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## MicroRNAs in oncogenesis: Size doesn't matter

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Protein-coding genes comprise only 3% of the human genome, while the vast majority of the genome is comprised of non-coding genes; RNAs but do not code for proteins. MicroRNAs (miRNAs) are short non-coding RNAs that play critical roles in numerous cellular processes through post-transcriptional regulating functions. During the last decade, we and others have reported that unique miRNA signatures associate with the pathogenesis and progression of several types of cancer. MiRNAs can act as tumor suppressors or behave as oncogenes depending on cellular context. In the last few years, our attempts were focused to design potent miRNAs as anticancer drugs and drug targets. Typically, one strand of a miRNA duplex is bound by argonaute proteins, loaded on microRNA-induced silencing complex (miRISC), and guides the miRISC to target mRNAs. This strand is called “lead” or “guide” strand. The other strand is usually mostly degraded and presented in the cell at much lower level. This strand is called “passenger” or “star” strand and designated as miR\*. We recently found that the passenger strand of miRNAs (miR\*) can have potent biological effects. We demonstrated that, for example, miR-16-1\* and miR-16-2\* inhibits primary tumor growth, metastasis, and chemoresistance and invasiveness of human cancer cells. Noteworthy, star miRNAs have different, although strongly overlapping functions with leading strand miRNAs. Importantly, systemic delivery of miR\* *in vivo* have promising anti-tumor effects which prompt us to expand use of miR\* in clinical trials for the treatment of relevant cancer types. Our findings indicate that deregulation of miRNA expression is a driving force in oncogenesis that can be utilized to target tumor cells.

### Biography

Rami I Aqeilan has completed his PhD from Hebrew University of Jerusalem and Post-doctoral studies from Thomas Jefferson University – Kimmel Cancer Center. He is the Chairman of Cell Biology, Immunology and Cancer Research division at Hebrew University-Hadassah Medical School. He has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of *Cell Death & Disease*, *Cell Death and Discovery* and *Journal of Cellular Biochemistry*.

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