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Structural insights into antibiotic action on the ribosome

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The ribosome is a cellular ribonucleoprotein machine responsible for protein synthesis. Due to its central role in a cell, the ribosome is a target of a large number of antibiotics. Understanding the molecular mechanisms, by which antibiotics inhibit translation, is of key importance for elucidating the bases of antibiotic resistance and developing novel antibacterial and antifungal therapeutics. Biochemical methods and X-ray crystallography were applied to gain high-resolution insights in the mechanisms of antibiotic action. Since the appearance of first crystal structures of ribosomal subunits, several mechanistic strategies used by antibiotics have been discovered. The most frequent strategy involves direct blocking of the polypeptide exit tunnel or of the binding sites of tRNAs and other extraribosomal factors involved in translation. Here in this talk, the author will discuss novel structural strategies involving the allosteric action of antibiotics, which may provide insights into development of new potent drugs.

Biography

Andrei A Korostelev obtained his PhD from Florida State University in 2003. He then moved to Santa Cruz, CA to pursue Postdoctoral studies in the laboratory of Harry F Noller. In 2010, he established a laboratory at the RNA Therapeutics Institute and Department of Biochemistry & Molecular Pharmacology, University of Massachusetts Medical School. He uses biochemical approaches and X-ray crystallography to study the mechanisms of protein synthesis on the ribosome and regulation of translation. His work resulted in more than twenty highly cited manuscripts published in Nature, Cell, PNAS, EMBO Journal, and other reputable journals. He serves as an editorial board member of Biochimie.

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