

Product Information

Toxic shock syndrome toxin-1 from *Staphylococcus aureus*

Product Number **T5662**

Storage Temperature -20°C

Synonym: TSST-1

Product Description

Molecular weight:¹ 24 kDa

pI:¹ 6.8 - 7.2

TSST-1 is a toxin secreted by *Staphylococcus aureus* in response to environmental stress, such as low oxygen or low nutrient content in its surroundings. The protein is highly resistant to proteases and is stable from pH 2.5-11 and at temperatures exceeding 60°C . In its active form, TSST-1 contains 194 amino acid residues and has a molecular weight of approximately 24 kDa.² It has a low level of sequence homology with other pyrogenic toxin superantigens.

This product is a superantigen for T-lymphocytes³⁻⁵ and activates production of immune signaling molecules such as tumor necrosis factor, interleukin-1, M protein, and γ -interferon. The term "superantigen" was first used to describe the pathogenic activities of certain bacterial toxins.⁶ Superantigens differ from conventional antigens in four major ways:⁷

1. Superantigens elicit a strong primary immune response.
2. The V_{β} chain of the T cell receptor (TCR) is sufficient for recognition of a superantigen, while a conventional antigen requires an interaction with the third hypervariable region of the TCR.
3. Superantigens are not MHC class II restricted as seen in conventional antigen T-cell responses.
4. Superantigens are able to interact with MHC class II molecules in an unprocessed form, while conventional antigens must be presented via the endocytic pathway.

There are several examples of superantigens that have been identified. They have been categorized into at least three major groups:⁷

1. Viral encoded superantigens such as murine mammary tumor virus M1s antigen, rabies virus nucleocapsid protein, and Epstein-Barr Virus (EBV) associated superantigen.
2. Pyrogenic toxin superantigens (PTSAgs) such as toxic shock syndrome toxin-1 (TSST-1), staphylococcal enterotoxin A, staphylococcal enterotoxin B, and streptococcal scarlet fever toxin (SPEs).
3. Other bacterial superantigens such as staphylococcal exfoliative toxins, *Mycoplasma arthritidis* mitogen, *Yersinia enterocolitica* and pseudotuberculosis superantigens, and streptococcal M protein.

All of these superantigens bind to the V_{β} portion of the TCR and residues on α -1 chain of a class II MHC molecule. This interaction causes activation of the T-cell and induces a major immune response that often has pathological consequences.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

This product is soluble in water (0.5 mg/ml).

Storage/Stability

Store the product at -20°C .

References

1. Reiser, R. F., *et al.*, Purification and some physicochemical properties of toxic-shock toxin. *Biochemistry*, **22(16)**, 3907-3912 (1983).
2. Earhart, C. A., *et al.*, in *Superantigens: Molecular Biology, Immunology, and Relevance to Human Disease*, Leung, D. Y. M., *et al.*, eds., M. Dekker (New York, NY: 1997), pp.127-148.
3. Marrack, P., and Kappler, J., The staphylococcal enterotoxins and their relatives. *Science*, **248(4956)**, 705-711 (1990).
4. Misfeldt, M. L., Microbial "superantigens". *Infect. Immun.*, **58(8)**, 2409-2413 (1990).
5. Blanco, L., *et al.*, Mutants of staphylococcal toxic shock syndrome toxin 1: mitogenicity and recognition by a neutralizing monoclonal antibody. *Infect. Immun.*, **58(9)**, 3020-3028 (1990).
6. White, J., *et al.*, The V-beta-specific superantigen staphylococcal enterotoxin B: stimulation of mature T cells and clonal deletion in neonatal mice. *Cell*, **56(1)**, 27-35 (1989).
7. Deresiewicz, R.L., in *Superantigens: Molecular Biology, Immunology, and Relevance to Human Disease*, Leung, D. Y. M., *et al.*, eds., M. Dekker (New York, NY: 1997), pp. 435-479.

CMH,RXR,NDH,MAM 12/05-1

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