

Study of the Unknown Extracellular Polymeric Substances (EPS) contained within *Legionella pneumophila* (*Lpn*) Biofilms.

Legionella pneumophila (*Lpn*) is a bacterium that can lead to a serious pneumonia known as Legionnaires Disease. *Lpn* can be transferred from natural habitats to water systems, which can lead to human infection by way of the inhalation of contaminated aerosols. These aerosols can be produced by air conditioning systems, cooling towers, showerheads, whirlpools, fountains, ice machines, vegetable misters, and dental devices. Other areas with a potential for increased risk of *Lpn* are intensive care units or plumbing systems, where the water may become stagnant. *Lpn* is readily found as part of biofilms, often as part of multi-species microbial communities. Biofilms are adherent communities of bacteria that contain individual cells and extracellular polymeric substances (EPS), which establish the structural and functional makeup of these biofilms. In these experiments, protein and polysaccharide content of *Lpn* biofilms was quantified by spectroscopic analysis. Results showed that small amounts of protein were present and that the EPS contained significant varying levels of carbohydrates. Secondly, EPS composition was investigated by enzymatic detachment and disruption of biofilms, which was then quantified by colony-forming units. Short treatments (1 hour) with the enzymes amylase, cellulase, DNase, lipase, pectinase, proteinase K, and lysozyme (all at 0.1% enzyme concentration) showed no detachment or disruption. These results show that properties of the biofilms may prevent enzyme penetration.

Key Words: Legionella pneumophila (Lpn), Extracellular Polymeric Substances (EPS), Biofilms