

Erin Smith: Chemistry & Biochemistry

Mentor: Michael Franklin -- Center for Biofilm Engineering

Alginate Epimerization by AlgG

Pseudomonas aeruginosa is a bacterium found in the respiratory tract of cystic fibrosis patients. This opportunistic pathogen thrives in the thick mucus layer formed in the lungs of people with chronic pulmonary infections. Under these conditions the mucoid strain of this bacterium, FRD1, is able to form a protective extracellular matrix making it resistant to antimicrobial treatments. The major component of this matrix is alginate, a secreted extracellular polysaccharide; in this strain alginate is composed of D-mannuronic acid residues and L-guluronic acid residues. Initially alginate is produced by the cell in a poly-mannuronic acid form. The protein AlgG epimerizes some of the mannuronic acid residues into guluronic acid residues. The entire structure of AlgG has been proposed and is the model used as the foundation for this research. The focus of this current project has been to characterize the functional region of AlgG. During this project single amino acid mutations have been made in regions of algG with a hypothesized function. These constructs have then been expressed in a strain of *P. aeruginosa* with and algG deletion to determine the effect of the mutation on alginate production. Assays of these different mutants will give a better understanding of which regions of AlgG play a role in this proteins function.