Blueberry Supplementation Improves High-Fat-Diet Induced Gut Inflammation

Keaton Rosquist
(Anandh Babu Pon Velayutham Department of Nutrition and Integrative Physiology, College of Health, University of Utah)

Background: Obesity has currently been a growing health concern that has ranged across the world. Diet-induced obesity drives gut inflammation through the production of cytokines and alteration in gut microbiota. High fat diet (HFD) favors the conditions that lead to gut inflammation with an increased gut epithelial permeability that allows for higher chances of gastrointestinal disorders occurring. Antibiotic usages interrupt the gut symbiosis and further exacerbates HFD-induced complications. Evidence indicates HFD with antibiotics increases the risk of pre-inflammatory bowel disease (IBD). Blueberries contain bioactive flavonoid compounds called anthocyanins which possesses antioxidant and anti-inflammatory properties. In the present study, we assessed whether dietary blueberry improves HFD- and antibiotics-induced gut inflammation.

Methods: Male C57BL/6J mice (7 weeks old) were divided into three groups: (1) control mice consumed standard diet (C), (2) mice consumed HFD and treated with antibiotics in drinking water (HFA), (3) mice consumed blueberry supplemented HFD and treated with antibiotics (HFAB) for 12 weeks. Gut inflammation was assessed by measuring the mRNA expression of inflammatory markers (IL-1β, IL-6, iNOS and MCP-1) using qPCR. The total RNA was isolated from colon using RNeasy plus mini kit, cDNA was synthesized using RT-PCR kit, and the expression of inflammatory molecules was measured with qPCR by using SYBR green (Qiagen).

Results & Discussion: The mRNA expression of inflammatory markers IL-1β, iNOS and MCP-1 were significantly increased in HFA vs C mice. However, dietary supplementation of blueberry significantly reduced the expression of IL-1β, iNOS and MCP-1 indicating the beneficial effect of blueberries on gut. The mRNA expression of IL-6 was similar among the groups. Our ongoing studies are focused on identifying the molecular mechanisms involved in the protective effect of blueberries. Our study suggests consumption of blueberry may be a potential dietary approach to improve gut health.