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## Role of MicroRNAs in shaping innate immunity and as therapeutic targets for autoimmune diseases

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The existence of life is governed by few but essential regulated life processes such as duplication of DNA, RNA synthesis from DNA and protein synthesis from the RNA known as replication, transcription and translation, respectively. The micro(mi)RNAs are a family of small RNAs which control cellular transcribed RNAs and subsequently affect protein levels for numerous biological processes including Immune pathways. This issue of the *International Reviews of Immunology* showcases innate immunity and autoimmune disorders, and how miRNAs influence mechanisms involved with both.

Low-grade chronic inflammation or metaflammation could be induced by excessive nutrient and energy which may result in cellular stress and an array of metabolic disorders such as diabetes, heart diseases, and others. In the first review, Faraj et al. discuss how gut bacteria and modern food (associated with lifestyle) are potential sources of chronic exposure to low levels of endotoxin reaching blood system via gut, that in turn promote metabolic endotoxemia leading to dysregulation of the metabolism of the host. This observation was further supported through analyzing TLR4-deficient mice which lack a capability to sense endotoxin. The review also questioned the methodology for endotoxin measurement, otherwise essential to evaluating associations with chronic inflammation, metabolic endotoxemia, and metabolic disorders (Fig. 1).


Innate immunity consists of two main components: cellular and humoral. Various immune cells (macrophages, dendritic cells, and others), and non-immune cells (such as fibroblast, epithelial cells) constitute the cellular component. The Complement system, Defensin, and Pentraxin represent humoral components. The second review article by Augusto et al., describes the essential role of Pentraxins in innate immunity, through

clearance of microbial infection, mainly by opsonization. The authors also highlighted the importance of Pentraxins in clearing modified self antigens, which may be involved otherwise in tumorigenesis through mediating chronic inflammation. Overall, this article provides substantial insight into the multifactorial pathogenesis of autoimmune diseases, which may lead to designing of superior therapeutics against inflammatory diseases including autoimmunity (Fig. 1).

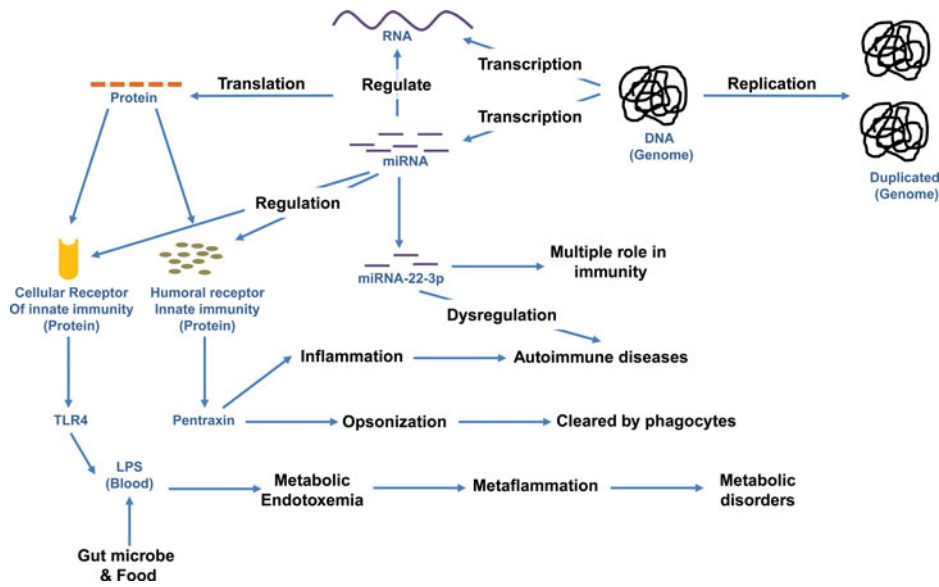
The miRNAs play a crucial role in regulating various biological processes such as cell signaling, biochemical pathways, tissue and organ development, and others. In the third review article by Kingsley et al., the authors focused on the important role of miRNA in regulating various functions of innate immune cells: phagocytosis, endotoxin sensing, production of inflammatory cytokines, antigen presentation by phagocytic cells and the cytotoxic ability of the natural killer cells. The review discusses also the potential impact of miRNA dysregulation on pathogenesis of immune disorders (Fig. 1).

The fourth review article of this issue by Wang et al. discusses the pleiotropic role of miRNA-22-3p in different categories of immune cells, and its importance in the pathogenesis of autoimmune diseases. This comprehensive review suggests a potential usefulness of miRNA agonists and antagonists to advance future therapeutics for autoimmune diseases (Fig. 1).

The host's immunity plays a crucial role in organ transplant acceptance or rejection. The last review article of this issue by Sá et al. reviews systematically critical points related to transplantation immunity, including a historical perspective, the complex cellular and molecular network underlying the interaction between the recipient and donor immune cells, and the importance and challenges linked to immunosuppressive drugs. This article

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**Figure 1.** MicroRNA regulating innate immunity and as a therapeutic target for autoimmune diseases.

provides both a basic understanding of the transplant immunology but also suggests roadmaps for prevention and management of transplant rejection.

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