

University of Akron

*Microfluidic-based Determination of Antibiotic Susceptibility by Fluorescence Imaging*

Current clinical methods for antibiotic susceptibility testing using mean inhibitory concentration (MIC) are accessible, but require a significant time investment despite automation. Bacterial cell concentration within the patient sample is initially below the detection limit of current clinical methods. Time must be given to culture the cells and allow cell count to reach the detection limit, often 24-48 hours. There exists a need for an accessible and easy to use methodology to determine antibacterial resistance without reliance upon cell growth. The development of single-cell analysis methods means it would be possible to determine the susceptibility of bacteria to particular antibiotics directly for the patient sample. We propose using a single-cell fluorescence imaging approach with viability reporters to determine the susceptibility of the bacteria to various antibiotics. Cells will be trapped in a specially designed microfluidic device which can concentrate bacterial cells in a select viewing area. Signal from the microfluidic device will be interpretable by fluorescence microscopes capable of 60x magnification or larger.