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Unraveling of gene expression control in genome-reduced bacteria

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Mycoplasmas of class Mollicutes represent extremely reduced bacteria, yet are capable of self-replication without the aid of eukaryotic cell. Thus, they are good models to study the basic principles of the organization of living cell. In the present work, we used a combination of high-throughput technologies to elucidate the transcription control network in a model organism *Mycoplasma gallisepticum*. Using RNA-seq we identified transcription units and performed identification and activity quantitation of promoters of *M. gallisepticum*. We used comparative genomics and promoters' identification across different Mollicutes species as well as a set of perturbation models to identify putative regulatory sequences. We used ribosomal profiling and proteomics to study the transfer of genetic information to the protein level. We identified that the significant amount of transcription regulation in *M. gallisepticum* is achieved via weak determinants of the core promoter. In addition *M. gallisepticum* features conditional terminators, which may undergo read-through under the stress and contribute to transcription profile. Ribosomal profiling demonstrated that while under exponential growth translation is near equal to transcription under stress ribosome demonstrates selectivity towards particular transcripts. Analysis of cross-species promoters' conservation demonstrated that transcriptional control is largely species specific, while the most conserved transcriptional regulators control cell cycle.

Biography

Vadim Govorun works at the Federal Research and Clinical Center of Physical-Chemical Medicine of FMBA since 1987; since 2015 till present as General Director. In 1991, he got Doctorate (PhD) in Biochemistry and in 2000, Senior Doctorate (Doctor of Biology Sciences) in Biochemistry and Molecular Biology. In 2003, he became a Professor of Biochemistry and in 2011, Corresponding Member of the RAS. Since 2006 till present, he is the Head of Department of Proteomics Shemyakin-Ovchinnikov Institute of bioorganic chemistry, RAS and Head of Chair, Molecular Medicine, Moscow Institute of Physics and Technology. He has published more than 240 scientific articles and 10 Russian patents.

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