DOI 10.18699/BGRSSB-2018-058

Analysis of biosynthetic gene clusters of *Rhodococcus* sp. S10

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Key words: siderophores, secondary metabolites, NRPS, *Rhodococcus*

Motivation and Aim: Bacteria produce a broad spectrum of biologically active natural compounds, including peptides, synthetized by using large multifunctional nonribosomal peptide synthetases (NRPSs) or polyketide synthases (PKSs). Among microbial peptides the compounds with a metal chelating activity draw a particular interest. Siderophores are secreted low molecular weight compounds, which can chelate Fe (III) with an extremely high affinity [1]. Bacteria from the genus *Rhodococcus* have been shown to produce a wide range of secondary metabolites [2]. Nowadays, the only known siderophores produced by members of the genus *Rhodococcus* include heterobactin A and rhodobactin [2]. The aim of this study was to identify additional biosynthetic gene clusters in the genome of *Rhodococcus* sp. S10.

Methods and Algorithms: *Rhodococcus* sp. S10 genome was analyzed for secondary metabolite and siderophore biosynthetic gene clusters using antiSmash software; RAST software was used for gene annotation [3].

Results: One hundred two biosynthetic gene clusters were predicted to be present in the genome of *Rhodococcus* sp. S10 by the antiSMASH software. Among those, two putative PKSs and ten putative NRPSs gene clusters were identified. Two NRPS clusters have a high sequence homology to known siderophores. Thus, cluster 99 has 100 % similarity to heterobactin gene cluster of *R. qingshengii* BKS 20-40, *Rhodococcus* sp. ADH and *R. erythropolis* SK121; while cluster 56 has 57 % similarity to albachelin gene cluster of *R. qingshengii* BKS 20-40 and *R. erythropolis* CCM2595. Five NRPS gene clusters of *Rhodococcus* sp. S10 did not show any homology to any known bacterial NRPS clusters.

Conclusion: Analysis of *Rhodococcus* sp. S10 genome allowed us to identify a number of putative biosynthetic gene clusters. High homology of several *Rhodococcus* sp. S10 gene clusters to genes involved in siderophores synthesis encourages the search for new metabolites with metal chelating activity, which might promote *Rhodococcus* sp. S10 growth and adaptation to the extreme environments.

Acknowledgements: This work was performed within the Program of Competitive Growth of Kazan Federal University and supported by RFBR (grant no. 16-34-60200) and the scholarship of the President of the Russian Federation for young scientists and graduate students.

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