

Next-Gen Antibiotics: Metal-Boosted Nisin to Halt AMR

Miroslava Nedyalkova, Marco Lattuada and Fabio Zobi

University of Fribourg, Department of Chemistry, Chemin du Musée 9, CH-1700 Fribourg

miroslava.nedyalkoav@unifr.ch

Antimicrobial resistance (AMR) is a growing global threat projected to surpass cancer in mortality by 2050. Our research introduces a novel antimicrobial strategy by conjugating the peptide Nisin with Rhenium (Re) metal complexes. Combining Nisin's membrane-targeting ability with Re's redox activity and catalytic potential enables a multi-target "multi-hit" mechanism against bacteria. The conjugates aim to inhibit key processes in cell wall biosynthesis by targeting Lipid II and the MurJ transporter. Molecular dynamics simulations will guide the design by revealing how these conjugates interact with bacterial membranes at the atomic level. This work aims to develop stable, potent antimicrobials capable of overcoming existing resistance mechanisms.