

Synthetic biology approach for biosynthesis of aromatic polyketide antibiotics

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Antibiotics belong to the most successful form of chemotherapy developed in the twentieth century. However, their extensive use inevitably selects for resistant microbes. Therefore, there is a continuing and cyclical need for new efficient antibiotics against these multi-resistant bacteria. Antibiotics have been discovered by screening natural products produced by bacteria and fungi for antibiotic activity and subsequently chemically modifying these structures to incorporate additional desirable pharmacological properties. During the last sixty years, large amount of different types of antibiotics has been discovered and characterized. Although it is estimated that only about 3% of the natural products potential has been discovered yet, it seems obvious that the antibiotics that were easy to discover have already been found, and it is likely that the classical search for new antibiotics will involve a substantial amount of expensive and laborious research. However, the current possibilities of new technologies (molecular biology approaches, gene manipulations, genomics, and synthetic biology) open up exciting possibilities for the discovery of new antibiotics. In this respect, synthetic biology is a very promising approach. This emerging area of interdisciplinary research can be defined as the design and construction of novel artificial

biological pathways, organisms or devices, or the redesign of existing natural biological systems for useful purposes. We used this strategy for testing of heterologous production of aromatic polyketides based on the first landomycine biosynthetic genes *lanABCFDLE*, under the control of two strong promoters, *ermEp** and *kasOp** and optimised RBS site. Although the production was not higher than in its native form, this approach seems to be promising, since it enables to combine various genes from other aromatic polyketide gene clusters to produce new structural polyketide motifs.

Biography

Renata Novakova has completed her PhD in Molecular Biology from the Slovak Academy of Sciences in 1998 and postdoctoral studies from Max Planck Institute of Molecular Physiology in Dortmund. She has worked as Group Leader in the Department of Genomics and Biotechnology in Institute of Molecular Biology of Slovak Academy of Sciences (Bratislava, Slovakia). Her main research interests include investigation of antibiotics production and regulation in *Streptomyces*. She has published 26 papers in reputed journals, which are cited by more than 140 citations in Web of Science.

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