

REGULATION OF GENE EXPRESSION BY SMALL NON-CODING RNAS

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Abstract

Small non-coding RNAs have gained recently much interest, as it has become evident that they are wide-spread in both pro- and eukaryotes and play important roles in post-transcriptional regulation of gene expression. These molecules present intriguing computational challenges: How can small RNA-encoding genes be identified based on the genome sequence? How many such genes are present in a genome? How can their gene targets be identified? What are the properties of regulation by small RNAs in comparison to other types of regulation, such as transcriptional regulation and protein-protein interaction? How is post-transcriptional regulation by small RNAs integrated with transcriptional regulation in the cellular networks? In my talk I will touch upon these questions and describe our attempts to address them. Intriguingly, viruses also encode regulatory RNAs, some of which play a role in cross-talk with the host. By a combination of computational and experimental approaches we identified human targets of viral microRNAs and showed that viruses use microRNAs for evasion of the host immune system. In my talk I will elaborate on these and other interesting human targets of viral microRNAs. Our results have promising therapeutic applications for both immunosuppressive therapy by mimicking the role of the viral microRNAs and for anti-viral therapy by using anti-sense molecules against them.