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The Importance of Biofilms in Lyme Disease

Biofilm is a thick, sticky, viscous “bacterial slime” made of mucopolysaccharides. Many types of bacteria secrete this substance which allows them to dwell in the extracellular matrix of tissues while also living in a “community.” The biofilm community can be comprised of one or many species of bacteria that cohabit and engage in “quorum sensing”, an evolutionarily old form of bacterial communication.

Dr. Alan MacDonald, a highly regarded Lyme Disease researcher in New York, has demonstrated that *Borrelia* species not only produce a biofilm, but can live in a biofilm community in any form (i.e., spirochete, granular, L form or cyst). Additionally, other zoonotic bacteria such as *Babesia*, *Ehrlichia*, *Bartonella*, *Rickettsia* and perhaps *Mycoplasma* species can live in these communities as well. The biofilm is used to both protect the bacteria from invasion by the host’s immune system, and also serves as a reservoir of nutrients in times of harsh environmental conditions. It is a very efficient way to ensure that many bacteria of a certain species survive and replicate. Essentially it’s “bacterial commune living.”

The biofilm adequately prevents antibiotics from reaching bacteria and this may account for why some people develop chronic lyme symptoms. The biofilm is effectively protecting many individual bacteria that can later escape the biofilm, reproduce and move on to other tissues.

Currently it is not scientifically known how to degrade the biofilm, however, it is known that enzymes are very effective at dissolving mucopolysaccharides in the laboratory. Therefore, a treatment plan rich in enzymes and enzyme catalysts is likely to be helpful in degrading the biofilm. Additionally, as the biofilm diminishes, toxins released by the bacteria that were contained in the biofilm matrix, are free to travel in the bloodstream. Remnants of the sticky biofilm probably allow for these toxins to get “stuck” so to speak on tissue surfaces and on the endothelium of blood vessels, and may contribute to the “hypercoagulable” blood that we see in chronically ill patients.

This is a new and exciting field of discovery with regards to Lyme Disease and I am certain that new insights regarding the clinical significance of biofilms are sure to follow shortly.