Perspective
Volume 13:6, 2022

Journal of Molecular Biomarkers & Diagnosis

ISSN: 2155-9929 Open Access

Insights of Circulating miRNAs as Tumor Markers

Shelley Wilkinson*

Department of Molecular Biology, University of Berlin, Germany

Introduction

MicroRNAs (miRNAs) are endogenous non-coding small RNA molecules that can be secreted into the bloodstream and exist in extremely stable forms. Circulating miRNAs, like intercellular miRNAs, participate in numerous biological process regulation and are expressed abnormally in abnormal or pathological conditions. Changes in the quality and quantity of circulating miRNAs are linked to cancer initiation and progression and can be easily detected using basic molecular biology techniques. As a result, considerable effort has been expended in identifying appropriate extracellular miRNAs for noninvasive biomarkers in cancer. However, several obstacles must be overcome before the practical application can begin. We discuss several aspects of circulating miRNAs in this review: biological function and basic transport carriers; extracellular cell communication process; roles as reliable cancer biomarkers and use in targeted cancer therapy; and clinical application challenges.

MicroRNA (miRNA) was discovered in *Caenorhabditis elegans* in as the product of the lin-4 gene. Small non-coding RNAs (19-22nt) undergo post-transcriptional regulation via mRNA cleavage or translation repression, depending on the degree of complementarity between miRNA and mRNA. When there is a perfect match, mRNA cleavage occurs, whereas an imperfect combination results in gene repression.

Description

Numerous studies have confirmed the role of microRNAs in a variety of cancer-related biological processes, including proliferation, differentiation, apoptosis, metabolism, and invasion, metastasis, and drug resistance. Cancer's pathological origin has also been proven to be directly related to miRNA dysregulation. Furthermore, miRNAs are tissue specific. MiRNA expression profiles in various tumours differ [1-3]. So far, the fundamental biogenesis and function of intracellular miRNAs have been discussed in a variety of contexts. Bartel was the first to describe the presence of extracellular RNAs in serum/plasma, and various miRNAs have been shown to exist in a stable cell-free form in body fluids and other extracellular environments, including plasma, serum, urine, saliva, seminal, ascites, amniotic pleural effusions, and cerebrospinal fluid.

Colorectal cancer (CRC) is the third most common cancer in the world in terms of incidence. Modifiable and preventable risk factors account for a sizable proportion of cases and deaths. A sedentary lifestyle, excess body weight, heavy alcohol consumption, smoking, an unhealthy diet, and physical inactivity were identified as preventable risk factors for colorectal cancer in several studies. Furthermore, secondary prevention through screening is critical in reducing the growing global burden of CRC. MicroRNAs (miRNAs) are a class of small non-coding RNA molecules that regulate gene expression post-transcriptionally through mRNA cleavage, mRNA destabilisation, or translation inhibition.

MiRNAs are extensively implicated in many complex physiological processes, including cell proliferation, metabolism, and signal transduction; however, it is unclear whether they play a causal role in tumorigenesis or if changes in tissues and blood are a result of cancer. Several studies looked into the role of miRNAs as cancer biomarkers, measuring the area under the curve (AUC), sensitivity, and specificity in relation to dysregulation in a single miRNA or a panel of miRNAs [4,5]. Many of them reported encouraging findings; however, some dysregulations appear to be common in most cancers, possibly due to their role in cancer-related biological processes rather than aetiology targets.

Conclusion

The aetiological link between miRNA dysregulation and CRC could be explained by a number of physiological processes that are also related to CRC risk factors (such as obesity and inflammation) and may be influenced by these molecules. A few studies, for example, looked into the relationship between obesity and the circulating miRNA profile, and found that a number of these molecules were over-expressed in obese people. Furthermore, a pattern of circulating miRNA expression linked to low-grade inflammation is becoming more widely recognised, opening up new avenues for research into cancer intermediate biomarkers. However, there was little consistency across the included studies, making it difficult to identify specific miRNAs that were consistently validated. Understanding the mechanisms by which miRNAs become biologically embedded in cancer initiation and progression may aid in the development of more effective cancer prevention and treatment strategies.

References

1. Ma R. Z, I. Russ, C. Park and D.W. Heyen, et al. "Isolation and characterization of 45 polymorphic microsatellites from the bovine genome." *Anim Genet* 27 (1996): 43-47.
2. Strassmann, Joan E, C.R. Solis and K. Barefield, et al. "Trinucleotide microsatellite loci in a swarm-founding neotropical wasp, *Parachartergus colobopterus* and their usefulness in other social wasps." *Mol Ecol* 5 (1996): 459-461.
3. Postlethwait, John H, Stephen L. Johnson and Clare N. Midson, et al. "A genetic linkage map for the zebrafish." *Science* 264 (1994): 699-703.
4. Broun, Pierre and Steven D. Tanksley. "Characterization and genetic mapping of simple repeat sequences in the tomato genome." *Mol Gen Genet* 250 (1996): 39-49.
5. Coote T and Michael William Bruford. "Human microsatellites applicable for analysis of genetic variation in apes and Old World monkeys." *J Hered* 87 (1996): 406-410.

***Address for Correspondence:** Shelley Wilkinson, Department of Molecular Biology, University of Berlin, Germany, E-mail: ShelleyWilkinson2@gmail.com*

Date of Submission: 02-Jun-2022, Manuscript No. jmbd-22-74374; **Editor assigned:** 04-Jun-2022, Pre QC No. P-74374; **Reviewed:** 16-Jun-2022, QC No.Q-74374; **Revised:** 21-Jun-2022, Manuscript No.R-74374; **Published:** 28-Jun-2022, DOI: 10.37421/2155-9929.2022.13.530

How to cite this article: Wilkinson, Shelley."Insights of Circulating miRNAs as Tumor Markers." J Mol Biomark Diagn 13 (2022): 530.