Heteroresistance Antibiotic Susceptibility Testing

EXECUTIVE SUMMARY

TEAM

David Weiss, PhD
Clinical Investigator
Emory University

Peter Yunker, PhD
Technical Investigator
Georgia Institute of Technology

Eileen Burd, PhD
Clinical Advisor

Colleen Kraft, MD
Clinical Advisor

INTELLECTUAL PROPERTY

Patents pending (PCT)

Technology available for licensing and partnership

STATUS

Benchtop verification completed, patient sample validation pending.

TECHNOLOGY

Antibiotic susceptibility testing (AST) is the universally accepted method for evaluating antibiotic resistance used to aid physicians in choosing the most optimal antibiotic agents for their patients. Traditional AST systems classify bacteria as resistant or susceptible, but lack the sensitivity to accurately classify instances in which only minor subpopulations of cells within the population are resistant (heteroresistance). This inadequate sensitivity to detect many instances of antibiotic resistance prevent effective treatment regimens from being designed.

This technology aims to identify heteroresistant microbes by precisely and sensitively analyzing bacterial populations. Once heteroresistance has been identified, the testing platform will suggest optimal antibiotic monotherapy or combination therapies to more effectively eradicate the bacterial infection. Implementing this tool facilitates the personalization of precise and effective antibiotic therapies tailored to a specific patient.

CLINICAL NEED

Antibiotic resistance is one of the greatest threats to human health and is described as the "silent pandemic". While it does not spread as fast as viral diseases such as COVID, it is predicted to annually kill 10 million people worldwide by the year 2050, becoming a bigger killer than cancer. Without effective antibiotics, critical medical innovations such as transplants, cancer chemotherapy, survival of extremely premature infants, and even routine surgeries such as knee replacements would no longer be possible due to the risk of untreatable infection. Currently in the United States alone, over 2 million patients are affected with antibiotic-resistant infections resulting in costly hospitalizations and up to 150,000 deaths every year.

With no new classes of antibiotics brought to market to treat many infections in the last 40 years, increasing resistance, and even growing numbers of untreatable, pan-resistant infections, it has never been more critical to optimize the use of the antibiotics we have. However, shortcomings of current AST hinder progress and effective treatments. Our paradigm-shifting discoveries leading to therapeutic and diagnostic advances are poised to disrupt the AST space, making treatments much more effective and saving lives.

STATUS

To date the team has validated their technology on over 300 antibiotic-strain combinations, successfully discriminating between susceptible, resistant, and heteroresistant populations. They are amassing clinical data demonstrating the importance of detecting heteroresistance in patients with Gram-negative or Gram-positive bacterial infections, as well as fungal infections. They have also completed real time testing for several patients with extremely drug resistant infections, where the resulting data successfully guided clinicians to use effective antibiotic combination therapies when no such options were obvious.

Next steps include further validation using patient-derived samples of antibiotic-resistant infection, with plans to enter the market with sepsis as a primary indication. The team is currently seeking a management team to bring this technology to market.

For more information on this technology email biolocity@gatech.edu or contact:
David Weiss, Clinical Investigator, david.weiss@emory.edu
Peter Yunker, Technical Investigator, peter.yunker@gatech.edu
David Mudd, Licensing Associate, David.mudd@emory.edu
Terry Bray, Director of Technology Licensing, terry.bray@gtrc.gatech.edu

biolocity™
GUIDING MEDICAL INNOVATION TO MARKET