June 2013 Media Alert: *The Journal of Nutrition*

The following articles are being published in the June 2013 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.

Piglet study supports possible benefit of prebiotics for formula-fed infants

Discovery of new "biomarker" of sugary drink consumption may aid research

Intensive psychosocial stimulation may be especially important in iron-deficient children

Piglet study supports possible benefit of prebiotics for formula-fed infants

Nutritional physiologists have long known that the human gastrointestinal (GI) tract harbors a magnificently diverse community of "friendly" bacteria that can be influenced by diet. However, not until lately have they discovered how important these microorganisms are to short- and long-term health. For instance, the make-up of an infant's GI microbes can influence early immune development, and adult microbial community composition is strongly associated with risk for obesity. Consequently, understanding components that shape GI microbial communities in early life has become a hot topic in nutrition research. Two factors known to impact early GI colonization are delivery mode (vaginal vs. c-section) and feeding choice (breastfeeding vs. formula-feeding), with vaginally-delivered, breastfed infants assumed to have the most optimal set of GI microbes. Recently, a research team headed by Dr. Sharon Donovan at the University of Illinois conducted a controlled animal study to better understand how diet and delivery mode impart these effects. Details concerning their experiment and its results are published in the June 2013 issue of *The Journal of Nutrition*.

The scientists tested their hypotheses using the neonatal piglet, a commonly-used animal that is relatively similar to the human infant in many important dimensions. A total of 4 pregnant sows were allowed to deliver their piglets naturally, whereas 3 others were sedated so that their piglets could be delivered surgically. Each of the 64 piglets born to these sows was then put into 1 of 3 groups: "sow-reared" (mimicking breastfeeding), formula-fed (provided a standard piglet weaning formula), or fed a formula containing a blend of dietary fibers ("prebiotics") sometimes added to commercially-available infant formula. At 1 and 2 weeks of life, a subset of the piglets was euthanized so that intestinal contents (including microbes) could be sampled.

Whereas delivery mode had only minor effects on bacterial communities, the influence of diet was more profound. For instance, at 1 week of life piglets fed the regular formula had relatively more *Clostridium* in their ascending colons compared with those fed the prebiotic-fortified version. And at 2 weeks of life, total bacteria counts were significantly higher in both formula-fed groups compared to the sow-reared piglets. And, in general, GI microbiota of sow-reared piglets produced greater amounts of short-chained fatty acids - metabolic byproducts important for intestinal development and protection from infection. This effect was somewhat ameliorated in piglets fed the prebiotic formula. The authors concluded that their data support previous reports that early diet can greatly influence establishment of GI microbiota and suggest a possible benefit of

Upcoming Events

June 6. Capacity Building in Nutrition Science: Revisiting the Curricula for Medical Professionals. New York, NY.

Journal Links

The American Journal of Clinical Nutrition

The Journal of Nutrition

Advances in Nutrition

Nutrition Today is a partner publication of ASN. Read more about the journal online. ASN members receive exclusive subscription rates.

Follow ASN on Twitter for scientific studies, nutrition news, and events.

Media Requests

To arrange an interview with an ASN Spokesperson, please email media@nutrition.org

Archive of Press Releases

Author Videos

ASN has partnered with SciVee to showcase author videos describing select articles from our scholarly journals. Watch the newest offerings online.

Advertise with ASN

Advertising opportunities with ASN include the ASN monthly e-newsletter, medical nutrition e-newsletter, on-site convention newspaper, and

prebiotic consumption in formula-fed animals. Of course, the relevance of these findings to human infants awaits the conduct of a controlled, human intervention study.

Reference Wang M, Radlowski EC, Monaco MH, Fahey GC, Gaskins HR, Donovan SM. Mode of delivery and early nutrition modulate microbial colonization and fermentation products in neonatal piglets. *Journal of Nutrition* 143:785-803, 2013.
For More Information To contact the corresponding author, Dr. Sharon Donovan, please send an e-mail to sdonovan@illinois.edu.

Discovery of new "biomarker" of sugary drink consumption may aid research

Calories consumed from sugar-sweetened beverages such as soda, "sports" drinks, sweet tea, and sweetened juices has increased greatly over the last few decades in the US. This increased consumption may be of concern because it has paralleled an increasing prevalence of obesity. However, the causal link between sugar intake and weight gain has been challenging to prove, in part because sugar intake is very difficult to measure, in part because research subjects inherently under-report both calorie and sugar intakes. In response, scientists have tried to identify biological markers that can be objectively measured in the laboratory and accurately reflect consumption of sugars and sugar-sweetened beverages. Recently, a group of researchers led by Dr. Diane O'Brien at the University of Alaska Fairbanks reported that sugar-sweetened beverage intake is highly correlated with the ratio of heavy (^{13}C) to light (^{12}C) carbon atoms found in alanine, one of the building blocks of protein molecules. This ratio is naturally elevated in corn and sugar cane, the source of 70% of the sugars consumed in the US and nearly all of the sugars found in sugar-sweetened beverages. You can read more about this study in the June 2013 issue of *The Journal of Nutrition*.

Participants for this study (n = 68) were recruited from 2 coastal Yup'ik communities situated in the southwestern coastal region of Alaska, and were men and women between 14 and 79 years of age. Dietary records were obtained 4 times by having each participant recall all foods and beverages consumed during the prior 24 hours. Blood samples were drawn, and red blood cell amino acids were analyzed for their carbon-isotope ratio ($^{13}C/^{12}C$). Specifically, the scientists determined the carbon-isotope ratio of the nonessential amino acids which can be made in the body from sugars. In theory, increasing the consumption of sugar-sweetened beverages should increase the carbon-isotope ratio of these amino acids.

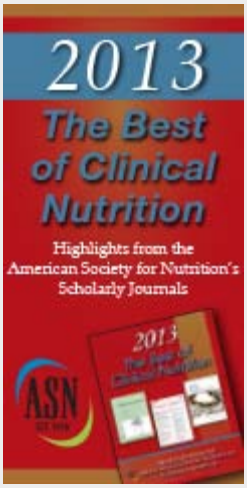
The results suggest that, of all the nonessential amino acids investigated, the carbon-isotope ratio of alanine best reflected sugar-sweetened beverage consumption. This "biomarker" was also correlated to total sugar and added sugar intakes. Importantly, however, it was not related to consumption of other foods (e.g., meats) that can also contribute elevated carbon-isotope ratios to the diet. These findings may be especially important for researchers as they continue to investigate whether and how sugar-sweetened beverage consumption may (or may not) contribute to human health.

Reference Choy K, Nash SH, Kristal AR, Hopkins S, Boyer BB, O'Brien DM. The carbon isotope ratio of alanine in red blood cells is a new candidate biomarker of sugar-sweetened beverage intake. *Journal of Nutrition* 143:878-884, 2013.
For More Information To contact the corresponding author, Dr. Diane O'Brien, please send an e-mail to dmobrien@alaska.edu.

Intensive psychosocial stimulation may be especially important in iron-deficient children

Iron is an essential mineral needed for many functions, most notably delivery of oxygen to tissues that subsequently use it to synthesize ATP. Inadequate iron intake, therefore, results in fatigue and an inability to optimally perform daily functions and more strenuous activities. Iron deficiency has also been associated with poor cognitive development, although it is unclear whether this relationship is causal in nature or due to other confounding factors such economic or educational status of the family. Understanding this distinction is important because it can help inform public health experts as to whether or not iron supplementation in at-risk children will be effective in preventing developmental deficits. Furthermore, whether providing additional psychosocial stimulation to iron-deficient children can improve cognitive development is not known. To shed additional light on this topic, a research team led by Dr. Fahmida Tofail at the International Centre for Diarrhoeal Disease Research in Bangladesh studied the effects of home-based stimulation on healthy and iron-deficient infants. Their results are published in the June 2013 issue of *The Journal of Nutrition*.

This study took place in 30 poor, rural villages outside of Dhaka, Bangladesh and



Contact ASN

Suzanne Price
Communications Director
9650 Rockville Pike
Bethesda, MD 20814
media@nutrition.org
301-634-7235

included 412 infants between 6 and 24 months of age. All children were tested to determine if they were iron deficient, and those who were classified as such (52% of the subjects) were treated with iron syrup for the first 6 months of the study. In half the villages, trained local women visited each participating household weekly for 9 months to help the mothers learn ways to provide additional psychosocial stimulation to their children. Simple toys and books were created and used for this purpose. No such behavioral intervention was provided in the other villages. Indicators of mental and motor development as well as child behavior were assessed at the beginning and end of the study.

There were no differences in developmental or behavioral scores between iron-deficient and healthy children at baseline. However, even though their iron deficiency had been corrected with supplementation, children who began the study iron deficient scored lower than their counterparts at the completion of the study. Nonetheless, children receiving the psychosocial stimulation scored higher on the mental development tests than children in the nonintervention villages. This effect was more pronounced in children who began the study without iron deficiency. The authors concluded that, in addition to iron therapy, iron-deficient children may need even more intensive stimulation than their iron-sufficient counterparts to overcome cognitive deficits. Clearly, this provides another example of the age-old maxim: *an ounce of prevention is worth a pound of cure*.

Reference Tofail F, Hamadani JD, Mehrin F, Ridout DA, Huda SN, Grantham-McGregor SM. Psychosocial stimulation benefits development in nonanemic children but not in anemic, iron-deficient children. *Journal of Nutrition* 143:885-893, 2013.

For More Information To contact the corresponding author, Dr. Fahmida Tofail, please send an e-mail to ftofail@icddrb.org.

ASN is the authoritative voice on nutrition and publisher of The American Journal of Clinical Nutrition, The Journal of Nutrition, *and* Advances in Nutrition. *Established in 1928, ASN's more than 4,900 members in more than 75 countries work in academia, practice, government and industry. ASN advances excellence in nutrition research and practice through its publications, education, public affairs and membership programs. Visit us at www.nutrition.org.*