

Fraunhofer CMI

Phenotypic AST--BACFLOWDX

Disease causing microbes that have become drug resistant are an increasing public health problem. Factors contributing to the rise in antibiotic resistance include widespread and inappropriate prescription of broad-spectrum antibiotics and patient non-compliance to antibiotic regimens. The ability of hospitals to optimally treat patients is severely hampered by the lack of rapid diagnostics that can accurately inform the medical staff if: 1) the patient is infected with bacteria and 2) which of the frontline antibiotics should be deployed to fight the infection. Current antibiotic susceptibility tests rely on technologies (broth, agar) developed in the mid-1800s. Therefore, results are delayed by long macroscopic growth steps in the presence of antibiotics. However, waiting for the bacteria to grow during these assays (8-18 h) can have serious consequences for the patient. For septic patients, each hour of delay in administering appropriate antimicrobial therapy increases morbidity and mortality by 8%. We have developed a novel and rapid microfluidic *phenotypic* assay that utilizes shear stress to accelerate the action of antibiotics. Phenotypic assays offer substantial advantages over genotypic-based methods including detecting resistant bacteria even when the underlying mechanism is unknown. Our method monitors the death of susceptible strains in the presence of antibiotics, circumventing the need for bacterial growth, and distinguishing resistant from susceptible bacteria as little as 30 min. This diagnostic is well-suited to replace growth-based phenotypic diagnostics for many sample types. We anticipate that our rapid diagnostic could be incorporated into an existing inpatient clinical workflow to significantly reduce the time to results for these crucial tests.