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Understanding the Impact of Fluid Viscosity on the Growth and Conjugation of Antimicrobial Resistant Donors and Recipients Pairs

Judah Pemble* Alex Chabrelie†

Jade Mitchell, PhD‡

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†Michigan State University

‡Michigan State University

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Judah Pemble; Alex Chabrelie; and Jade Mitchell, PhD

Abstract

To combat the spread of antimicrobial resistance (AMR), it is vital to link the behavior of donor and recipient bacteria in dynamic environments to horizontal gene transfer (HGT) potential-specifically, conjugation the primary means of spread of AMR genes. However, HGT is poorly understood under dynamic conditions, such as those in the gut of humans and animals. Most experiments are done under static conditions at viscosities similar to water, but these methods do not accurately represent the higher gut viscosities or movement. Hence, a next step to increase understanding of conjugation is with experiments using generic donor and recipient pairs at different viscosities.

Accordingly, it is necessary to establish the relationship between viscosity and bacterial growth in these experiments, for which our hypothesis is that the rate of bacterial growth in fluids with higher viscosities will be lower due to water displacement. To test this hypothesis, experiments were designed to measure the number of donors, recipients and transconjugant bacteria using optical density. Varying concentrations of the thickeners agar and xanthan gum will be used to achieve different viscosity levels in the media. Media of thicknesses closer to that of bodily fluids, which are more alike to pancake syrup or batter, will be evaluated. Concentrations will be tracked at half hour intervals as a means to obtain data and to formulate a growth curve model. Some preliminary results indicate that our hypothesis has a good probability of being correct. Linear growth curve models were applied to the data for comparison purposes.

KEYWORDS: antimicrobial resistant bacteria; antibiotics; conjugation; gene transfer

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School of Public Health
University of Nevada, Las Vegas

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Judah Pemble
Alex Chabrelie, Doctoral Student, Michigan State University
Jade Mitchell, PhD, Michigan State University
Coordinating Center: University of Nevada, Las Vegas

ABSTRACT

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