The Development of Specific Colon Cancer microRNA Profiles for Early and Accurate Diagnosis

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The identification of cancer specific miRNAs and their target genes is necessary to understand the role of miRNA in tumorigenesis. Recent studies show that expression of miR-378 is correlated to CRC survival and lymph node metastasis. When an individual has low expression of miR-378, chances of survival decrease. My study aimed to understand how diet and exercise affect colon cancer formation and biomarker analysis in a preclinical model. To test this, C57BL/6N mice were fed either a control (C) (16% fat) or a high fat (HF) diet (45% fat) for 9 weeks followed by azoxymethane (AOM) injections. HF diet mice were divided into two groups: high-fat (HF) and high-fat plus exercise (HF+EX). A 24-week treadmill-training program (1 hr/d, 3 d/wk) was used to exercise the HF+EX group. I showed that the colon, muscle, and serum tissue expressed miR-378 inverse-proportionally to CRC progression; the treatment groups with the least cancer progression had the highest miR-378 expression and the high-fat group had the lowest miR-378 expression. The C group miR-378 expression significantly higher than the HF group. The exercise treatment shows signs of trending for increasing the miR-378 expression back to C levels compared to the HF group. The serum expression of miR-378 was consistent with miR-378 colon data. The C group has miR-378 expression significantly higher than the HF group. The exercise treatment increased miR-378 expression back to C levels compared to the HF group. The exercise treatment surpassed original C levels. I conclude that exercise increased levels of miR-378 expression back to control levels. miR-378 is able to be used as a detectable marker in colon, muscle, and serum, blood being most easily obtained. I show miR-378 is detectable in very early stages of CRC.

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