Recombinant Human SP-D

Catalog Number: 1920-SP

DESCRIPTION

Source	Mouse myeloma cell line, NS0-derived human SP-D protein Ala21-Phe375 (Glu22Gly) Accession # P35247
N-terminal Sequence Analysis	Ala21
Structure / Form	Oligomer
Predicted Molecular Mass	35.4 kDa (monomer)

SPECIFICATIONS

SDS-PAGE	40-48 kDa, reducing conditions
Activity	Measured by its ability to bind fluorescein-conjugated *E. coli* Bioparticles. Kuan, S.F. *et al.* (1992) J. Clin. Invest. **90**:97. The ED_{50} for this effect is 0.5-3 µg/mL.
Endotoxin Level	<0.10 EU per 1 µg of the protein by the LAL method.
Purity	>95%, by SDS-PAGE under reducing conditions and visualized by silver stain.
Formulation	Lyophilized from a 0.2 µm filtered solution in PBS. See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution	Reconstitute at 100 µg/mL in sterile PBS.
Shipping	The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.
Stability & Storage	**Use a manual defrost freezer and avoid repeated freeze-thaw cycles.** • 12 months from date of receipt, -20 to -70 °C as supplied. • 1 month, 2 to 8 °C under sterile conditions after reconstitution. • 3 months, -20 to -70 °C under sterile conditions after reconstitution.

BACKGROUND

SP-D (surfactant protein-D; also PSP-D) is a 43 kDa member of the collectin family of innate immune modulators. It is constitutively secreted by alveolar lining cells and epithelium associated with tubular structures. Its principal components consist of a collagen-like region and a C-terminal carbohydrate recognition domain (CRD), a structure that further places it in a subset of an expanded group of proteins termed defense collagens (1-4). Human SP-D is synthesized as a 375 amino acid (aa) precursor. It contains a 20 aa signal sequence and a 355 aa mature region. The mature molecule is characterized by the presence of a 25 aa N-terminal linking-region, a 177 aa hydroxyproline and hydroxylysine collagen-like domain, a 46 aa coiled-coil segment, and a 106 aa, C-terminal collectin-like C-type lectin domain (CRD) (5, 6). Two additional, potential isoforms exist. One shows a 13 aa N-terminal extension, while the other combines the N-terminal extension with a deletion of aa's # 206-375. Mature human SP-D shares 75% and 78% aa identity with mouse and pig SP-D, respectively. Monomeric SP-D is unusual (3). The basic form of SP-D is that of a glycosylated, disulfide-linked 150 kDa trimer that generates an α-helical coiled-coil structure linked to a "head" of three symmetrical CRDs (4, 7). Each CRD recognizes the hydroxides of one monosaccharide (4). Trimerization allows for the discrimination of monosaccharide patterns specific to microbial pathogens (7). Typically, SP-D forms a higher-order 620 kDa, X-shaped dodecamer through disulfide bonds associated with the N-terminus (8). This allows for even finer discrimination of self vs. nonself carbohydrate patterns, and facilitates binding to complex antigens (8, 9). One polymorphism, a Met11-Thr11 transition in human, apparently precludes the formation of oligomers, potentially affecting the ability of affected individuals to interact with microorganisms (9, 10). Finally, SP-D is known to bind both SIRPα and the calreticulin/CD91 complex on macrophages. When the ratio of antigen/pathogen to available CRDs is low, antigen can be bound without occupying all available CRDs. The free CRDs will bind to SIRPα, generating a signal that downmodulates the inflammatory response. When virtually all CRDs are occupied by ligand, however, free CRDs are not available for SIRPα binding. Instead, the dodecamer is depicted to undergo a structural rearrangement, exposing the N-termini of all four linked trimers. This exposed terminus is known to bind to the calreticulin/CD91 complex, an event that initiates inflammation. Thus, it would appear that SP-D allows for a graded response to environmental challenge. SP-D provides a mechanism for the clearance of small antigenic insults without the need for a damaging inflammatory response (3).

References:

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