

MicroRNAs present exciting opportunities for cancer therapy and diagnosis

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As many as 50 percent of all human protein-coding genes are regulated by microRNA (miRNA) molecules. While some miRNAs impact onset and progression of cancer, others can actually suppress the development of malignant tumors and are useful in cancer therapy. They can also serve as potential biomarkers for early cancer detection. In a new issue of *Cancer Biomarkers*, investigators report on non-coding miRNAs as appealing biomarkers for malignancy.

"MiRNA-based therapies are attractive partly due to the fact that these molecules can target multiple genes in different signaling pathways simultaneously," says guest editor Pier Jr Morin, PhD, MBA, Assistant Professor of Biochemistry, Department of Chemistry and Biochemistry, Université de Moncton, New Brunswick, Canada. "In addition to their therapeutic potential, miRNAs are released into the circulation, and measurement of such species in plasma and serum samples highlights the possibility of leveraging these molecules as potential biomarkers for early cancer detection, prognostic assessment, and evaluation of therapeutic response in [cancer patients](#)."

Six articles follow Dr. Morin's editorial, each discussing the diagnostic and therapeutic potential of miRNAs across a variety of cancer malignancies.

In "The Value of MiRNA in Diagnosing Thyroid Cancer: A Systematic Review," L. Lodewijk and colleagues address the diagnostic potential of miRNAs in [thyroid cancer](#).

Niamh M. Hogan, Myles R. Joyce, and Michael J. Kerin discuss the need to identify new biomarkers to detect colorectal cancer in its early stages. It has been shown that five-year patient survival increases from 10 percent at stage IV detection to more than 90 percent at an early stage, an important finding for this fourth most common cause of death from cancer. Investigators outline the advantages of current methods of colorectal [cancer detection](#), identify challenges, and assess miRNA diagnostic potential. The stability of miRNAs and their presence in [body fluids](#) can be useful for the development of non-invasive [malignancy](#) detection methods.

"MicroRNAs hold enormous potential to revolutionize diagnostics and screening in colorectal cancer," says lead investigator Professor Michael J. Kerin, MCh, Department of Surgery, School of Medicine, National University of Ireland. "Not only have they been shown to be differentially expressed in colorectal cancer, microRNAs may also be capable of providing crucial information regarding response to therapy and core tumor characteristics."

In further articles, André Odjélé, Dhany Charest, and Pier Jr Morin review the progress made in recent years in identifying miRNAs that could assist in diagnosing aggressive brain tumors in "MiRNAs as Important Drivers of Glioblastomas: A No-brainer?" The role of miRNAs in non-melanoma skin cancer (NMSC) and recommendations for improving NMSC-related miRNA research are the subjects of a review article by Michael Sand, Daniel Sand, Peter Altmeyer and Falk G. Bechara. Fang Wang, Guo-Ping Sun, Yan-Feng Zou, Ji-Qing Hao, Fei Zhong, and Wen-Jun Ren address miRNAs and their diagnostic and prognostic potential in gastric cancer. Wrapping up the issue, Jason Harquail, Sami Benzina, and Gilles A. Robichaud examine miRNAs in a focus on breast cancer, providing a detailed account of tissue dynamics related to tumor metastasis.

"Clearly, the discovery of miRNAs has led to exciting opportunities for [cancer therapy](#) and diagnosis. Their regulation of key molecules and signaling pathways involved in cancer-related processes as well as their stability in body fluids further reinforce their attractiveness as therapeutic targets and biomarkers in cancer," Dr. Morin concludes. "While several hurdles, including efficient delivery and potential off-target effects, remain to be surpassed before miRNA-based therapies reach the clinic, recent advances in the field warrant a closer look at the potential roles that these molecules could play in cancer."

More information: MiRNAs in Cancer: Non-coding RNAs as Appealing Biomarkers for Malignancy, Guest Editor: Pier Jr Morin, *Cancer Biomarkers*, Volume 11, Issue 6 (December 2012).
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