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Nutrition Research Update

Issue 4

SPECIAL FEATURE

Spoonful of Science: The Great Sugar Debate

Earlier this year, the journal *Nature* published an editorial proposing regulation of sugar in the food supply. The article stirred debate among the health professional community and garnered significant media coverage, further elevating the topic of sugar and food policy. Proposed food legislation has become a divisive issue, piquing the nation's interest in recent years. Several states, including New York and Mississippi have introduced controversial "soda taxes" and the recent news that New York City plans to ban the sale of sugar-sweetened beverages in servings larger than 16 ounces, confirms that regulating sugar intake remains a hot topic.

The *Nature* editorial examines the modern rise of non-communicable diseases, pointing out that of the three factors that contribute to chronic disease – tobacco, alcohol and diet –diet is the only one that is not regulated by the government. The authors state that sugar consumption has tripled worldwide in the past 50 years and recommend that governments focus regulation on added sugars instead of other targets like fat or salt.

The authors evaluate sugar against four criteria that have been largely accepted as justification for the regulation of other substances, like alcohol—unavoidability (prevalence in society), toxicity, potential for abuse and negative impact on society. Taxes on sugar or sweetened beverages and age limits for purchase of high-sugar foods are among the many potential regulatory actions proposed.

As the debate continues about the most appropriate approaches for reducing added sugar consumption in the population, individuals can continue to use simple strategies to reduce sugar intake and achieve a balanced diet, such as choosing a protein-rich breakfast versus one high in sugar. A recent report by the Environmental Working Group showed that two-thirds of children's cereals assessed contained more sugar than federal guidelines consider acceptable. Eating a breakfast that includes high-quality protein may improve satiety and reduce food intake later in the day. One study demonstrated that an egg breakfast, compared to a bagel breakfast of similar calories, increases feelings of fullness and reduces food intake at lunch and decreases snacking, leading to a significant reduction in BMI and waist circumference.

KEY MESSAGES

- While approaches to reduce sugar intake across the population are still a hot topic for discussion, individuals can follow evidence-based strategies to reduce their personal sugar intake; choosing a breakfast with high-quality protein that is low in added sugars as a simple first step.
- The debate over the government's regulating of food is bridging from the academic and public health communities, to become a topic of mainstream conversation.

Sources: Lustig, RH, Schmidt, LA, Brindis CD. Public health: The toxic truth about sugar. *Nature* 2012;482:27-29.

Reddan J, et al. Children's perceived benefits and barriers in relation to eating breakfast in schools with or without Universal School Breakfast. J Nutr Education Behav 2002;34(1):47-52.

Vander Wal JS, Gupta A, Khosla P, Dhurandhar NV. Egg breakfast enhances weight loss. *Int J Obes* 2008;32:1545-51.

Leidi MJ, Bossingham, MJ, Mattes RD, Campbell WW. Increased dietary protein consumed at breakfast leads to an initial and sustained feeling of fullness during energy restriction compared to other meal times. *Br J Nutr* 2009;101(6):798-803.

Environmental Working Group. Sugar in children's cereals: Popular brands pack more sugar than snack cakes and cookies. December 2011. Available at: http://static.ewg.org/reports/2011/cereals/pdf/2011-EWG-Cereals-Report.pdf.

CHOLINE

An article in the May issue of *American Journal of Clinical Nutrition (AJCN)* explored the adequacy of choline recommendations for pregnant women. Choline, like folate, has been shown to play an important role in fetal and infant brain development and decrease the incidence of neural tube defects. In fact, research indicates that folate and choline might work together to prevent neural tube defects such as spina bifida and exencephaly by supporting methyl group metabolism or by keeping homocysteine levels in check. Current *Adequate Intake (AI)* levels of choline are set at 425mg, 450mg and 550mg per day for non-pregnant, pregnant and breast-feeding women, respectively.

The study followed 26 pregnant adult women (27 weeks gestation) and 21 non-pregnant controls consuming either 480mg or 930mg of choline per day for 12 weeks. The controlled-feeding study provided an average of 380mg of choline per day from food sources and either a 100mg or 550mg supplement to achieve the intended levels of choline intake.

Maternal blood samples were collected at 0, 3, 6, 9, 10 and 12 weeks and maternal urine samples at 0, 6, 9 and 12 weeks. Maternal blood sample, placenta tissue and cord blood were also obtained at delivery. Samples were tested for levels of free choline as well as choline metabolites, such as betaine, dimethylglycine, sarcosine, homocysteine and methionine.

The researchers found that pregnancy drastically altered biomarkers of choline metabolism and higher maternal choline intake increased the use of choline as a methyl donor in both the mother and fetus. The researchers concluded that the current recommended level of choline intake during pregnancy is insufficient.

This study used a combination of food sources and dietary supplements to achieve the experimental level of 930mg choline per day. It is important to remember that most prenatal and regular multivitamins provide far less than the *Adequate Intake* for choline. It is important to include choline-rich foods in the diet regardless of supplementation. One egg – including the yolk – contains about 125 milligrams of choline, or roughly one-quarter of the recommended *Adequate Intake*.

KEY MESSAGES

- The current *Adequate Intake* for choline is 425mg, 450mg and 550mg per day for non-pregnant, pregnant and breastfeeding women, respectively.
- Pregnancy may alter choline metabolism, resulting in a demand for choline as a methyl donor that exceeds current recommendations.
- It is important to include choline-rich foods like eggs in the diet and most prenatal and regular multivitamins provide far less than the *Adequate Intake* for choline.

Source: Yan, J, Jiang, X, West, AA, Perry, CA, Malysheva, OV, Devapatla, Spressman, E, Vermeylen, F, Stabler, SP, Allen, RH, Caudill, MA. Maternal choline intake modulates maternal and fetal biomarkers of choline metabolism in humans. AJCN 2012;95(5):1060-71.

PROTEIN

In March, *AJCN* published a study comparing the effects of weight loss diets differing in macronutrient composition from the POUNDS LOST trial. The randomized clinical trial divided 811 overweight or obese participants into one of the following four diet groups:

- Low-fat, average-protein diet (20% fat, 15% protein, 65% carbohydrate)
- Low-fat, high-protein diet (20% fat, 25% protein, 55% carbohydrate)
- High-fat, average-protein diet (40% fat, 15% protein, 45% carbohydrate)
- High-fat, high-protein diet (40% fat, 25% protein, 35% carbohydrate)

Additionally, each participant's diet was customized for a deficit of 750 calories per day, to promote weight loss. Dietary intake was measured in random sample of 50% of subjects using a 5-day diet record at baseline and 24-hour recall on three non-consecutive days at both six and two years follow-up. HDL cholesterol, urinary nitrogen excretion and respiratory quotient were also measured to ascertain macronutrient intake.

Body weight measurements were taken at baseline, six months and two years of follow-up. A random sample of 424 participants were selected to undergo duel-energy x-ray absorptiometry (DXA) scans to determine body composition and 165 of those subjects also received computed tomography (CT) scans to measure abdominal and hepatic fat.

Over the two-year follow-up period, all participants on average lost more fat than lean mass, with no significant differences in body composition, abdominal fat or hepatic fat across the four study diets. The authors concluded that reduction of total energy intake, not a specific macronutrient composition, was the most important determinant of fat loss.

Interestingly, the same issue of *AJCN* featured an editorial on the POUNDS LOST trial, specifically questioning the conclusions related to protein intake and highlighting common limitations of long-term dietary intervention studies. The editorial points out that critical evaluation of the study results reveal that protein intakes did not differ significantly between subjects in the average- and high-protein study groups. Urinary nitrogen excretion, considered a reliable marker of protein consumption, decreased in the high-protein group during the follow-up period to the same level as the average-protein group, indicating that protein intakes for much of the study were similar, differing by only 3g of protein at two years follow-up. The editorial also points out that since all subjects were required to consume a specified calorie level, the study did not take into account the effect of satiety in reducing caloric intake that has been demonstrated in prior research.

KEY MESSAGES

- Long-term dietary intervention studies are challenging, since adherence to a specific diet over a long period of time is difficult for subjects to maintain and intake is typically measured by self report.
- The study authors concluded that reduction of total energy intake was more important than macronutrient composition of the diet in determining fat loss; however, the study required all subjects to consume an isocaloric diet, so the effects of satiety on inhibiting intake could not be ascertained.
- While the study aimed for subjects to consume either 15% or 25% of calories from protein, actual intakes over the course of the two-year follow-up were much more similar, differing by about 3g of protein at two years.

Sources: De Souza, RJ, Bray, GA, Carey, VJ, Hall, KD, LeBoff, MS, Loria, CM, Laranjo, NM, Sacks, FM, Smith, SR. Effects of 4 weight-loss diets differing in fat, protein, and carbohydrate on fat mass, lean mass, visceral adipose tissue, and hepatic fat: results from the POUNDS LOST trial. *AJCN* 2012;95:614-625.

Astrup, A, Pedersen, SD. Is a protein calorie better for weight control? *AJCN* 2012;95:535-536

In The News

Eggs Receive Great For You Seal From Walmart
Reuters
February, 2012
Click Here

Best Breakfasts From Around The World
Today's Dietitian
March, 2012
Click Here

'Egg-cellent' Nutrition
Fox News
April, 2012
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Event Schedule

ENC is participating in the following conferences during the 2012 calendar year:

American Academy of Nurse Practitioners National Conference
Wednesday, June 20 – Sunday, June 24, 2012
Orlando, FL

American Association of Family & Consumer Sciences Annual Conference & Expo
Monday, June 25 – Wednesday, June 27, 2012
Indianapolis, IN

IDEA World Fitness Convention
Thursday, July 5 – Sunday, July 8, 2012
San Diego, CA

Academy of Nutrition & Dietetics Food and Nutrition Conference & Expo
Saturday, October 6 – Tuesday, October 9, 2012
Philadelphia, PA

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