

Pathogenic biofilms

Background

Most bacteria in natural environments exist as structured, aggregated communities known as biofilms. Cells within these communities undergo substantial physiological changes compared with their planktonic counterparts. Biofilms are implicated in a wide range of infections and can have significant, and sometimes severe, consequences for patients. These biofilms usually comprises of several bacterial species that play a role in the course of infection.

Our model Organism is *Stenotrophomonas maltophilia*, an opportunistic pathogen of clinical relevance involved in lung infections. *S. maltophilia* is a multidrug resistant strain and a good biofilm former.

In our group we focus on understanding the biofilm lifestyle of *S. maltophilia*. For this purpose we cultivate *S. maltophilia* alone (single species biofilms) and with other pathogens such as *Staphylococcus aureus* and *Pseudomonas aeruginosa* that frequently co isolated with *S. maltophilia* from infection sites. These biofilms are cultivated under flow or static conditions.

With Omics analysis and reporter fusion constructs we analyze the dynamics of *S. maltophilia* gene expression in single and in mixed species biofilms and investigate species interactions within these biofilms

With the global threat of antimicrobial resistance, the focus is now shifting to bacteriophages as a possible alternative for the treatment of bacterial infections.

We are therefore isolating phages for *S. maltophilia* and other pathogens from environmental and waste water samples and testing the efficacy of these phages against pathogenic biofilms.

Biofilm- phage interactions is also a major focus in our group.

Possible topics for a master thesis

- 1. Labelling *Klebsiella pneumoniae* and *Acinetobacter baumannii* (ESKAPE pathogens) with fluorescent genes for mixed species biofilm experiments, involving confocal microscopy**

2. Cloning reporter fusion constructs for the analysis of gene expression in *S. maltophilia* biofilms after phage exposure

3. Characterizing and sequencing isolated phages

- evaluating their efficacy on single and mixed species biofilms.
- Identifying possible phage receptor

Your Profile

- Degree studies in biotechnology, biology, biochemistry, microbiology, or a related field
- Basic laboratory experience
- Ability to work independently and in a structured manner

Interested ?

Please contact

Dr. Ifey Alio

+49 (40) 2395-21485

ifey.alio@uni-hamburg.de



