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INTRODUCTION

Why *Staphylococcus aureus*?

- Major cause of hospital acquired (nosocomial) infection
- Causes pneumonia, mastitis, phlebitis, meningitis, urinary tract infections, food poisoning, and toxic shock syndrome
- Many virulence factors: surface proteins, membrane-damaging toxins, exotoxins
- Complex antioxidant strategies that serve to neutralize and repair oxidative damage



Why triclosan as antimicrobials?

- Triclosan is one of the most common antimicrobial agents on the market today.

- Widely used in healthcare facility

- A lack of understanding their mode of action and the corresponding defensive mechanisms hinders successful antimicrobial application

Why microarray technology (GeneChip®)?



- Enables a genome-wide analysis of the cellular

- responses to oxidative stress

How *S. aureus* responds to Triclosan?

- Genome-wide changes in *S. aureus* transcription
- Reinforce known relationships between genes with previously identified functions
- Reveal new target genes that provide more insight into *S. aureus*-antimicrobial interactions

MATERIALS AND METHODS

S. aureus growth inhibition by antimicrobials

- Inhibition assessed with various concentrations of the three antimicrobials
- Two exposure times employed to determine transcriptional profile changes

Affymetrix *S. aureus* GeneChip® arrays

- 5 biological replicates for each sample
- Statistical analysis of microarray data
 - p -value for the t-test ≤ 0.05
 - Fold change in transcript level ≥ 2.0
 - Presence or marginal calls $\geq 50\%$ replicates on both the experimental and control sets
- Clustering analysis

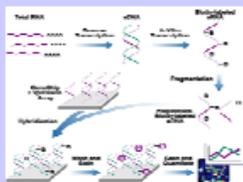
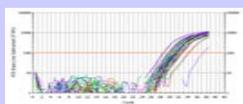


Image courtesy of Affymetrix

- Real-time PCR used for the validation of the microarray data



RESULTS AND DISCUSSION

S. aureus growth with antimicrobials

- We determined concentrations that cause strong growth inhibition but not cell death

