Performing Polymerase Chain Reaction to determine the prevalence of different SAgs in *Staphylococcus aureus* samples.

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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.

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

Alpha toxin is present in most nasal-derived *Staphylococcus aureus* samples

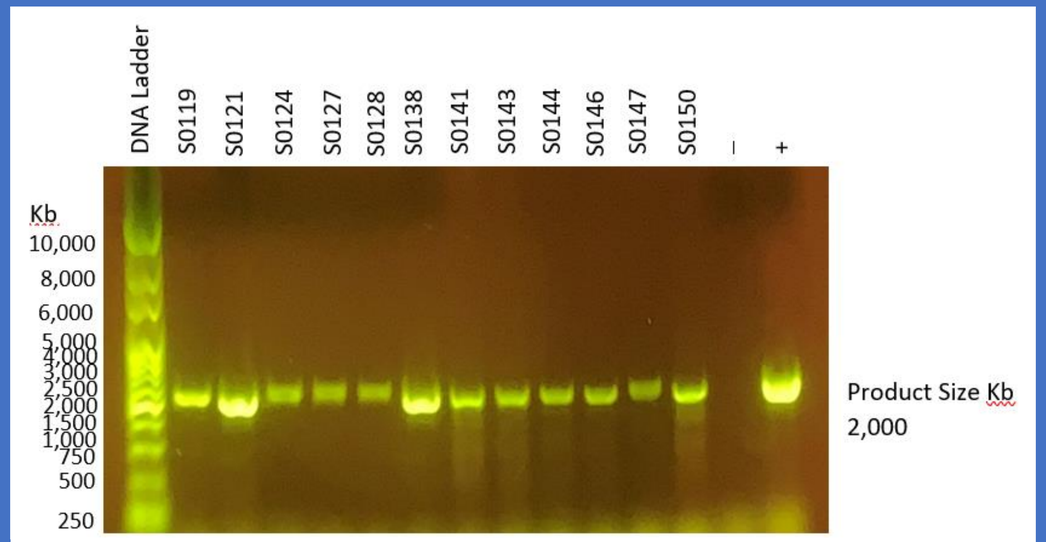

Figure 1: ***DNA gel electrophoresis of alpha toxin on S. aureus samples.*** A DNA gel was imaged using GelGreen and blue light UV illumination to show which *S. aureus* samples produced alpha toxin. All samples presented a band at 2,000 Kb showing the presence of alpha toxin.

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.

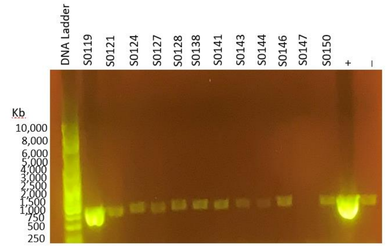

Figure 2: ***DNA gel electrophoresis of the superantigen SEA on S. aureus samples.*** A DNA gel was imaged using GelGreen and blue light UV illumination to show which *S. aureus* samples produced SEA. All samples, except S0147, presented a band at 1,500 Kb showing the presence of SEA.

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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