

Mupirocin and batumin – New areas of application of known antibiotics

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Development of new antibiotics is recognized as a global problem. We have to admit that we have been rather prodigal with the natural resources of antibiotics. The idea that one bioactive compound may exhibit many useful activities by targeting many unrelated molecular targets is getting popularity. This work was focused on two antibiotics, mupirocin and batumin, – synthesized by *Pseudomonas*, which are active against drug resistant *Staphylococcus aureus*. Our study was driven by a curiosity: what could be the biological sense for the rhizobacterial *Pseudomonas* to produce these rather complex and energy expensive compounds, which specifically inhibit growth of bacteria not common for the rhizosphere? Pharmacophore based search, molecular docking and experimental trials demonstrated that these antibiotics may have multiple molecular targets. Pathogenic staphylococci were inhibited by targeting tRNA synthetases and fatty acid biosynthesis. Another possible target was the bacterial MotB flagellar motor protein. It was shown that batumin can immobilize phytopathogenic bacteria leaving them alive but not active. Moreover, possible molecular targets were found among eukaryotic cancer related proteins. Mupirocin and batumin showed an extremely high and specific cytotoxicity against several cancer cell lines including melanoma MEL-1 and Lewis lung carcinoma. By preliminary results it was supposed that these compounds caused a cell cycle arrest at G1/S checkpoint via activation of retinoblastoma protein and down-regulation of the cyclin D1. Our results showed that the same antibiotics, or their target specific derivatives, may find much more proper and broader use in medicine, veterinary and agriculture.

Biography

Oleg Reva has obtained his PhD in 1995 from Institute of Microbiology and Virology, National Academy of Science of Ukraine. He has his Post-doctoral fellowship in 2002-2004 in High School of Medicine, Hannover, Germany. He is an Associated Professor in the Centre for Bioinformatics and Computational Biology at the University of Pretoria. He has published more than 90 papers cited in 1700 in other publications. Fields of interest are bioinformatics for biotechnology and medicine, genome sequencing, comparative genomics and molecular docking.

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