

Non-Coding RNAs in Oncology: From Biomarkers to Therapeutic Targets

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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 an Associate Professor of Biochemistry at the Faculty of Science at Masaryk University in Brno and the 1st Faculty of Medicine at Charles University in Prague, Czech Republic. He also works as research group leader (group Molecular Oncology II) at the Central European Institute of Technology at Masaryk University in Brno and as a scientific secretary at the Masaryk Memorial Cancer Institute in Brno. Dr. Slaby has published extensively in the field of non-coding RNAs and cancer with special focus on their translational potential in diagnostics and as the therapeutic targets.