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Detection of *Streptococcus pyogenes* biofilm in a rabbit osteomyelitis model and identification of proteins recognized by the antibody-mediated immune response

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Group A *Streptococcus* (GAS) is an important human pathogen that causes a number of diseases with a wide range of severity. While all known strains of GAS are still sensitive to penicillin, there have been reports of antibiotic treatment failure in as many as 20-40% of cases. Biofilm formation has been implicated as a possible cause for this failure. A biofilm is a microbially derived, sessile community where cells grow attached to a surface and surrounded by a complex extracellular matrix. While the ability of Group A *Streptococcus* to form biofilms in the lab has been shown, there is a lack of understanding of the role of GAS biofilms during an infection. We hypothesized that during infections, GAS exhibits a biofilm phenotype, complete with unique protein expression. To test this hypothesis, a rabbit model of GAS osteomyelitis was developed. A rabbit was inoculated with GAS using an infected indwelling device. Following the infection, blood and tissue samples were collected. Histological samples of the infected tibia were prepared and the formation of a biofilm *in vivo* was visualized using PNA-FISH and confocal microscopy. In addition, Western blotting with convalescent rabbit serum detected cell wall proteins expressed *in vitro* under biofilm and planktonic growth conditions. Immunogenic proteins were then identified using MALDI-TOF. These identities, along with the *in vivo* results, support the hypothesis that GAS forms biofilms during an infection. This unique phenotype should be taken into consideration when designing a vaccine or any other treatment for Group *A Streptococcus* infections.

Biography

Jeffrey A. Freiberg is currently an M.D./Ph.D. student at the University of Maryland, Baltimore. He is currently working on his Ph.D. in the graduate program in Molecular Microbiology & Immunology at UMB.

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