

Exploration of enzymes targeting the biofilm and cell wall of pathogenic bacteria

Antimicrobial resistance is one of the most serious health-related problems humanity is facing. One way of making bacteria more susceptible to existing antibiotics is to weaken either the bacterial cell wall or the biofilm in which they grow. This can be accomplished by identifying enzymes that can degrade or modify carbohydrates in the bacterial cell wall (peptidoglycan) and/ or biofilm (polysaccharides like alginate and poly- β (1-6)-N-acetylglucosamine).

Peptidoglycan is a polymer consisting of sugars and amino acids that forms a mesh-like layer outside the bacteria plasma membrane to form the cell wall. Biofilms represent a group of microbes that bind to each other forming highly complex tertiary structures that adhere to a surface. The microbial cells are embedded into a self-produced extracellular matrix comprising of polymeric substances including polysaccharides, proteins, lipids and DNA.

The purpose of this project is to assess the applicability of glycoside hydrolases and polysaccharide oxidizing enzymes for dispersion of *Staphylococcus aureus* and *Pseudomonas aeruginosa* biofilms and for degradation of Gram positive peptidoglycan. You will learn how to work with pathogenic bacteria, express and purify enzymes, perform biofilm dispersion assays, perform bacterial viability assays and analyze peptidoglycan degradation.

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