May 20th, 12:30 PM

Inhibition of Colon Cancer by Polyphenols from Whole Cranberry

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Neto, Catherine; Liberty, Anne; Frade, Sarah; Tata, Anuradha; Ferreira, Tracie; Song, Mingyue; Wu, Xian; and Xiao, Hang, "Inhibition of Colon Cancer by Polyphenols from Whole Cranberry" (2014). UMass Center for Clinical and Translational Science Research Retreat. 85.

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Presenter Information
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Comments
Abstract of poster presented at the 2014 UMass Center for Clinical and Translational Science Research Retreat, held on May 20, 2014 at the University of Massachusetts Medical School, Worcester, Mass.

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The ability of cranberry fruit extracts to inhibit colon carcinogenesis is under investigation using a combination of in vitro and in vivo methods. Compounds isolated from cranberry fruit (Vaccinium macrocarpon) including oligomeric polyphenols known as proanthocyanidins (PACs) decreased the proliferation of HCT116 and HT-29 colon cancer cells, induced apoptosis and reduced the formation of tumor colonies. Treatment of HCT116 colon cancer cells with cranberry polyphenols produced changes in expression of genes and proteins associated with the MAPK pathway, confirmed by microarray analysis, quantitative (Q)-PCR and Western blotting. Based on cranberry's effect in vitro, a feeding study was conducted using AOM/DSS mice, an inflammatory colon cancer model that mimics colitis. Mice were treated with AOM and DSS to induce inflammation-driven colon carcinogenesis, while receiving an AIN-93 diet containing whole cranberry powder, concentrated polar polyphenolic extract, nonpolar extract or no cranberry (control). After 20 weeks on the diet, mice were sacrificed and the tumors analyzed. The number and volume of tumors was significantly lower in the cranberry powder group compared to control; the polyphenolic extract group also showed a significant reduction in tumor volume, while the non-polar extract showed significant inhibition on the tumor number. Tissue analysis indicated that expression of proinflammatory cytokines IL-1 and IL-6 were greatly reduced, and mRNA levels of iNOS and COX-2 were also significantly decreased by different cranberry preparations. These studies demonstrate potential for dietary cranberry to inhibit colon carcinogenesis through decreased inflammation and proliferation.