Technische Universität Braunschweig

INSTITUT FÜR MIKROBIOLOGIE

DSMZ

Master thesis:

Investigating the protein-machinery involved in vesicle formation of *Pseudomonas aeruginosa*

General description

Membrane vesicles (MVs) are produced by most bacteria, have diverse biological functions, display a great potential in biomedical applications and are promising vaccine candidates. Vesicle formation allows the release of bacterial compounds and therefore enables bacteria-bacteria interaction as well as host-pathogen interaction. During infection, Gram-negative *Pseudomonas aeruginosa* produces extracellular vesicles that encase and deliver a wide variety of molecules into the eukaryotic host cell. Hence, *P. aeruginosa* has become a model organism to study vesicle formation.

Project background

Recent studies revealed different pathways of vesicle formation. In Gram-negative bacteria, MVs can originate via lethal explosive cell lysis or via blebbing, where they get pinched off of the living cells. Therefore, vesiculation is considered as a new secretion system. Despite the biological importance of MVs, mechanisms governing vesicle biogenesis remain poorly understood. Recently, we have found a protein family to be involved in restructuring events of bacterial membranes. Therefore, we want to elucidate the role of these proteins as part of the protein-machinery crucial for vesiculation in *P. aeruginosa*.

Thesis content – Methodology

Our approach is the *in vitro* characterization of the proteins involved in vesicle formation. Your project will focus on the recombinant protein production and purification of these proteins. Therefore, you need to find a suitable expression host and adapt protocols for successful production and purification.

Methodology:

- Microbiological methods, cultivating different bacteria
- Optimizing recombinant plasmids/ vector design
- Improving transformation protocols and adapting cultivation
- Recombinant protein production and purification
- Protein analysis including SDS-PAGE, Western Blot

Interested?

Please contact us if you are interested and send your preferred starting date. English or German

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BRICS Braunschweig Integrated Centre of Systems Biology