Dietary Intervention with Black Raspberries to Reduce Colitis Symptoms in Mice Fed Either Standard AIN93G Diet or the Total Western Diet (P05-021-19)

Daphne Rodriguez, Micheala Brubaker, Elizabeth Park, Canyon Neal, Korry Hintze, and Abby Benninghoff

Utah State University

Objectives: Approximately 1.4 million people suffer from inflammatory bowel disease, which is a major risk factor for developing colitis associated colorectal cancer (CAC). Dietary interventions with the goal to reduce colon inflammation and encourage gut microbiome homeostasis may be a strategy to reduce the risk of CAC. The antioxidants and anti-inflammatory compounds present in black raspberries (BRB) have demonstrated protective effects in the colon epithelium and may alter the composition of the gut microbiome. Previously, we showed that dietary supplementation with black raspberries significantly suppressed colitis and colon tumorigenesis promoted by the consumption of a Western type diet in mice. The goal of this study was to compare the efficacy of dietary intervention with whole, freeze-dried black raspberries on colitis and colon tumorigenesis in mice consuming either a standard diet or a Western type diet that emulates typical U.S. nutrient intakes.

Methods: C57BL/6 J male and female mice were fed a standard diet (AIN93G) or the total Western diet (TWD) supplemented with 0 to 10% (w/w) black raspberry powder for a total of 16 weeks. All mice were dosed with axozymethane and provided 1% dextran sodium sulfate in drinking water for 10 days to promote colonic inflammation and tumorigenesis.

Results: As previously observed, mice fed TWD experienced more pronounced symptoms of colitis with a 40% increase in the disease activity index (DAI) score. Preliminary analyses suggest that dietary supplementation with 10% BRB suppressed the DAI score in mice fed TWD such that the colitis symptoms in these mice were not apparently different compared to the AIN93G-fed controls. However, addition of 10% BRB did not appear to provide a benefit to mice fed the AIN basal diet. Composition of the fecal microbiome over the course of disease development will be determined by standard 16S rRNA sequencing, and assessment of tumor outcome is ongoing.

Conclusions: Consumption of a Western type diet increased symptoms of colitis, whereas dietary supplementation with 10% BRB appeared to ameliorate TWD-enhanced colitis in mice.

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