DESCRIPTION FOR THE GENERAL PUBLIC

Title: *The role of retrogenes in splicing regulation*

Our understanding of functions played by retrocopies of protein coding genes has undergone a significant evolution over recent years. These sequences, initially considered inactive pseudogenes resulting from reverse transcription, turned out to play important biological roles. They do not only have an influence on the complexity and diversity of genomes, transcriptomes and proteomes of various organisms from the world of plants and animals, but they are also involved in various molecular mechanisms and cellular pathways, including immune response and tumorigenesis. Despite the continuous emergence of new reports focused on these interesting sequences, their functions are vaguely understood and described. Our knowledge of the roles played by retrocopies is often limited to the results obtained either from individual case studies or from large bioinformatic screening analyses that usually lead only to predictions of retrocopies course of action.

One of barely studied functions of retrocopies is their influence on the transcription process of other genes, in particular genes in which introns they are located. Our preliminary studies suggest link between expression of different splice variants of host gene and transcription of nested retrocopy. Moreover, we presume that presence of active retrocopy (retrogene) in intron of other gene can regulate RNA splicing by influence on the dynamic of the process of host gene transcription. Therefore, in the proposed project, we are going to verify the above-described potential function of retrocopies. The research will focus on retrocopies present in the human genome and will utilize both bioinformatic and modern experimental methods. In addition to large-scale identification of retrocopies potentially involved in regulation of splice variants expression, selected cases will be subjected to detailed experimental studies including expression analysis, silencing of the retrocopy by genomic deletion of the promoter, and analysis of transcriptional dynamics before and after the deletion of the retrocopy.

The proposed research will not only enrich our understanding of basic biological processes including transcriptional interference, splicing regulation and molecular interplay between the retrocopy-gene pair, but also will be important for research on human biology and molecular genetics, as well as medical research.