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## Parasitic Infections and MicroRNAs

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Some parasites are innocuous or even beneficial to mammalian hosts. The gastrointestinal helminths modulate several important intestinal functions such as immunomodulation. In contrast, infections by pathogenic parasites are the cause of numerous epidemics and serious diseases. The inflammatory response to infection must be tightly regulated in order to achieve pathogen clearance whilst avoiding consequences of deregulated gene expression.

The discovery of small non-coding RNAs called microRNAs (miRNAs) in eukaryotic cells has greatly expanded our understanding around the mechanisms of regulation of gene expression.<sup>1</sup> Recently, the miRNAs biosynthesis and mechanism of action have well been documented. Regarding their mechanism of action, miRNAs most often silence gene expression following association with mRNA targets and Argonaute proteins (Ago), thereby forming the miRNA-induced silencing complex (miRISC). Numerous miRNAs can also be identified in extracellular compartments; for example, when associated with Ago in plasma, when contained within exosomes, or when small membrane vesicles bud off the cell surface into the extracellular space. These biofluid miRNAs have increasingly been validated as robust biomarkers for disease and organ damage.<sup>2</sup>

miRNAs are a class of highly conserved, single stranded RNA molecules (19–25 nucleotides) that regulate expression levels of their target mRNAs. miRNAs are considered as a potential treatment target against parasitic and other infectious diseases. The miRNAs have emerged in the last few years as key regulatory elements in the life cycle of many other organisms such as animals and thus have been designated, together with transcription factors, as the main family of regulatory elements of gene

expression showing combinatorial regulatory patterns among them. The identification and characterization of miRNAs in several helminthic parasites such as *Toxocara canis*, *Angiostrongylus cantonensis*, *Echinococcus granulosus*, and *Schistosoma japonicum* have provided new opportunities to understand the biology of a number of species.<sup>3,4</sup>

Regarding their wide and intricate regulatory roles and their ubiquity, as well as their sequence specificity, miRNAs arise as potential alternative diagnostic and therapeutic targets for parasitic diseases. The sequences of parasitic miRNAs could provide a new plan to investigate gene regulation, development and evolutionary processes in parasites, while decisively help to decipher host-parasite interactions and relationships.

### Ethical Approval

Not applicable.

### Conflict of Interest Disclosures

The author declares that he has no conflict of interests.

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