Licensable Technologies

Superantigen Receptor Mimics

Applications:

- Therapeutic option for food poisoning, inflammatory skin disease, and toxic shock syndrome
- Therapeutic option against weaponized S. aureus toxin in bio-warfare
- Potential treatment for autoimmune diseases

Benefits:

- Effective treatment for superantigen infections
- Can treat antibiotic-resistant strains of superantigen-producing bacteria

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Summary:

As a result of their close association with serious human pathologies, superantigens have been the subject of intense research over the last decade. The bacterial superantigen family, which includes the pathogenic species *Staphylococcus aureus* and *Streptococcus pyogenes,* is associated with multiple chronic and acute diseases such as food poisoning, toxic shock syndrome, multiple sclerosis, and diabetes to name a few.
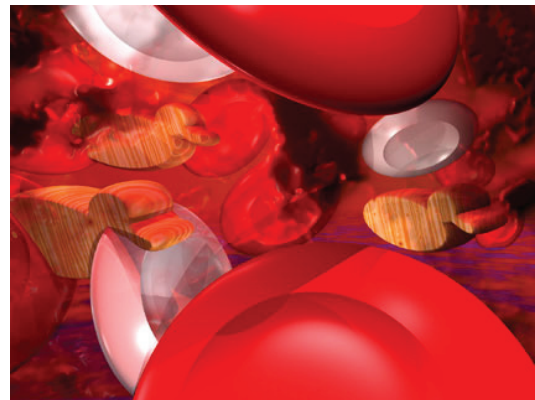
The Centers for Disease Control and Prevention estimate that 1.3 million hospital patients develop *S. aureus* infections every year, prolonging hospital stays and increasing treatment costs. Even though food poisoning is relatively rare in the United States, it affects between 60 and 80 million people worldwide each year and results in approximately 6 to 8 million deaths. Although the earliest described cases of toxic shock syndrome involved mostly menstruating women, only 55% of current cases are associated with menstruation. The illness can also occur in children, postmenopausal women, and men.

In the United States, health care costs for multiple sclerosis are second only to those for Alzheimer's disease and, in 2002, the total annual economic cost of diabetes was estimated to be $132 billion, or 1 out of every 10 health care dollars spent. Additionally, there is a potential that superantigens from these bacteria could be weaponized, thus posing a threat to national security.

Several novel treatments are currently being evaluated for efficacy against superantigens including the Los Alamos National Laboratory (LANL) developed anti-superantigen chimeras. The Los Alamos invention is a structure-based receptor mimic that is targeted against bacterial superantigen toxins from *S. aureus* and *S. pyogenes*. The overuse of antibiotics in recent years has resulted in a number of antibiotic-resistant strains of both *S. aureus* and *S. pyogenes* related pathogens. The LANL invention can treat antibiotic-resistant strains of superantigen-producing bacteria.

Development Stage:

Experiments are ongoing at LANL to demonstrate the efficacy of the anti-superantigen as a therapeutic option.

Patent Status:

Patent pending

Licensing Status:

A partner is being sought to advance the development of this novel therapy for use in combating toxic shock syndrome, inflammatory skin disease, and food poisoning. An additional market for this technology, which could be used as a tool against biowarfare relying on *S. aureus* toxin is the U.S. government.

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