



The following articles are being published in the June 2018 issue of *The American Journal of Clinical Nutrition (AJCN)*, a publication of the American Society for Nutrition. Full summaries and analyses are available on the [ASN website](#). Links to the articles are below. Articles published in AJCN 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.

**Eggs: making a science-based return to the “healthy food” list
Randomized trial finds no harm in eating more than 12 eggs weekly on a variety of health outcomes, including blood lipids and oxidative stress.**

Fuller NR, Sainsbury A, Caterson ID, Denyer G, Fong M, Gerofi J, Leung C, Lau NS, Williams KH, Januszewski AS, et al. Effect of a high-egg diet on cardiometabolic risk factors in people with type 2 diabetes: the Diabetes and Egg (DIABEGG) Study—randomized weight-loss and follow-up phase. *American Journal of Clinical Nutrition* 2018;107:921–31.

Astrup A. Goodbye to the egg-white omelet—welcome back to the whole-egg omelet. *American Journal of Clinical Nutrition* 2018;107:853–4.

**Revisiting basic nutrition science: assessing protein absorption
Researchers report new method, using stable isotope-labeled proteins, to measure how much of food protein is actually absorbed into the blood. They find that values vary by type of protein and processing methods.**

Devi S, Varkey A, Sheshshayee MS, Preston T, Kurpad AV. Measurement of protein digestibility in humans by a dual-tracer method. *American Journal of Clinical Nutrition* 2018; 107:984–91.

Tomé D. Editorial on “Measurement of protein digestibility in humans by a dual tracer method—a key limiting factor of protein quality. *American Journal of Clinical Nutrition* 2018;107:855–6.

**Researchers evaluate nationwide folic acid intake in the postfortification era
Results from newly published study suggest that red blood cell folate concentrations are consistent with neural tube defect prevention for most US women, but that some cases still might be prevented by consuming additional folic acid from supplements and fortified foods.**

Crider KS, Qi YP, Devine O, Tinker SC, Berry RJ. Modeling the impact of folic acid fortification and supplementation on red blood cell folate concentrations and predicted neural tube defect risk in the United States: have we reached optimal prevention? *American Journal of Clinical Nutrition* 2018;107:1027–34.

Molloy AM, Mills JL. Fortifying food with folic acid to prevent neural tube defects: are we now where we ought to be? *American Journal of Clinical Nutrition* 2018;107:857–8.

Sugar may activate brains of teens at risk of obesity more than fat

Using functional magnetic resonance imaging of the brain, study finds that teens at high risk of becoming obese have greater activation of several important brain regions in response to consuming highly appetizing foods, particularly those high in sugar.

Shearrer GE, Stice E, Burger KS. Adolescents at high risk of obesity show greater striatal response to increased sugar content in milkshakes. *American Journal of Clinical Nutrition* 2018;107:859–66.

Eggs: making a science-based return to the “healthy food” list

Background For decades, health experts have largely recommended that we reduce our cholesterol consumption to lower overall cardiovascular disease risk. Originally, this dietary guidance was based on several large studies that found statistical associations between consuming diets rich in cholesterol and heart disease, leading to recommendations to reduce consumption of foods such as eggs, meat, and milk that contain significant amounts of cholesterol. Recently, a growing body of research has raised questions about the direct causal relation between dietary cholesterol intake and circulating plasma cholesterol, and observational evidence has suggested that the statistical associations between dietary cholesterol and heart disease were being driven by other factors, such as physical inactivity and obesity. Moreover, results from several studies now suggest that consuming eggs—rich in a variety of vitamins, minerals, and healthy fats and protein—may *lower* risk for stroke and type 2 diabetes. The June 2018 issue of *The American Journal for Clinical Nutrition* contains an additional study concluding that eggs can be consumed as part of a healthy diet.

Study Design This research, led by Nicholas Fuller (University of Sydney, Australia), represented a follow-up study originally designed to assess the impact of weekly consumption of at least 12 eggs (compared with consuming fewer than 2 eggs) on cardiovascular disease risk factors—for example, circulating cholesterol concentrations—in individuals with prediabetes or type 2 diabetes. The original shorter study found no adverse effects of consuming more eggs. In this study, the same participants continued with their low- or high-egg diets while implementing a weight-loss plan for 3 months, followed by a 6-month period during which time they continued with their assigned egg-consumption protocol. A total of 128 individuals were evaluated for a variety of health outcomes such as circulating blood sugar, serum lipids, markers of inflammation, and signs of oxidative stress.

Results and Conclusion Regardless of whether they were eating fewer than 2 or at least 12 eggs each week, subjects lost an average of ~6 pounds (3 kg) of weight. Similarly, there were no differences in any of the laboratory tests assessed. The researchers concluded: “A healthy diet based on population guidelines and including more eggs than currently recommended by some countries may be safely consumed.” This is good news for this low-cost, nutrient-dense, whole food that has played a major role in keeping individuals and families healthy for generations.



References

Fuller NR, Sainsbury A, Caterson ID, Denyer G, Fong M, Gerofi J, Leung C, Lau NS, Williams KH, Januszewski AS, et al. Effect of a high-egg diet on cardiometabolic risk factors in people with type 2 diabetes: the Diabetes and Egg (DIABEGG) Study—randomized weight-loss and follow-up phase. *American Journal of Clinical Nutrition* 2018;107:921–31.
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For more information

For the complete article, go to: <https://academic.oup.com/ajcn/article/107/6/921/4992612>
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For the complete editorial, go to: <https://academic.oup.com/ajcn/article/107/6/853/5032667>
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Revisiting basic nutrition science: assessing protein absorption

Background Protein represents an important dietary component because it not only contributes energy, but also amino acid building blocks and nitrogen critical to the synthesis of molecules essential for life. However, not all dietary protein is created equal. This is because, of the 20 amino acids we need for life, there are 9 that we cannot make ourselves and therefore must get from the diet. Dietary proteins containing all 9 of these “indispensable amino acids” are called “complete proteins,” whereas dietary proteins lacking one or more of them are referred to as “incomplete proteins.” In addition, there is variability in terms of how easily the body digests and absorbs proteins. Nutrition scientists have long been interested in characterizing dietary protein quality and digestibility so that protein recommendations can be tailored to age, health, and availability of various foods. However, this has been hampered by an inability to accurately measure what percentage of a food’s amino acids is actually absorbed in the intestine and utilized by the body. In an article published in the June 2018 issue of *The American Journal of Clinical Nutrition*, a research team led by Anura Kurpad (St. John’s National Academy of Health Sciences, India) describe a promising new method utilizing stable (nonradioactive) isotopes to do just that.

Study Design The researchers conducted 2 experiments. In the first, they fed a combination of stably labeled amino acids and stably labeled spirulina proteins to 3 men and 3 women and measured the appearance of both in the blood. Spirulina is a well-studied form of blue-green algae and is widely available as a dietary supplement. In the second study, they fed stably labeled chickpea and mung bean proteins (in a curry) and compared their digestibility and absorption to that of spirulina. The research team also studied the impact of food processing on amino acid absorption.

Results They found that ~85% of the spirulina protein was absorbed into the blood, compared with ~57% for both chick peas and mung beans. Dehulling the mung beans increased the relative absorption of the amino acids they contained by ~10%.

Conclusions The authors concluded that this method might be important in terms of better characterizing amino acid availability of various food types, particularly in regions of the world where high-quality protein foods are not commonly consumed. This might be especially important for optimizing protein nutrition in growing children and individuals suffering from chronic infections and illness.



References

Devi S, Varkey A, Sheshshayee MS, Preston T, Kurpad AV. Measurement of protein digestibility in humans by a dual-tracer method. *American Journal of Clinical Nutrition* 2018;107:984–91.

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For more information

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Researchers evaluate nationwide folic acid intake in the postfortification era

Background Neural tube defects are a group of congenital conditions characterized by incomplete closure of the spinal column during early fetal development. Neural tube defects (for example, spina bifida) can result in serious and life-threatening physical and physiological problems. The US Centers for Disease Control and Prevention (CDC) estimates that ~3,300 US infants are born with some form of neural tube defect annually. The good news is that the prevalence of neural tube defects has decreased over the past several decades. This welcomed trend is thought to be largely due to the federally driven decision to require all foods labeled as being “enriched” to contain a specified amount of folic acid (a synthetic form of the B-vitamin folate). In addition, all sexually active women of child-bearing age are encouraged to take folic acid-containing supplements. These measures were taken because scientific evidence shows that consuming folic acid can lower risk of giving birth to an infant with a neural tube defect. In an article published in the June 2018 issue of *The American Journal of Clinical Nutrition*, Krista Crider (CDC) and colleagues evaluated whether current folate and folic acid consumption among reproductive-age women is adequate in terms of neural tube defect prevention.

Study Design The researchers used data collected as part of the CDC’s National Health and Nutrition Examination Survey between 2007 and 2012. Data from a total of 4,783 women were evaluated. Folate intakes from foods as well as folic acid intake from vitamin supplements, enriched cereal grain products, and fortified ready-to-eat foods (like breakfast cereals) were estimated using dietary recall. Each woman also provided a blood sample, which was analyzed for the amount of folate found in red blood cells (an indicator of folate status).

Results The researchers estimated that, based on red blood cell folate concentrations, the women in the study were at risk of ~7 in every 10,000 live births being affected by a neural tube defect. This estimate increased to ~9 in every 10,000 live births for women whose only source of folic acid was through enriched cereal grains.

Conclusions The research team concluded that currently in the United States red blood cell folate concentrations are consistent with neural tube defect prevention for most women. Nonetheless, between 345 and 701 additional neural tube defects could be prevented each year if women who are currently consuming folic acid only from enriched cereal grains also ate fortified breakfast cereals and/or took folic acid supplements to achieve the recommended daily intake amount of 400 µg folic acid.



References

Crider KS, Qi YP, Devine O, Tinker SC, Berry RJ. Modeling the impact of folic acid fortification and supplementation on red blood cell folate concentrations and predicted neural tube defect risk in the United States: have we reached optimal prevention? *American Journal of Clinical Nutrition* 2018;107:1027–34.

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Sugar may activate brains of teens at risk of obesity more than fat

Background The increase in obesity among teenagers is one of the most alarming aspects of today's global obesity. Over the past 2 decades, the percentage of obese American teens doubled. Although inadequate physical activity plays a role in excess weight gain, much of it is due to overconsumption of unhealthy foods. The million-dollar question remains as to why only some individuals choose unhealthy food whereas others, often without even thinking about it, simply do not. One possibility is that the former get more pleasure out of eating than the latter. To test whether this might be true, Kyle Burger and Grace Shearrer (University of North Carolina at Chapel Hill) conducted an insightful experiment in which they studied brain responses when adolescents tasted various types of milkshakes. Their results indicating that healthy-weight adolescents at high-risk of becoming obese are particularly sensitive to sugar are published in the June 2018 issue of *The American Journal of Clinical Nutrition*.

Study Design A total of 108 healthy-weight teens (average age: 15 years) were studied; 53 were considered high-risk for obesity because both of their parents were overweight or obese, whereas the others were low-risk because both parents had healthy weight. Each participant consumed (in random order) a series of chocolate milkshakes with varying amounts of fat and sugar but similar in taste during a functional magnetic resonance image (fMRI) scan.

Results The scientists found that the sensory-related regions of the brains of the high-risk teens responded more strongly than those of the low-risk teens to all of the milkshakes (compared with the control solution). Moreover, several brain regions of the high-risk participants particularly responded to consuming the high-sugar (moderate-fat) milkshake. Similar differences between low- and high-risk subjects were not seen after consuming the high-fat milkshakes.

Conclusions The scientists concluded that having an overweight or obese parent during adolescence is associated with greater activation of several important brain regions in response to consuming highly appetizing foods, particularly high-sugar ones. This might, at least in part, contribute to overeating and weight gain during this important period of life.



Reference

Shearrer GE, Stice E, Burger KS. Adolescents at high risk of obesity show greater striatal response to increased sugar content in milkshakes. *American Journal of Clinical Nutrition* 2018;107:859–66.

For more information

For the complete article, go to: <https://academic.oup.com/ajcn/article/107/6/859/4996574>

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