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Poster Title: EFFECTS OF HYDROGEN PEROXIDE AND LACTIC ACID ON PLANKTONIC VERSUS ADHERENT BIOFILM CULTURES OF GARDNERELLA VAGINALIS

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Background: Bacterial vaginosis (BV) is a common vaginal disorder, characterized by a decrease in commensal lactobacilli and an increase in unhealthy anaerobic bacteria, such as Gardnerella vaginalis. The infection is difficult to treat and frequently relapses. It has recently been demonstrated that G. vaginalis grows as an adherent biofilm on the vaginal epithelium. When bacteria grow as a biofilm, they are more resistant than when in their planktonic state to many negative environmental stimuli such as dessication, pH changes, disinfectants, and antibiotics. The biofilm phenotype may therefore play an important role in the pathogenesis of BV. Hydrogen peroxide and lactic acid are produced by lactobacilli, and normally repress the growth of anaerobic species in the vagina.

Objectives: To evaluate the effects of hydrogen peroxide and lactic acid on G. vaginalis planktonic cultures versus adherent biofilm cultures to determine whether or not the biofilm phenotype affects susceptibility to these compounds.

Methods: An in vitro model for G. vaginalis biofilm formation was developed. The bacteria were grown in BHI+1% glucose in 96 well tissue culture plates overnight to induce biofilm formation. Planktonic and biofilm cultures were treated with various concentrations of hydrogen peroxide and lactic acid for 24hr. Viability was assessed after treatment using a Luciferase-based reagent that measures ATP.

Results: G. vaginalis produced a heavy biofilm in vitro. Biofilm cultures were resistant to challenge with an approximately 4,000-fold higher concentration of hydrogen peroxide and an approximately 25-fold higher concentration of lactic acid than were planktonic cultures.

Conclusions: The formation of a biofilm by G. vaginalis in bacterial vaginosis likely contributes to its resistance to the conditions produced by lactobacilli and may also contribute to relapsing BV.