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Ondrej Slaby

Masaryk University, Czech Republic

Translational potential of non-coding RNAs in oncology

For many years, central dogma of molecular biology has been that RNA functions mainly as an informational intermediate between DNA sequence and its encoded protein. One of the great surprises of modern biology was discovery that protein-coding genes represent less than 2% of total genome sequence, and subsequently that almost 90% of human genome is actively transcribed. Thus, human transcriptome was found to be more complex than collection of protein-coding gene transcripts and their splice variants. Recent evidences have clearly shown that non-coding RNAs (ncRNAs) play major biological roles in cellular development, physiology and pathologies. NcRNAs are grouped into two major classes based on transcript size; small ncRNAs and long ncRNAs. Each of these classes can be further divided, whereas novel subclasses are still being discovered and characterized. In last ten years, class of small ncRNAs called microRNAs was studied most intensively with more than fifty thousand hits at PubMed database. Huge amount of evidence has been accumulated to describe molecular mechanisms of novel RNA species functioning, providing insight into their functional roles in cellular biology and in human disease, especially in cancer. Knowledge regarding ncRNAs functioning in cancer biology and their translational potential to serve as disease biomarkers and novel therapeutic targets in cancer will be summarized and demonstrated on several examples based on our recent observations.

Biography

Ondrej Slaby is a Professor of Medical Biochemistry at the 1st Faculty of Medicine at Charles University in Prague, Czech Republic. He works as Research Group Leader at the Department of Molecular Medicine, Central European Institute of Technology (CEITEC), Masaryk University (Brno, Czech Republic) and as a Scientific Secretary at the Masaryk Memorial Cancer Institute in Brno. He has published extensively in the field of non-coding RNAs and solid cancer with special focus on their translational potential in diagnostics and as the therapeutic targets (h-index 31, Sum of the times cited without auto-citations > 3500). Since 2018, he is a chair of Czechoslovak Biological Society. In 2010 and 2012, he received Award of Czech Society for Oncology, in 2016 an Award of Czech Medical Society and 2014 and 2016 Award for Medical Research of Czech Minister of Health, Novartis Discovery Award 2017.

on.slaby@gmail.com