

Projekt Title: Integration of glycopeptide resistance into the primary cell wall metabolism in enterococci

Supervisor: Anna Müller

Institute/group: Institute for Pharmaceutical Microbiology/Müller group

Webpage: <https://www.imp.uni-bonn.de/research/mueller-group>

Requirements: Interest in scientific questions, (basic) knowledge of molecular biology and biochemistry

Skills to be learned: Application of molecular biological methods, expression and purification of heterologously expressed fusion proteins (particularly integral membrane proteins), studying protein-protein interactions, establishment and implementation of enzyme activity tests, application of reporter-based assays, gene expression analyses using qRT-PCR.

Project Description: Glycopeptide antibiotics are drugs of last resort for the treatment of infections with resistant Gram-positive bacteria. They bind to the C-terminal d-alanyl-d-alanine moiety of the central peptidoglycan precursor lipid II stalling cell wall synthesis. Resistance to this class of antibiotics is conferred by enzymes encoded within the van resistance operon which structurally modify the binding motif on lipid II. Efficient incorporation of the modified precursor, ending in d-alanyl-d-lactate, into the growing peptidoglycan network of resistant enterococci requires biosynthetic adaptations within the lipid II cycle. The processing of the modified building block on the extracellular site of the membrane is of particular interest, as it requires tight coordination between different enzymatic processes to ensure the formation of a vital cell wall and proper cell division.

Support concept: Participation in ongoing research projects and independent lab work, participation in seminars, opportunity to pursue a master thesis with subsequent doctorate, support in applying for a research or doctoral scholarship, collaborations with national and international cooperation partners.

Interested to recruit and finance a suitable student by own funds: No