

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

Neeson, Emily

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.