Background

• Alpha toxin is a pore forming toxin and when it binds to its target cell it puts a β-barrel through the target cell's membrane making a channel, causing rapid release of cellular ions.

• Alpha toxin can bind and attack a wide variety of cell causing large inflammatory response and cell death, leading to shock and sepsis.

• TSST-1 and SEA are superantigens that crosslink the Vβ domain of lymphocytes and class II MHC, impacting the T-cell response.

• TSST-1 and SEA causes a burst in cytokine release, also known a cytokine storm, leading to an extreme inflammatory response.

• Due to the high proinflammatory response, causing symptoms of high fever, sepsis and more.

Methods

• Twelve positive S. aureus samples from the study were tested for toxins

• Isolate DNA from S. aureus samples

• PCR

• gel electrophoresis

• PCR allows the DNA of a sample to be amplified allowing it to be studied, including determining if toxins are present

Overview

Staphylococcus aureus is a bacteria that lives commensally on one third of the human population. S. aureus can produce toxins and superantigens, like SEA, TSST-1 and alpha toxin that cause disease.

Some diseases produced by these toxins are pneumonia, endocarditis, osteomyelitis, toxic shock syndrome, dermatitis, and sepsis. Twelve S. aureus positive samples, previously collected from nasal swabs, were tested through PCR and DNA gel electrophoresis in order to visualize the DNA you are looking for.

Results

• All 12 samples showed presence of alpha toxin

• 11:12 samples showed presence of SEA

• No samples showed presence of TSST-1

Acknowledgements & References

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Figure 1: DNA gel electrophoresis of alpha toxin on S. aureus samples. A DNA gel was imaged using GelGreen and blue light UV illumination to show which S. aureus samples produced alpha toxin. All samples presented a band at 2,000 Kb showing the presence of alpha toxin.

Figure 2: DNA gel electrophoresis of the superantigen SEA on S. aureus samples. A DNA gel was imaged using GelGreen and blue light UV illumination to show which S. aureus samples produced SEA. All samples, except S0147, presented a band at 1,500 Kb showing the presence of SEA.