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Role of Extracellular MicroRNAs on Inflammation

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Introduction

The inflammatory response, which encompasses defence mechanisms fighting against infections and injuries, is a quick and intricate physiological process. The loss of homeostasis between the host and immune cells is frequently used to describe inflammation. Numerous clinical disorders, such as chronic inflammation, autoimmunity, neurodegenerative illnesses, and cancer, are characterised by dysregulation of the inflammatory response. Using bacterial lipopolysaccharide (LPS), peptidoglycan, and viral double-stranded RNA under experimental settings, previous findings in inflammatory processes have highlighted the physiological and cellular foundation of inflammation. Initial inflammatory [1-3] cues are conveyed to the immune cell nucleus in response to intracellular signals, and these cues trigger different transcriptional modifications.

Exosomes, microvesicles, and apoptotic bodies are the three forms of EVs that may be distinguished based on their size and biogenesis. EVs are small vesicles (30-10,000 nm in diameter). Nearly all living cells have EVs, which are attracting interest as a novel mediator of cell-to-cell communication and a variety of biological processes and regenerative abilities. Proteins, mRNA, long non-coding RNA, circular RNAs, RNA, and miRNA are only a few of the substances carried by Evs. Endogenous non-coding RNA molecules known as miRNAs use exosomes as transporters to facilitate intercellular communication and control protein synthesis while preventing oxidation in the harsh extracellular environment. Extracellular miRNAs play a variety of roles in cell migration, apoptosis, proliferation, and inflammatory processes.

Description

Several extracellular miRNAs have recently been revealed to be expressed in immune cells, influencing the strength of their responses from the standpoint of inflammatory reactions. Furthermore, extracellular miRNAs' structural stability has been well acknowledged, and they are currently thought of as possible noninvasive biomarkers for the monitoring and prognosis of inflammatory diseases. In this article, extracellular miRNAs are discussed in general with an emphasis on their function in inflammatory disorders in animals.

Short non-coding RNA, which includes miRNAs, is an important component of cellular transcriptional regulation. A precursor miRNA (pre-miRNA), which can then enter the cytoplasm to produce a mature miRNA and ultimately be directed to its targeted mRNA, is created when miRNAs are translated into primary miRNA transcripts [4,5] (pri-miRNAs). In general, miRNA can attach to the target gene at its 3′-UTR by imperfect pairing, which decreases the stability of mRNA or the translation of the target gene. They play a crucial role in the control of practically every biological process, particularly signal transduction and cell differentiation, proliferation, and death. Furthermore, miRNAs control transcription in a variety of ways, including as the particular interaction between miRNA and mRNA, the targeted DNA sequence, the control of miRNA localization, and the additive effects of other miRNAs.

Conclusion

Due to their selective extracellular secretion, EV-miRNAs are thought to be more sensitive and specific than whole-cell miRNAs or free miRNAs. The widest variety of downstream signalling may result from the many miRNA payloads. The selection of EV-miRNAs is very selective and can be controlled by particular endogenous target sequences. By encouraging the combination of RNA-binding proteins (such as hnRNPA2B1, SYNCRIP), the short sequence motifs overexpression in miRNAs (EXO-motifs) in exosomes can govern the sorting of miRNAs. The GGAG motif is recognised by the heterogeneous nuclear ribonucleoproteins (hnRNPs), which also recognise the particular sequence (GCUG) at the 3′end of miRNA, to mediate miRNA packing into exosomes.

The sorting of miRNAs also involves membrane proteins and the miRNA-induced silencing complex. One of the ways for sorting is the pathway that is dependent on membrane proteins. Further research is required since miRNA sorting is a complex process without a clear, uniform sorting mechanism at this time. Extracellular vesicles (EVs) containing miRNAs, which control inflammatory signals, are released by cells in response to hypoxia. These signals can be recognised by particular receptors, changing the related signalling pathways' downstream immune cell activation and the state of inflammation.

References

1. Mitsche, Matthew A., Jeffrey G. McDonald and Helen H. Hobbs. "Flux analysis of cholesterol biosynthesis in vivo reveals multiple tissue and cell-type specific pathways." *Elife* 4 (2015): e07999.
2. Tchernof, Andre, and Jean-Pierre Després. "Pathophysiology of human visceral obesity: an update." *Physiol Rev* (2013).
3. Tall, Alan R., Laurent Yvan-Charvet and Marit Westerterp. "Cholesterol efflux: a novel regulator of myelopoiesis and atherogenesis." *Arterioscler Thromb Vasc Biol* 32 (2012): 2547-2552.
4. Yvan-Charvet, Laurent, Fabrizia Bonacina, Rodolphe Renè Guinamard, and Giuseppe Danilo Norata. "Immunometabolic function of cholesterol in cardiovascular disease and beyond." *Cardiovasc Res* 115 (2019): 1393-1407.
5. Zhang, Shumin. "Natural history of mevalonate kinase deficiency: A literature review." *Pediatr Rheumatol* 14 (2016): 1-10.

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