Objective: To develop a method to observe the antimicrobial susceptibility of multispecies biofilms grown in a microfluidic device

Methods:

- Images taken at 4 positions perpendicular to flow at center of device
- Pure species liquid culture grown overnight
- Control - P. aeruginosa : TSB media 1:1 (v/v)
- Coculture - P. aeruginosa : S. aureus 1:1 (v/v)

Results:

- Successfully observed biofilm respiration and abundance in real time
- Center positions of channel have higher rates of oxygen consumption due to laminar flow
- Larger respiration rates of coculture biofilms may be due to presence of S. aureus
- Media rinsing causes large increase in respiration

Conclusions:

- Strains
  - GFP Pseudomonas aeruginosa
  - wt Staphylococcus aureus

The Market:

- Costs industries over $500 billion annually worldwide
- Biofilms generally exist as complex communities of multiple bacterial species
- Current research focuses on single species biofilms

Future Direction:

- Expose biofilms to antimicrobials
- Measure cell densities of "eradicated" biofilm
- Introduce YFP/CFP S. aureus to better characterize biofilm

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