Impact of the introduction of black raspberries in a standard diet and a western-style diet on colitis and colorectal cancer risk in mice

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Colorectal Cancer (CAC)

2nd leading cause of cancer death

• 1. 4 Million people suffer from inflammatory bowel disease (IBD).
• IBD is the primary risk of CAC.
• CAC is predicted to be responsible for 51,000 deaths in 2019.
Inflammatory Bowel Disease

- Patients diagnosed with colitis and Crohn’s Disease with prolonged colitis are at high risk.
- Overall health cost of more than $1.7 billion.
- Treatment include anti-inflammatory drugs.
- Intervention studies to reduce colonic inflammation could reduce the progression of CRC including diet.

American Cancer Society, Cancer facts and figures 2016
Total Western Diet for Rodents

- Based on energy density macro and micro nutrient of the 50\textsuperscript{th} percentile intakes reported in NHANES.

- Past studies showed a 2.8-fold increase in tumor outcome in mice fed the TWD.

- Reduce inflammation by supplementation of different foods such as black raspberries

OBJECTIVE

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.
Study design

Endpoints (G1, G4)
- Mucosa (8 mice)
- Fecal microbiome (8 cages)

Endpoints (all groups)
- HP/IHC (6 mice)
- Mucosa (8 mice)
- Fecal microbiome (10 cages)

Endpoints (all groups)
- MRI (12 mice)
- HP/IHC (6 mice)
- Mucosa (8 mice)
- Fecal microbiome (8 cages)
- Tumor assessment (24 mice)
Early results – colitis symptoms

**Colitis**

- **Disease activity index (DAI)**
  - **AIN**
  - **TWD**

**Recovery**

- **Disease activity index (DAI)**
  - **CON**
  - **5%BRB**
  - **10%BRB**

*Statistical analysis pending curation of remaining data*
Ongoing Data Analysis

- Body weight gain
- Food intake
- Organ weights
- Tumor outcome
- Microbiome analysis
- Inflammatory Biomarkers
- Gene expression
Future work

Is the protection by BRB against colitis conferred to recipient mice when the microbiome is transferred?
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