ABSTRACT

Title of Abstract : Identification of microRNA-Based Targeted Therapy as Novel Strategy Against Colorectal Carcinoma: In Silico Analysis
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Background : Dysregulation of microRNAs plays a key role in the development of multiple cancers, including colorectal carcinoma (CRC), the second leading cause of cancer-related mortality worldwide. The high mortality rate is partly driven by the limited effectiveness of conventional therapies.

Objective : This study aimed to explore the pathogenesis of CRC and identify candidate microRNA-based targeted therapeutic agents through an in silico approach.

Research Methods/ Implementation Methods : MicroRNA expression profiles were retrieved from dbDEMC 3.0. Differentially expressed microRNAs (DEMs) were identified using GEO2R and OrangeApp with a cutoff P-value ≤ 0.05 and Log2FC < -1.5. Predicted target genes of DEMs were intersected with CRC-related genes obtained from GEPIA2. Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) analyses were then conducted on the intersecting genes.

Results : One DEM was identified as a potential therapeutic candidate for colon cancer (hsa-miR-139-5p) and one for rectal cancer (hsa-miR-193b-3p). A total of 780 DEGs associated with hsa-miR-139-5p and 4,744 DEGs associated with hsa-miR-193b-3p were found. Intersection with colon cancer (33,287 DEGs) and rectal cancer (29,599 DEGs) yielded 25 overlapping DEGs for hsa-miR-139-5p and 10 for hsa-miR-193b-3p. GO and KEGG analyses showed involvement in key biological processes and cancer-related signaling pathways. Three target DEGs of hsa-miR-139-5p (FOXO1A, ZEB1, HOXA9) were linked to transcriptional misregulation in cancer, while one DEG targeted by hsa-miR-193b-3p (14-3-3 gene) was associated with the cell-cycle pathway.

Conclusion/Lesson Learned : This in silico analysis identifies hsa-miR-139-5p and hsa-miR-193b-3p as promising microRNA-based therapeutic candidates for CRC, highlighting critical genes and pathways involved in CRC carcinogenesis.

Keyword : microRNA; targeted therapy; colorectal carcinoma; in silico