



NUTRITION FRONTIERS

A newsletter of the Nutritional Science Research Group

Summer 2015

Volume 6, Issue 2

Dear Colleague,

Welcome to the summer issue of the *Nutrition Frontiers*, a newsletter from the Nutritional Science Research Group (NSRG), Division of Cancer Prevention, NCI. This issue showcases how rice bran modulates the microbiome, the effects of black raspberries on the immune system, and the link between high fat diet-induced obesity and skin inflammation. Learn about our spotlight investigator, Dr. Susan McMann, and her research on diet, cancer and the microbiome. Don't miss upcoming announcements and more.

RESEARCH UPDATE: WHAT'S NEW IN BASIC SCIENCE

Skin Inflammation Induced by a High Fat Diet in Obese Mice



Obesity is known to be associated with bacterial skin infections and inflammatory skin disorders. [Zhang and colleagues](#) demonstrate a clear link between high fat

diet (HFD)-induced obesity and inflammatory skin lesions in a mouse model. Their previous observation of a HFD greatly increasing the occurrence of skin lesions in C57BI/6 mice led them to investigate the mechanism associated with this finding. They found that a HFD induced the accumulation of a specific type of CD11c⁺ macrophage in skin preceding detectable lesions which primed skin to induce IL-1 β and IL-18 signaling, and promoted the cytokines IFN- γ and IL-17-mediated skin inflammation. Additionally, the absence of Epidermal-Fatty Acid Binding Protein (E-FABP), a major lipid carrier in CD11c⁺ macrophages and keratinocytes, resulted in complete protection against HFD-induced skin



Announcements

The National Academy of Medicine, which oversees activities formerly administered by the Institute of Medicine (IOM), has launched a new website at www.nam.edu. Reports and studies on health and medicine remain activities of the IOM, and information on these can be found at the new web address iom.nationalacademies.org.

Upcoming Events

- July 6-8, 2015
[Probiotics Summit - Healthy Bacteria for a Healthier Life](#)
San Francisco, CA
- July 13-15, 2015
[International Conference on Weight Loss and Fitness](#)
Philadelphia, PA
- July 19-24, 2015
FASEB Science Research
Conference: [Origins and Benefits of Biologically Active Components in Human Milk](#)
Big Sky, MT
- July 25-28, 2015
[Society for Nutrition Education and Behavior Annual Meeting](#)
Pittsburgh, PA

lesions, establishing E-FABP as a new molecular sensor in HFD-induced skin inflammation. Thus, E-FABP-mediated inflammation may be a potential mechanism contributing to obesity-related inflammatory diseases.

Black Raspberries Modulate T Lymphocytes Relevant to Carcinogenesis

A recent study by [Mace and colleagues](#) is the first to demonstrate that bioactive components from BRBs have modulatory activity on human immune cells that may positively or negatively



influence cancer therapy or prevention. They studied an ethanol extract from BRB (BRB-E) containing a mixture of phytochemicals and 2 abundant phytochemical metabolites of BRBs produced upon ingestion, Cyanidin-3-Rutinoside (C3R) and Quercetin-3-Rutinoside (Q3R). They found that BRB-E inhibits T cell proliferation, T lymphocyte survival and IL-2 induced signal transducer and activator of transcription (STAT) 5 phosphorylation and inhibits *in vitro* generation and suppressive activity of myeloid-derived suppressor cells (MDSC). Further, BRB-E, C3R, and Q3R promoted differential modulation of cytokine-induced STAT 3 and STAT 5 phosphorylation and retained the ability to limit MDSC expansion *in vitro*. This study demonstrates that an ethanol extract containing bioactive compounds from BRBs can directly modulate the proliferation, survival, and differentiation of immune cells and may be utilized for therapeutic intervention and as a potential source of compounds for drug development.

RESEARCH UPDATE: ON THE CLINICAL FRONT

Stabilized Rice Bran Modulates Microbiota & Metabolites



Heat-stabilized rice bran (SRB) maintains its bioactivity and increases shelf life due to the inactivation of rancid inducing lipases/lipoxygenases. [Sheflin and colleagues](#) conducted a single blinded dietary SRB pilot study to determine the feasibility and the amount of SRB necessary to induce differences in the stool microbiome and metabolome without adverse events. After healthy adults consumed 30 g/day of SRB for 2 and 4 weeks, 8 operational taxonomic units (OTUs) increased, including the *Bifidobacterium* and *Ruminococcus* genera, with no reduced abundance in OTUs. Additionally, 28 stool metabolites increased, including a 12% increase (baseline to 4 weeks) with indole-2-carboxylic acid, branched chain fatty acids,

July 27-28, 2015

[Healthy Aging Summit](#) 

Washington, DC

August 17-19, 2015

[International Conference on Food Safety and Regulatory Measures](#)



Birmingham, UK

August 24-26, 2015

[2015 National Conference on Health Statistics](#)

Bethesda, MD

September 9-12, 2015

[Diet and Optimum Health](#) 

Corvallis, OR

September 15-16, 2015

[Functional and Medical Foods for Chronic Diseases: Bioactive Compounds and Biomarkers](#) 

Boston, MA

October 2-3, 2015

5th International Breast Cancer Prevention Symposium:

[Epigenome, Environment & Prevention Tools](#) 

Guadeloupe, French West Indies

October 3-6, 2015

Academy of Nutrition and Dietetics: [Food & Nutrition Conference & Expo](#) 

Nashville, TN

October 5-8, 2015

[15th International Nutrition & Diagnostics Conference](#) 

Prague, Czech Republic

October 16, 2015

The New York Academy of Sciences: Toward Evidence-based Nutrition Policy: [Methods, Implementation and Political Reality](#) 

New York, NY

Quick Links

- [Funding Opportunities](#)
- [Nutritional Science Research Group](#)
- [Division of Cancer Prevention](#)

secondary bile acids and 11 other putative microbial metabolites. While larger cohort studies are needed, this pilot study confirms that the consumption of 30 g/day of SRB is feasible and microbial and metabolite endpoints can be detected that can potentially influence intestinal health and colorectal cancer prevention outcomes.

→ [National Cancer Institute](#)

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SPOTLIGHT: SUSAN MCCANN



Susan McCann, PhD, RD is a registered dietitian and nutritional epidemiologist in the Department of Cancer Prevention and Control at Roswell Park Cancer Institute. She received a MS in Nutrition from the University at Mississippi and a PhD in epidemiology and community health from the State University of New York at Buffalo. Her research

interests include phytochemicals as dietary compounds and their relationship to breast, endometrium, and ovary cancer risk and prognosis, as well as the effect of genetic variation on these relationships. Dr. McCann recently discovered that a low glycemic diet may affect expression of several miRNAs related to energy metabolism and cancer processes. She also is interested in the application of metabolomics and genomics to problems of diet in the etiology and prognosis of cancer and the role of the gut microbiome in cancer etiology. In collaboration with Dr. Johanna Lampe from Fed Hutchinson Cancer Research Center, she was recently awarded an NCI-sponsored U01 entitled, [*Flaxseed Effects on Hormones and Lignans: Role of Race, Genes, and Gut Microbiome*](#).

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DID YOU KNOW?

Guava the Queen of Fruit



The round, ovoid or pear-shaped tropical fruit, guava, thought to have originated from Mexico or Central America now grows throughout the tropics and Asia. Guavas vary in color from yellow, pink to dark red and are considered the queen of fruit. Besides being a rich source of soluble fiber and a laxative guavas are an excellent source of vitamin C; more vitamin C is found just underneath the outer thick skin compared to its inner creamy pulp. Guavas also contain vitamin A, beta-carotene; and pink guava has twice the lycopene content of tomatoes,

along with lutein and cryptoxanthin. Did you know, guavas have more potassium than bananas!

Guava's soft and creamy flesh with numerous tiny, semi-hard edible seeds is eaten sliced or added to salads for a sweet-tart taste, consumed as fresh juice or savored as a thick, rich paste made into cheese or jelly. For a bit of spice this summer, toss ½ tsp roasted cumin powder, ½ tsp red chili powder, finely chopped cilantro and lemon juice to cubed guava. That will heat up your summer!

References

<http://www.nutrition-and-you.com/guava.html> 

<http://www.hort.purdue.edu/newcrop/morton/guava.html> 

<http://foodfacts.mercola.com/guava.html> 

<http://www.bawarchi.com/recipe/spicy-guava-salad-oetq8ffjbhgja.html> 

Sincerely,

Your friends at the Nutritional Science Research Group

Division of Cancer Prevention
National Cancer Institute
National Institutes of Health
U.S. Department of Health & Human Services

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