Topologically designed xeno-peptide antibiotics

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The emergence of antibacterial resistance necessitates the need for new antibiotics with novel mechanisms of action[1]. Among the bacteria, Gram-negative bacteria are harder to target compared to Gram-positive bacteria due to their additional outer membrane[2]. Peptides are often used by various organisms as defense mechanisms against pathogens[3]. They typically work by making membrane pores. Another class of antibiotics are small moleules which target specific biomolecules, and some of them can be effective against gram negative bacteria. We show that we can design peptides which specifically attack key proteins necessary for bacterial survival, using the topology of the protein fold. They also retain the ability to make membrane pores. The effect of such peptides is probed using MTT viability assays. The mode of action is investigated using scanning electron microscopy (SEM) and electrophysiology experiments. In this talk, I will discuss the design principle and the corresponding antibacterial activity of such peptides.

References

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