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ENGINEERING ANTISENSE OLIGONUCLEOTIDES AS ANTIBACTERIAL AGENTS

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In the last decade, antibacterial drug resistance has emerged as a major challenge to modern medicine due to the rise of many bacterial pathogenic strains that are resistant to many antibiotics. Here, we present a novel strategy for the design and applications of antisense oligonucleotides (ASOs) as novel antibacterial agents that target specific bacterial mRNAs. The ASOs are coupled with cell penetrating oligopeptides that deliver them into the cell. We use several different mRNAs as molecular targets. These mRNAs are responsible for the function of different biosynthetic pathways in bacteria that synthesize essential metabolites. We demonstrate a growth inhibition of various pathogenic bacteria, including *Staphylococcus aureus, Listeria monocytogenes, and Escherichia coli by our ASOs*. Our approach is very promising since we have achieved 100% efficiency of the bacteria growth inhibition by our designer ASOs. We believe that our approach for engineering novel synthetic antibacterial agents based on ASOs is applicable to the rapid development of novel classes of antibiotics.

Biography

Robert Penchovsky is an Associate Professor of Genetics, Synthetic Biology, and Bioinformatics and Molecular Evolution at the Faculty of Biology, Sofia University "St. Kliment Ohridski", Bulgaria, where he obtained his Master's degree in Biochemistry and Molecular Genetics and his Associate's degree in Applied Computer Sciences. He earned his Doctoral's degree in Genetics from Cologne University, Germany while researching in the fields of microfluidics and DNA computing for the Fraunhofer Gesellschaft at Schloss Birlinghoven in Sankt Augustin (near Bonn), Germany. He did his Postdoctoral Study in the fields of computational and RNA synthetic biology at Yale University, New Haven, CT, USA.

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