Non-coding RNAs as Mediators of Epithelial to Mesenchymal Transition in Metastatic Colorectal Cancers

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Abstract:

Colorectal cancer (CRC) remains a leading cause of cancer-related mortality globally, necessitating the development of innovative treatment strategies. Recent research has underscored the significant role of non-coding RNAs (ncRNAs) in CRC pathogenesis, offering new avenues for diagnosis and therapy. In this review, we delve into the intricate roles of various ncRNAs, including microRNAs (miRNAs), long non-coding RNAs (lncRNAs), and circular RNAs (circRNAs), in CRC progression, epithelial-mesenchymal transition (EMT), metastasis, and drug resistance. We highlight the interaction of these ncRNAs with and regulation of key signaling pathways, such as Wnt/β-catenin, Notch, JAK-STAT, EGFR, and TGF-β, and the functional relevance of these interactions in CRC progression. Additionally, the review highlights the emerging applications of nanotechnology in enhancing the delivery and efficacy of ncRNA-based therapeutics, which could address existing challenges related to specificity and side effects. Future research directions, including advanced diagnostic tools, targeted therapeutics, strategies to overcome drug resistance, and the integration of personalized medicine approaches are discussed. Integrating nanotechnology with a deeper understanding of CRC biology offers the