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## Modulation of obesity and host immune response by diet-gut microbiota interactions

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The role of diet non-digestible bioactive compounds including phenolics and dietary fiber on the modulation of gut microbiota and the possible relationship with obesity is not fully understood.

Our *in vitro* studies with colon fibroblast cells demonstrated that phenolic compounds decrease inflammation in colonic fibroblast cells in part mediated by induction of antioxidant enzymes that contributes to improve the immune response of colon fibroblast cells. In addition phenolics downregulated the TLR4 pathway, a known target for pathogens that promotes the expression of adhesion molecules that contributes to inflammatory bowel disease.

In vitro and *in vivo* studies showed that fruit non-digestible bioactive compounds including dietary fiber and phenolic compounds induced a significant increase on the relative populations of health beneficial bacteria including *Lactobacillus sp.* and *Bifidobacterium sp.*; whereas the Enterobacteriaceae genera which include many of the more familiar pathogens were decreased.

The link between phenolic compounds-gut microbiota-obesity was investigated using and *in vivo* animal model. Data from fecal DNA pyrosequencing analysis showed that *Bacteroidetes*, *Ruminococcacea*, and *Lactobacilluswere* in higher abundance in obese animals fed with fruit phenolics compared to phenolic absent controls. qRT-PCR data showed the phenolic-induced higher proportions of *Faecalibacterium* which has been reported to be in low levels in patients with Crohn's Disease. These changes were accompanied by decreased weight gain; improved levels of metabolic syndrome and decreased levels of lipid peroxidation markers in plasma.

Overall, these results suggest that protection against obesity and obesity related disorders is mediated by diet-induced altered composition of the distal intestinal microbiota.

## **Biography**

Giuliana D. Noratto received her doctoral degree from Texas A&M University in 2008 and was a postdoctoral fellow and research scientist at Institute for Obesity Research and Program Evaluation, Department of Nutrition and Food Science, and Department of Vet Physiology & Pharmacology at Texas A&M University until August 2012. Currently, she is an Assistant Professor at Washington State University, School of Food Science. Her research program is focused on the role of nutrition in the prevention or progress of obesity-related chronic diseases. She investigates food bioactive compounds with the main goal of uncovering the molecular mechanisms by which diet derived compounds interact with the genome to shift the onset or outcome of diseases. Research projects are centered on diet induced modulation of gut microbiota and host response.

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