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NUTRITION FRONTIERS

A newsletter of the Nutritional Science Research Group

Summer 2014

Volume 5, Issue 3

Dear Colleague,

Welcome to the Summer 2014 issue of the *Nutrition Frontiers*, a quarterly newsletter from the Nutritional Science Research Group (NSRG), Division of Cancer Prevention, NCI. In this issue, we showcase two recent publications about diet-gene interactions and colon cancer, and a publication that sheds light on how flaxseeds modulate miRNA in the lung. Plus, learn about our spotlight investigator, Louise Fong, announcements and more.

RESEARCH UPDATE: ON THE CLINICAL FRONT

Diet-Gene Interaction and Risk of Colorectal Cancer



High intake of red and processed meat and low intake of fruits, vegetables and fiber are associated with a higher risk of colorectal cancer (CRC).

[Figueiredo et al.](#) investigated if the effect of these dietary

factors on CRC risk is modified by gene-diet interactions. Over 9,000 CRC cases and 9,000 controls, who were not diagnosed with CRC, were included. Results found strong evidence for a gene-diet interaction and CRC risk between a genetic variant (rs4143094) on chromosome 10p14 near the gene *GATA3* and processed meat consumption. No other dietary factors were found to interact with the any of the 2.7 million variants. This work suggests that genetic variants may interact with diet and in combination affect CRC risk.

Fatty Acid Genotype and Diet, Changes in Colonic Fatty Acids

[Porenta and colleagues](#)

evaluated interactions of polymorphisms (SNPs) in the



Upcoming Events

Sept 16, 2014

[Frontiers in Nutrition and Cancer Prevention: Online Series](#)

Cancer, Prevention Through Immunomodulation: Does Diet Play a Role?

12:00-1:30 pm EDT

Sept 16-17, 2014

[Fifth Public Meeting of the 2015 Dietary Guidelines Advisory Committee](#)

Bethesda, MD

Sept 28-Oct 01, 2014

[Frontiers in Cancer Prevention Research](#)

American Association for Cancer Research
New Orleans, LA

Oct 06, 2014

[Stars in Nutrition & Cancer Lecture](#)

Graham Colditz, MD, DrPh presents "Childhood and Adolescent Nutrition and Growth Drive Breast Cancer Risk
Untapped Opportunities for Prevention"

Bethesda, MD

3:00-4:00 pm EDT

Oct 16-18, 2014

[4th International Breast Cancer](#)



fatty acid desaturase (*FADS*) genes, *FADS1* and *FADS2* and how changes in diet affect serum and colonic fatty acid concentrations. In secondary analysis, 108 people at increased risk of colon cancer were randomized to a Mediterranean or a Health Eating diet and genotyped for 4 SNPs in the *FADS* gene cluster. The presence of any minor alleles in the *FADS* genes was strongly associated with lower baseline serum arachidonic acid (n-6), and not serum eicosapentaenoic acid (n-3) or colonic fatty acid concentrations. After six months, those who had all major alleles for *FADS1/2* and were on a Mediterranean diet had 16% lower arachidonic acid concentrations in the colon than those on the Healthy Eating diet. Variations of the *FADS* genotype could modify the effects of dietary fat intakes on colonic arachidonic acid concentrations, reducing substrate availability for inflammatory prostaglandin E2 production when dietary n-6 fatty acid intakes are limited.

RESEARCH UPDATE: WHAT'S NEW IN BASIC SCIENCE

Flaxseed Modulates miRNA in Irradiated and Non-irradiated Murine Lungs



Although responses of miRNA profiles to diet and radiation exposure have been reported, the potential contribution of miRNAs to diet-related radioprotection has never been tested. In a pilot study,

[Christofidou-Solomidou and colleagues](#) fed mice a 10% flaxseed diet (FS) or a 0% FS isocaloric control diet for 3 weeks prior to a single dose radiation challenge to the thorax. Lung RNA was extracted 48 hours post radiation treatment and small RNAs were profiled. Flaxseed modulated the expression of multiple miRNAs in the lung, with or without radiation exposure. Although few miRNAs were significantly changed by radiation, diet and radiation interactions occurred, including a 10- to 50-fold downregulation of miR-29c in the flaxseed control group and a slight upregulation in the flaxseed radiation group. The p53-responsive miR-34a was upregulated significantly in the flaxseed group. This study provides insight into the potential radioprotective effects of flaxseed and may be a model to further explore small RNA-based therapies.

SPOTLIGHT: LOUISE FONG

Prevention Symposium
International Breast Cancer
& Nutrition
West Lafayette, IN

Oct 29-31, 2014

[AICR Annual Research
Conference](#)

American Institute of
Cancer Research
Washington, DC

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Louise Fong, PhD, is an Associate Professor in the Department of Pathology, Anatomy & Cell Biology at Thomas Jefferson University in Philadelphia. Dr. Fong holds an MS and PhD in biochemistry from the University of Hong Kong and she did postdoctoral work at the Massachusetts Institute of Technology. Dr. Fong researches

the mechanisms by which dietary zinc insufficiency promotes oral-esophageal cancer. Her lab developed zinc-deficient rodent cancer models that mimic the features of dietary zinc insufficiency in human oral-esophageal cancer. Dr. Fong identified molecular signatures, mRNA and microRNA, modulated by dietary zinc in oral-esophageal cancer development and prevention. She was recently awarded an R01 entitled, [Chemoprevention of Upper Aerodigestive Tract Cancer by Dietary Zinc](#).

[Read More »](#)

DID YOU KNOW?

Tomatoes are a Fruit!



Tomatoes, the ovary of the plant, were first cultivated in Mexico. Spanish explorers brought the seeds back to Europe but Italians were initially fearful of eating them because tomatoes belonged to the nightshade family and were believed to be poisonous.

Tomatoes are now the most widely produced fruit in the world; Americans consume about 20 pounds fresh and 70 pounds processed each year. They are the major dietary source of the carotenoid, lycopene. Lycopene is better absorbed from tomato products, such as tomato paste, than from fresh tomatoes; tomato juice can also significantly increase serum lycopene levels. The USDA and Purdue University researchers are working on developing a tomato that contains more than twice as much lycopene and has a longer shelf life than currently available tomatoes. In the meantime, *you could have a V8!*

References

- Grotto, D. 101 Foods That Could Save Your Life, Bantam Books, New York, 2007.
- [Natural Medicines Comprehensive Database](#).  Accessed 8/13/2014.
- [The Sauce Source](#),  Accessed 8/13/2014.

Sincerely,

Your friends at the Nutritional Science Research Group

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

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