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Cleavable Conjugates of Antibiotics and an Antibacterial Cell-Penetrating Peptide

A novel conjugated antibiotic combining kanamycin and an antimicrobial peptide effectively targets and kills antibiotic-resistant ESKAPE pathogens by disrupting biofilms.

Researchers at Purdue University have developed a conjugated antibiotic therapeutic in which kanamycin is conjugated to an anti-microbial peptide. The conjugated antibiotic has the ability to disrupt the biofilm resulting in kanamycin entering the cell. Once conjugated kanamycin enters the cell, the linkage between kanamycin and the peptide is broken due to the reducing environment of the cell cytosol. Synergistic anti-microbial activity of conjugated kanamycin was observed for both gram positive and gram negative bacteria. Whereas, the antibacterial activity was significantly less for either kanamycin or peptide alone. In vitro experiments showed that the kanamycin conjugate was more effective at killing 3 antibiotic resistant strains of ESKAPE pathogens than conventional treatments: vancomycin, linezolid, and kanamycin.

Advantages:

-Conjugate between 2 molecules with antibacterial activity

Potential Applications:

-Antibiotic drug delivery

-Antibiotic drug design

Related Publications:

Mohamed, Mohamed F., et al. "Targeting biofilms and persisters of ESKAPE pathogens with P14KanS, a kanamycin peptide conjugate." Biochimica et Biophysica Acta (BBA)-General Subjects 1861.4 (2017): 848-859

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Brezden, Anna, et al. "Dual targeting of intracellular pathogenic bacteria with a cleavable conjugate of kanamycin and an antibacterial cell-penetrating peptide." Journal of the American Chemical Society 138.34 (2016): 10945-10949.

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Intellectual Property:

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