C-032. Direct Identification of Methicillin Resistant \textit{Staphylococcus aureus} (MRSA) Using Small Numbers of Immobilized Cells and Response to Oxacillin (OXA) by Automated Growth Analysis
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Abstract (revised)

Title: Direct Identification of Methicillin Resistant \textit{Staphylococcus aureus} (MRSA) Using Small Numbers of Immobilized Cells and Response to Oxacillin (OXA) by Automated Growth Analysis

Background: Conventional MRSA phenotyping methods rely on large numbers of bacteria, increasing the total time-to-result. We report initial results for a new method requiring 500 bacterial cells, enabling rapid MRSA identification.

Methods: A microfluidic device, using computerized microscopy of immobilized bacteria, was used to measure bacterial growth rates. Tests were performed on 14 MRSA and 19 Methicillin Susceptible \textit{Staphylococcus aureus} (MSSA) ATCC® strains, and on 18 MRSA and 6 MSSA clinical isolates. 2 MRSA strains exhibited Class 1 heteroresistance. Bacteria were grown for 2 hours (to assure log phase) and 10 μl of a 5E6 CFU/ml inoculum was delivered to the flowcell. Bacteria were concentrated onto a poly-L-lysine glass surface, capturing approximately 500 cells in the microscope's field of view. 32 MRSA and 27 MSSA strains and isolates were run in parallel.

Sample Introduction

- S. aureus isolates were resuspended in electrophoretic capture buffer at 1 x 10^6 CFU/ml.
- The samples were introduced into flowcells and the cartridge was placed on the reader.
- Flowcells were constructed of transparent top and bottom surfaces allowing microscopy imaging.

Capture and Concentration

- Cells were electrophoretically concentrated to the flowcells' capture surface coated with PLL.