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Transcription interference networks coordinate the expression of pseudorabies virus genes

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The genomic structure of herpesviruses shows a modular organization whose basic units are the convergently oriented nested gene clusters each with coterminal 3'-ends. In this study, we report the detection of a genome-wide expression of antisense non-coding RNAs from the genome of an alpha-herpesvirus called pseudorabies virus. We put forward the Transcription Interference Network (TIN) hypothesis in an attempt to explain the genomic design and existence of the antisense RNAs in a common interpretation framework. The TIN hypothesis suggests the existence of a novel genetic regulatory layer, which controls the cascade of herpesvirus gene expression at the level of the transcription. According to our model, the genes and gene clusters mutually inhibit each other's transcription through the collision of their transcriptional machineries at the various overlapping transcription units. The TIN might represent a mechanism, which plays a central role in the programmed step-by-step switches of transcription between kinetic classes and subclasses of viral genes. The proposed model may be not restricted to the herpesviruses, but might explain the mechanism of an important regulatory system existing in other organisms belonging to various phyla.

Biography

Zsolt Boldogkői received his Ph.D. degree (1999) in molecular biology from Szent Istvan University at Gödöllő and had post-doctoral training at University of Bonn. He received his DSc degree (2008) at University of Szeged. His primary field of interest is the molecular biology of herpes viruses with special emphasis on the regulation of gene expression analysis and utilization of herpesviruses as tools in various fields of biology including neurobiology and cardiology. He has published more than 60 papers in reputed journals. Currently, Zsolt Boldogkői is the head of Department of Medical Biology at Faculty of Medicine of University of Szeged.

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