

Rapid spread of drug resistant bacteria has recently emerged as a serious threat to public health which could lead to up to 10 mln deaths annually in next 20 years. To combat drug resistant bacteria new types of antibiotics are needed. Unfortunately, research in antimicrobials is stagnant. Most of the “new” drugs entering clinical trials are just mere upgrades of already released drugs and as a consequence lack any structural and mechanistic novelty which is necessary to combat drug resistance. Lack of innovative drugs in conjunction with the rise of antibiotic resistant bacteria puts our safety in doubt.

Proposed research project aims to address this issue and expand the chemical space of antibiotics, overcoming the current lack of structural innovation though the use of new chemical scaffolds of abiotic cobalta bis(dicarbollide) also known as COSAN [3,3'-Co(1,2-C₂B₉H₁₁)₂]⁻. So far monofunctionalised COSAN derivatives showed great promise to combat bacteria, especially Gram-positive bacteria. Our plan is to pursue new chemical pathways which would afford bifunctionalised derivatives which we suspect to have higher and wider antibacterial activity than monofunctional derivatives. The ultimate goal of this project is to propose new antibiotic lead structure and insight into structure-activity relationship for COSAN derivatives.

