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Suppression of intestinally mediated diseases by consumption of polyphenol rich sorghum brans

Polyphenols may protect against intestinally mediated diseases such as obesity, type 2 diabetes, chronic inflammation and cancer by influencing the colonic bacteria and their metabolites. We demonstrated diet induced modifications to the microbiota and their metabolites in rodent models of disease and overweight humans. When sorghum brans containing 3-deoxyanthocyanins, condensed tannins or their combination were included in a purified diet, they almost completely prevented microbial shifts that occurred in rats given the polyphenol free diet. Microbiota changes with the purified diet were suggestive of a pro-inflammatory state. In animals challenged with dextran sodium sulphate to initiate colitis, sorghum bran diets mitigated intestinal inflammatory tone. This response may result from the retention of Bacteroidetes and inhibition of an increase in Firmicutes in rats consuming the control diet. The condensed tannins increased Akkermansia, a microbe considered protective against metabolic diseases including diabetes. In addition to affecting the microbiota, inclusion of condensed tannins also causes a shift from rapidly digestible starch to slowly

digestible and resistant starch in the diet, which likely contributed to a reduction in blood glucose levels that occurred after a meal. Similar changes in the microbiota and importantly, microbe derived plasma metabolites occurred in humans consuming a cereal containing condensed tannins. Finally, rats fed these sorghum brans had fewer early colon cancer lesions, and this was associated with changes in the expression of pro-inflammatory mediators and regulators of apoptosis induction. Overall, our data suggest the potential for polyphenol rich brans derived from sorghum to suppress multiple intestinally mediated chronic disease states that negatively affects millions of people around the world.

Biography

Nancy D Turner is a Research Professor in the Nutrition & Food Science Department. Her research is focused on characterizing the mechanisms whereby dietary chemoprotective compounds mitigate colon carcinogenesis and inflammatory bowel disease, with special attention given to the interaction between colon microbiota and the colonocytes. She has published 69 peer-reviewed papers, 6 book chapters, and co-edited a book entitled "Potential Health Benefits of Citrus". She is the Director of PhD Training Program in Space Life Sciences and Co-Director of a Postdoctoral Training Program in Nutrition, Biostatistics and Bioinformatics. She serves on the editorial boards of Advances in Nutrition, Molecules, and Experimental Biology and Medicine.

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