September 2014 Media Alert: *The Journal of Nutrition*

The following articles are being published in the September 2014 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.

Breastfeeding associated with lower risk of overweight in Chinese children

Green, black, and oolong tea extracts help curb weight gain in lab mice

Scientists suggest a simple metric can be used to assess growth faltering beyond the first 1000 days

Breastfeeding associated with lower risk of overweight in Chinese children

Breastfeeding is universally considered the optimal way to feed babies. For instance, in 2011 the US Surgeon General Dr. Regina Benjamin published her *Call to Action to Support Breastfeeding*, in which exclusive breastfeeding for 6 months was advocated. The World Health Organization (WHO) also makes a similar recommendation. Although breastfeeding (as opposed to formula feeding) is known to reduce risks for a litany of early health threats (for instance, diarrhea and respiratory infections), it is also associated with reduced risk for chronic conditions such as diabetes and obesity. With today's skyrocketing prevalence of obesity and its related poor health outcomes, this potentially healthy benefit of breastfeeding has received considerable recent consideration and emphasis. However, most studies investigating the correlation between breastfeeding and obesity have been conducted in Western populations, and it is not known whether the same kind of association occurs in other groups, such as Asians. In a paper published in the September 2014 issue of *The Journal of Nutrition*, an international collaboration of researchers from Zheijang University (China), the Jiaxing Maternity and Child Health Care Hospital (China), and the Harvard School of Public Health (Boston, USA) report their findings that breastfed, Chinese children are indeed less likely to become overweight than their formula-fed counterparts.

Data used in this study were drawn from a large, population-based Chinese health surveillance survey begun in 1993. More specifically, between 1999 and 2009, mothers of ~97,000 children from the Jiaxing region provided detailed breastfeeding information and growth measurement when their infants were 1, 3, and 6 months of age. Since that time, additional information has been collected from these children when possible. Data from a total of 42,550 children were ultimately used in this analysis which investigated the relationships between breastfeeding and risk of being overweight at 4-5 years of age.

The researchers found that over 11% of the Chinese preschool-aged children

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could already be classified as being at risk for overweight. After adjusting for variables that are themselves risk factors for childhood obesity (e.g., mother's age and body mass index, infant's birth weight), the scientists also found that children who had been breastfed for longer periods of time had lower risk for becoming obese than those who were not breastfed or were breastfed for shorter durations. Later introduction of supplementary foods - in other words, longer exclusive breastfeeding - among breastfed infants was also associated with lower risk for obesity. These relationships appeared to be stronger in boys than in girls. The authors concluded "the present findings suggest that longer duration of exclusive breastfeeding is associated with lower risk of becoming overweight in Chinese children." They urge additional studies in other Asian countries to confirm their findings.

Reference: Zheng J-S, Liu H, Li J, Chen Y, Wei C, Shen G, Zhu S, Chen H, Zhao Y-M, Huang T, Li D. Exclusive breastfeeding was inversely associated with risk of childhood overweight in a large Chinese cohort. *Journal of Nutrition* 144:1454-1459, 2014.
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Green, black, and oolong tea extracts help curb weight gain in lab mice

Serving many purposes including sheer enjoyment, disease prevention and treatment, and religious ritual, tea has been part of the human experience for millennia. Recently, the international obesity "crisis" has also prompted researchers to wonder if drinking tea might be involved in regulating energy metabolism and maintaining healthy body weight. Indeed, results from some observational studies have suggested that tea drinkers may be less prone to obesity than people who do not drink tea. In addition, animal studies have shown that common tea components called polyphenols may help reduce weight gain caused by a high-sugar/high fat obesity-causing diet. To help understand this somewhat complicated issue, a research team led by Dr. David Heber (University of California, Los Angeles) studied what happens when laboratory mice are fed a high-fat, high-sucrose diet with or without polyphenol extracts from green tea, black tea, and oolong tea. Their results, showing inhibition of weight gain and anti-inflammatory effects regardless of tea variety, are published in the September 2014 issue of *The Journal of Nutrition*.

This study was designed as a controlled, dietary intervention study using well characterized laboratory mice randomly assigned to one of 5 groups: low-fat, low-sucrose (LF/HS) diet; high-fat, high-sucrose (HF/HS) diet; HF/HS diet supplemented with green tea polyphenols; HF/HS diet supplemented with black tea polyphenols; and HF/HS diet supplemented with oolong tea polyphenols. The polyphenols were extracted and separated from caffeine found in fresh tea leaves collected or purchased in China's Sichuan province and incorporated into the mouse diets. Each mouse consumed the experimental diets for 20 weeks, during which time food intake and body weights were repeatedly monitored. At the end of the dietary treatment, the researchers studied a variety of physiologic outcomes such as

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body fat content and serum biomarkers of inflammation.

The scientists found that all the animals consuming tea extracts gained less weight and visceral fat than controls eating the HF/HS diet that contained no tea polyphenols, but that only the mice consuming the green tea extract had reduced food intake (~10% reduction). In addition, consumption of each of the tea extracts appeared to decrease markers of inflammation. The research team concluded that the polyphenol fractions of teas are biologically active in inhibiting abdominal visceral fat gain on a HF/HS diet, but that these tea extracts are likely working through different mechanisms. They further suggest that using a "combination approach" of different tea varieties may be especially useful in curbing weight gain, but that additional human intervention studies will be needed to test this hypothesis.

Reference Heber D, Zhang Y, Yang J, Ma JE, Henning SM, Li Z. Green tea, black tea, and oolong tea polyphenols reduce visceral fat and inflammation in mice fed high-fat, high-sucrose obesogenic diets. *Journal of Nutrition* 144:1385-1393, 2014.
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Scientists suggest a simple metric can be used to assess growth faltering beyond the first 1000 days

Malnutrition during early life has serious consequences, not only in infancy but also during adulthood. For instance, malnourished infants are at increased risk of illness and death, and are also more likely to experience physical, cognitive, educational, and productivity deficits as adults. As such, there is significant international focus on making sure that pregnant women, infants, and toddlers have access to adequate, nutrient-dense diets, preventive and curative health services, and optimal overall care. Indeed, several international health agencies have implemented special programs to target the "first 1,000 days," which encompasses pregnancy and the first 2 years as the most important windows of opportunity for preventing malnutrition. This focus has been largely based on a constellation of research examining growth faltering using a metric referred to as "height-for-age Z-score" or HAZ. In brief, HAZ is calculated by subtracting a child's expected height from his actual height and then dividing by the standard deviation - a general measurement reflecting variation in height. However, the standard deviation for height of healthy children at different ages is obtained from cross-sectional data of children at different ages, and some researchers question whether or not HAZ is an appropriate measure to describe and compare changes in child height over time as children age. To examine this, a research team led by Dr. Jef Leroy (International Food Policy Research Institute, Washington DC) compared international growth curves generated using HAZ to those obtained when standard deviation was not included in the calculation. You can read more about their approach and findings in the September 2014 issue of *The Journal of Nutrition*.

Leroy and his team conducted their study using data from 51 low- and middle-income countries; a total of 309,215 children's data related to height measurements from birth to 5 years were included. Using both HAZ and the simple difference between actual and expected height at each age (height-for-age difference, HAD), the researchers created graphs showing growth curves for the combined data and also for 5 regions: eastern Europe and central Asia, north Africa and the middle east, Latin America and the Caribbean, south-Saharan Africa, and south Asia.

Results using either the HAZ or HAD method suggests drastic growth faltering during the first 2 years and support the global programmatic momentum to focus on the first 1,000 days of life. However, whereas use of HAZ suggests that this trend levels off after this time, use of HAD shows that children continue to experience additional growth deficits until at least 5 years. The scientists concluded that HAZ is appropriate to compare children's height across populations at a given point in time, but HAD

instead of HAZ should be used to assess changes in height over time as populations of children age. They also urge additional research designed to better understand the dynamics and timing of growth faltering so that it can be prevented throughout the lifecycle.

Reference Leroy JL, Ruel M, Habicht J-P, Frongillo EA. Linear growth deficit continues to accumulate beyond the first 1000 days in low- and middle-income countries: global evidence from 51 national surveys. *Journal of Nutrition* 144:1460-1466, 2014.

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