloudy. Warm to room temperature and mix gently until solution appears uniform.
5. Aspirate each well and wash, repeating the process three times for a total of three washes. Wash by filling each well with Wash Buffer (350 uL) using a squirt bottle, multi-channel pipette, manifold dispenser or autowasher. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against clean paper towels.
6. Add 100 uL of **Detection Reagent B** to each well. Cover with a new adhesive strip. Incubate for 1 hours at 37° C.
7. Repeat the aspiration/wash as in step 5.
8. Add 90 uL of **Substrate Solution** to each well. Incubate for 30 minutes at room temperature. Protect from light.
9. Add 50 uL of **Stop Solution** to each well. If color change does not appear uniform, gently tap the plate to ensure thorough mixing.
10. Determine the optical density of each well within 30 minutes, using a microplate reader set to 450 nm.

Specificity

This assay recognizes recombinant and natural human SP-D. No significant cross-reactivity or interference was observed.

Sensitivity

The minimum detectable dose of human SP-D is typically less than 1.56 ng/mL.

The sensitivity of this assay, or Lower Limit of Detection (LLD) was defined as the lowest protein concentration that could be differentiated from zero.

Detection Range

6.25-400 ng/mL. The assay range was estimated by calculating the coefficient of variation (CV) of each standard constructing five independent standard curves. The standard curve concentrations used for the ELISA's were 400 ng/mL, 200 ng/mL, 100 ng/mL, 50 ng/mL, 25 ng/mL, 12.5 ng/mL,

6.25 ng/mL.

Important Note:

1. The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbance readings.
2. It is recommended that no more than 32 wells be used for each assay run if manual pipetting is used since pipetting of all standards, specimens and controls should be completed within 5 minutes. A full plate of 96 wells may be used if automated pipetting is available.
3. Duplication of all standards and specimens, although not required, is recommended.
4. When mixing or reconstituting protein solutions, always avoid foaming.
5. To avoid cross-contamination, change pipette tips between additions of each standard level, between sample additions, and between reagent additions. Also, use separate reservoirs for each reagent.
6. To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary.

Calculation of results

Average the duplicate readings for each standard, control, and sample and subtract the average zero standard optical density. Create a standard curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph. The data may be linearized by plotting the log of the SP-D concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

Storage of test kits and instrumentation

1. Unopened test kits should be stored at 2-8°C upon receipt and the microtiter plate should be kept in a sealed bag with desiccants to minimize exposure to damp air. The test kit may be used throughout the expiration date of the kit (six months from the date of manufacture). Refer to the package label for the expiration date.
2. Opened test kits will remain stable until the expiring date shown, provided it is stored as prescribed above.
3. A microtiter plate reader with a bandwidth of 10nm or less and an optical density range of 0-3 OD or greater at 450nm wavelength is acceptable for use in absorbance measurement.

Precaution

The Stop Solution suggested for use with this kit is an acid solution. Wear eye, hand, face, and clothing protection when using this material.