

# ASN Publications

## August 2016 Media Alert: *The Journal of Nutrition*

The following articles are being published in the August 2016 issue of *The Journal of Nutrition*, a publication of the American Society for Nutrition. Summaries of the selected articles appear below; the full text of each article is available by clicking on the links listed. Manuscripts published in *The Journal of Nutrition* are embargoed until the article appears online either as in press (Articles in Press) or as a final version. The embargoes for the following articles have expired.

[Dietary variety, at least when it's healthy foods, may help maintain weight loss](#)

["Normal" circulating concentration of vitamin D, but not dietary requirements, depends on a woman's reproductive state](#)  
[Higher maternal protein intake during pregnancy related to less abdominal fat in infants](#)

### **Dietary variety, at least when it's healthy foods, may help maintain weight loss**

Moderation, variety, and balance have long been the 3-pronged foundation upon which recommendations for a healthy diet have been based. Moderation (not eating too much of any particular food) helps prevent nutrient toxicities and excessive energy intake, and variety (different foods within a food group) and balance (reasonable amounts from each food group) provide assurance that adequate amounts of all of the essential nutrients are consumed. Variety, however, is a bit of a double-edged sword because multiple studies have shown that we eat more if we have access to myriad high-calorie food choices - a phenomenon exemplified by what often happens when confronted with a buffet or cafeteria-style meal. Of course, this can lead to weight gain. On the flip side, having access to a variety of nutrient-dense, healthy foods should increase a person's consumption of them, theoretically leading to moderation of calorie intake and better health. To test whether consuming a greater variety of healthful foods helps people lose weight and maintain weight loss after dieting, a research group headed by Dr. Josiemer Mattei (Harvard T.H. Chan School of Public Health) studied a group of overweight and obese individuals enrolled in the Preventing Overweight Using Novel Dietary Strategies (POUNDS) Lost trial, a 2-year randomized clinical weight-loss trial. Their findings can be found in the August 2016 issue of *The Journal of Nutrition*.

A total of 367 men and women were studied. Although the study was originally designed to investigate if variation in the balance among protein, carbohydrates, and fats influenced dieting success, this reanalysis of the data focused more on the relationship between dietary variety of healthy foods and dieting success. More specifically, they focused on what happened 2 years after participants increased, decreased, or did not alter the variety of their healthy food choices during the first 6 months of the weight-loss trial.

As hypothesized, participants who increased their variety of healthy foods lost the most weight and body fat. At 2 years, this group was also the most successful in terms of keeping the weight off. The researchers concluded that focusing on consuming a variety of nutrient-dense, healthy foods may be a useful dieting strategy - particularly, in terms of maintaining weight loss after the desired weight is reached, which is often more difficult than losing the weight to begin with.

## Upcoming Events

**June 7-9.** [The Mary Frances Picciano Dietary Supplement Research Practicum](#). NIH campus, Bethesda, MD

**June 13-17.** [Short Course: The Mathematical Sciences in Obesity Research](#). University of Alabama at Birmingham

**July 19.** [JAM pre conference on gut microbiome](#).

Plans are underway for the 2016 Joint Annual Meeting to kick off with a pre-conference symposium on "Gut Microbiota, Diet, and Health." The all-day symposium will take place on Tues., July 19 in Salt Lake City, Utah. It will be hosted by ASAS and the American Society for Nutrition.

**July 25-29.** [Short Course: Strengthening Causal Inference in Behavioral Obesity Research](#). University of Alabama at Birmingham

## Journal Links

[The American Journal of Clinical Nutrition](#)

[The Journal of Nutrition](#)

[Advances in Nutrition](#)

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**Reference**

Vadiveloo M, Sacks FM, Champagne CM, Bray GA, Mattei J. Greater healthful dietary variety is associated with greater 2-year changes in weight and adiposity in the POUNDS Lost trial. *Journal of Nutrition* 2016;146:1-8.

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**"Normal" circulating concentration of vitamin D, but not dietary requirements, depends on a woman's reproductive state**

Vitamin D is an unusual nutrient because not only can we get it from foods (especially oily fish and fortified dairy products), but we also make it internally from a cholesterol-like precursor if exposed to sufficient amounts of sunshine. As such, circulating levels of vitamin D can be influenced by myriad factors, including vitamin D intake, skin color (darker pigments skin slows endogenous synthesis), and sun exposure. Interestingly, circulating levels also appear to be influenced by pregnancy and breastfeeding. These shifts in what is considered 'normal' are great examples of a biological phenomenon referred to as homeorhesis - the alteration of homeostasis to support a particular physiologic state. For instance, because vitamin D is needed for dietary calcium absorption, vitamin D synthesis may increase during pregnancy and breastfeeding to support fetal growth and milk production. Surprisingly, although this has been extensively studied in the dairy cow, very few controlled human studies have been conducted to evaluate these shifts in vitamin D metabolism during pregnancy and lactation in women. To help fill this knowledge gap, a research team led by Dr. Marie Caudill at Cornell University assessed a multitude of vitamin D-related markers in pregnant, lactating, and nonpregnant/nonlactating women. You can read more about this important study in the August 2016 issue of *The Journal of Nutrition*.

This study was conducted as a controlled 10-week trial during which all meals and dietary supplements were provided to each subject. Healthy women were enrolled at the beginning of their 3rd trimester of pregnancy, or (if lactating) at 5 weeks postpartum; a group of control women were neither pregnant nor breastfeeding. At the beginning and end of the study, blood samples were collected and analyzed for various forms and metabolites of vitamin D as well as vitamin D binding protein which carries the nutrient in the blood.

Compared to their nonpregnant/nonlactating counterparts, pregnant women had higher circulating concentrations of all the vitamin D status biomarkers and vitamin D binding protein. There were no such differences between control and breastfeeding women. The researchers posit that metabolic changes (perhaps having to do with vitamin D production in the placenta) might occur during pregnancy, resulting in elevated circulating levels. They also conclude that the current recommendations for vitamin D intake for women are likely adequate, regardless of whether they are pregnant or lactating. These results represent a superb reminder of the profound metabolic and physiologic changes that transpire in the pregnant state to accommodate the needs of the mother-infant dyad.

**Reference** Park H, Brannon PM, West AA, Yan J, Jiang X, Perry CA, Malysheva OV, Mehta S, Caudill MA. Vitamin D metabolism varies among women in different reproductive states consuming the same intakes of vitamin D and related nutrients. *Journal of Nutrition* 2016;146:1-9.

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**Higher maternal protein intake during pregnancy related to less abdominal fat in infants**

Obesity, which does not discriminate by nationality or income level, is now one of the world's most pressing health issues. Understandably, the primary focus of current research on this topic revolves around factors that influence the balance between energy intake (calories) and physical activity levels. But other dietary aspects might also contribute to a

person's risk of obesity and all of its poor health outcomes. For instance, the distribution of fat in the body seems to be important, with upper-body (abdominal) adiposity ("apple" shaped) being worse than lower-body fat deposited around the hips ("pear" shaped). Because a person's body fat distribution is highly related to that of his or her parents, genetics and/or shared dietary patterns might be involved. In addition, some research suggests that a person's eventual body fat distribution might be determined or "programmed" very early in life, even as early as before birth. To investigate the hypothesis that a mother's diet during late pregnancy might affect her infant's abdominal fat deposition, Drs. Ling-Wei Chen and Yung Seng Lee along with associated colleagues followed 320 mother-infant dyads living in Singapore. Their findings have been published in the August 2016 issue of *The Journal of Nutrition*. The researchers were particularly interested in whether distribution of energy from fat, protein, and carbohydrates (referred to as energy-yielding nutrients) in a mother's diet can predict body fat distribution of her baby. To study this, they asked mothers to complete detailed 24-hour dietary recalls during pregnancy. Percent calories from each energy-yielding nutrient class was then estimated, and infants' abdominal adiposity was assessed using magnetic resonance imaging (MRI), considered to be the gold-standard method in this regard. The researchers found that women eating relatively more protein (but within normal range recommended by the Dietary Guidelines for Americans) tended to give birth to infants with lower amounts of abdominal adipose tissue, particular if the baby was a boy. This correlation was mainly due to consumption of protein from animal-source foods, rather than plant-based foods. The researchers concluded that dietary recommendations urging women to consume a relatively protein-rich diet during pregnancy might have long-lasting positive impacts on body fat distribution in the next generation, but additional studies are needed to determine if these findings are repeatable and generalizable to other populations.

**Reference** Chen L-W, Tint M-T, Fortier MV, Aris IM, Bernard JY, Colege M, Gluckman PD, Saw S-M, Chong Y-S, Yap F, Godfrey KM, Kramer MS, van Dam RM, Chong MF-F, Lee YS. Maternal macronutrient intake during pregnancy is associated with neonatal abdominal adiposity: The Growing Up in Singapore Towards healthy Outcomes (GUSTO) study. *Journal of Nutrition* 2016;146:1-9.

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### ***The Journal of Nutrition: Editor's Pick***

[A natural product feed additive shows promise to reduce the damage caused by Salmonella infection in a cell culture model](#)

#### **A natural product feed additive shows promise to reduce the damage caused by Salmonella infection in a cell culture model**

Salmonella infection from contaminated poultry or eggs is a major source of food-borne illness around the world. One approach used to reduce contaminated foods is to include low levels of antibiotics in poultry feed. However, in some places, such as the European Union, this approach is not allowed. Therefore, new approaches to reduce Salmonella contamination must be developed. The work reported by Brufau and colleagues suggest that including Salmosan, a source of mannan oligosaccharides that is rich in  $\beta$ -galactomannan, essentially restored barrier function in a cell culture model of the intestine. Restoration of barrier function led to reduced movement of small molecules between the cells in the layer. In addition, their data suggest Salmosan was able to cause bacteria to clump together and this led to fewer bacteria absorbed into the epithelial cells. Their results suggest this natural plant-derived product may help protect against the damaging effects of Salmonella exposure in animals and humans.

A major cause of food-borne illness is infection by *Salmonella* Enteritidis, which is often transmitted through contaminated poultry or eggs.

Although infection of young chicks leads to obvious disease, older infected animals do not typically display disease symptoms. This characteristic makes it difficult to identify and remove infected animals that ultimately create the potential for contamination of cooking or food processing surfaces, and eventually transmission to humans. Previous work has demonstrated that *Salmonella* infects humans by being absorbed by the epithelial cells lining the intestine or by interfering with the connections between those cells and thereby moving between the epithelial cells and into our bodies. In places such as the European Union, antibiotics cannot be used in animal feeds as a way to reduce *Salmonella* infections in their flocks. There is also debate in the US concerning antibiotic use in feeds because of the possibility that it may contribute to antibiotic resistance in bacterial strains with human health consequences. Therefore, alternative approaches to reducing *Salmonella* transmission are being researched. Brufau and colleagues report on a possible strategy using a natural, plant-based feed additive to combat the transmission of this bacterium in the August issue of *The Journal of Nutrition*.

The authors used an intestinal cell line to test the changes in the connections between cells and absorption of the *Salmonella* bacteria. They then compared those results to cells that had also been incubated with Salmosan, a mannan oligosaccharide that is rich in  $\beta$ -galactomannan. They hypothesized that the Salmosan would help maintain cellular connections, which help to provide a barrier against invasion by small molecules and bacteria. Another measure of effectiveness measured was the level of reactive oxygen species (ROS) and oxidized lipids in the cells, which are normally elevated during an infection.

Barrier function was reduced by *Salmonella* Enteritidis exposure, which led to several small molecules being able to pass between the cells. However, the presence of Salmosan in the culture medium restored most measures of barrier function to levels similar to those in the cells not exposed to *Salmonella*. In addition, Salmosan treatment also prevented the increase in ROS seen in cells treated with the *Salmonella* that did not include the Salmosan treatment. The authors also discovered that Salmosan was able to bind to the bacteria, which contributed to a 32% reduction in the number of bacteria contained within the cells. The authors suggest that results from this cell culture study support the ability of Salmosan to contribute towards protecting against disruption of barrier function caused by *Salmonella*.

**Reference** Brufau MT, Campo-Sabariz J, Bou R, Carné S, Brufau J, Vilà B, Marqués AM, Guardiola F, Ferrer R, and Martin-Venegas R. Salmosan, a  $\beta$ -Galactomannan-rich product, protects epithelial barrier function in Caco-2 cells infected by *Salmonella* enterica Serovar Enteritidis. *Journal of Nutrition* 2016;146:1-7.

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