

## Credible Science Incredible Egg

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### Coming Events

ENC staff will be exhibiting at the following health professional conferences:

#### IDEA World of Fitness

August 11-14, 2011  
Los Angeles, California

#### American Academy of Family Practitioners

September 14-17, 2011  
Orlando, Florida

#### Food and Nutrition Exhibition and Conference (ADA)

September 24-27, 2011  
San Diego, California

#### American College of Nurse Practitioners

October 5-9, 2011  
Denver, Colorado

ENC will be speaking at the following health professional conferences:

#### Virginia Physician Assistants Annual Conference

July 28, 2011  
Virginia Beach, Virginia

#### Protein Course for food formulators: Bridge2Food

June 15, 2011  
New Orleans, Louisiana

#### ENC Mission Statement:

*ENC is a credible source of nutrition and health science information and the acknowledged leader in research and education related to eggs.*

**Nutrition Close-Up** is a quarterly publication written and produced by the Egg Nutrition Center.

**Nutrition Close-Up** presents up-to-date reviews, summaries and commentaries focused on the role of diet in health promotion and disease prevention, including the contributions of eggs to a nutritious and healthful diet.

*Executive Editor:*  
Mitch Kanter, PhD

*Writer/Editor:*  
Marcia Greenblum MS, RD

Egg Nutrition Center



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#### SPECIAL FEATURE

## Breakfast— The Meal of Health.

By Roger Clemens  
DrPH, CNS, FACN, FIFT  
Excerpted with permission from  
Journal of Food Technology



Breakfast composition around the globe is dependent on resources, culture, and tradition. Bao (steamed pork buns), *Congee* (rice porridge), and *You Tiao* (fried dough strips dipped in hot soy milk) are popular in China. A traditional breakfast in India often includes *Aloo Poha* (cooked rice with mustard seeds, curry and coriander leaves, and chilies) and *Rawa Dosa* (crepe from semolina and rice flour with buttermilk, coconut and cashew nuts, plus coconut chutney). Then there is *Natto* (bean condiment with rice) in Japan and, moving west, *Kasha* (grain-based porridge with fruit) in Russia, *Ful Medames* (fava beans with garlic) in Egypt, and churros and chocolate in Spain. Mexicans enjoy *Huevos Rancheros* (eggs on a flour tortilla plus salsa and cheese) or burritos, and *Arepas* (fried eggs, shredded beef, and black beans) is popular in Venezuela.

*“An egg-based breakfast was more effective than a bagel-based meal in leading to weight loss among obese adults.”*

These breakfasts may be categorized as either carbohydrate-rich or protein-and fat-rich. These breakfast choices are often high in sugar and saturated fat and low in dietary fiber. Total protein is usually adequate. Incorporating legumes is common, as is the use of tree nuts. Further assessments of these meals suggest there are numerous inadequacies in most vitamins and minerals, but in many countries, the association of meal composition and health outcomes is seldom considered.

Numerous studies during the past decade indicate that breakfast composition, particularly protein quality, and breakfast frequency may influence weight management, especially among children and adolescents. Leidy and Racki (2010) demonstrated that high-protein breakfasts (~48 g protein primarily from whey and eggs), fed 5 times/week to adolescents who typically skipped the morning meal, contributed to greater postprandial fullness. Total plasma PYY (appetite-suppressing hormone) concentrations increased following the 4-hr postprandial assessment period in the protein-rich group and were significantly greater than concentrations detected among breakfast skippers and individuals eating a normal (~18 g protein) breakfast.

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# Recent ENC-Sponsored Symposium Highlights Controversies Surrounding Dietary Cholesterol.

The Egg Nutrition Center sponsored a symposium at the Experimental Biology meetings in April in Washington DC entitled, *“Exploring the Factors That Impact Blood Cholesterol and Heart Disease Risk: Is Dietary Cholesterol as Bad for You as History Would Lead Us to Believe?”*. Symposium presenters were Dr. David Katz from Yale-Griffin Hospital in New Haven, Connecticut; Dr. Maria-Luz Fernandez from the University of Connecticut; Dr. Penny Kris-Etherton from Penn State University; and Dr. Casey Vickers, a Post Doctoral Research Fellow at the National Heart, Lung and Blood Institute (NHLBI) in Bethesda, MD. Dr. Mitch Kanter, Executive Director of ENC, served as the symposium moderator.

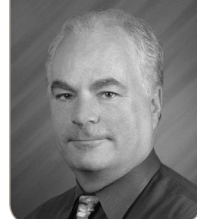
Among other things, all of the experts on the panel spoke about the controversies surrounding dietary cholesterol intake and its relationship with serum cholesterol levels and cardiovascular disease (CVD) risk.

Dr. Fernandez pointed out that we absorb about 60% of the dietary cholesterol that we consume, and that roughly 80% of our serum cholesterol level is the result of cholesterol that our body synthesizes; only about 20% of our serum cholesterol is the result of ingested cholesterol. She further pointed out that data from some of the more robust epidemiological data bases, included NHANES and the Nurses’ Health Study suggest that dietary cholesterol is not related to an addition increased risk of CVD.

In addition, Dr. Fernandez presented data from her laboratory in subjects who were required to consume three eggs per day. Sixty six percent of the study participants did not experience an increase in plasma cholesterol; of the 33% that did respond, most experienced an increase in both LDL and HDL, which resulted in the maintenance of the LDL/HDL ratio, a key biomarker for heart disease risk. Further, when egg consumption was accompanied by weight loss only HDL levels increased, resulting in an overall improvement in the LDL/HDL ratio.

Dr. Kris-Etherton indicated that when assessing the impact of dietary cholesterol on serum cholesterol and CVD risk other factors such as individual variation, the total amount of cholesterol consumed, the amount of saturated fat in the diet, as well as the P/S ratio of the diet, and total intake of macronutrients, particularly protein, must be taken into account.

By Mitch Kanter, Ph.D.  
Executive Director,  
Egg Nutrition Center



Dr. Katz cited much of his own research on the impact of dietary cholesterol on endothelial dysfunction (a dynamic measure of vascular health and CVD risk) in healthy and hypercholesterolemic subjects, indicating that intake of two eggs per day for six weeks had no impact on endothelial function or serum cholesterol levels in normo- or hyperlipidemic subjects.

He further pointed out that we don’t know yet whether long-prevailing advice to restrict egg intake, for example, has compromised overall diet quality, a question he felt needs to be addressed.

Dr. Vickers spoke about the complexities associated with diet and lipoprotein metabolism, citing, among other things, data indicting that high fat diets tend to down- regulate cholesterol biosynthesis gene expression.

A couple of the presenters cited dietary recommendations from various health and governing bodies around the world indicating that a strict upper limit on dietary cholesterol intake (within the context of an overall healthy diet) may not be as beneficial as meeting recommended limits on saturated fats.

Overall, the symposium underscored the fact that the impact of lifestyle on disease risk is affected by many dietary and lifestyle factors, all of which contribute to serum lipid levels. The relevance of data collected as long as 40 years ago to today’s population is open for discussion, and there is much we need to learn about the diet/disease relationship.

The symposium was very well attended, and it generated some spirited discussions between the audience and the presenters at the conclusion of the meeting. We are contemplating publication of a manuscript that highlights key points discussed during the symposium. ✨

## MESSAGES

- Speakers stated that following a low to moderate saturated fat diet is more beneficial to health than maintaining a strict limit on dietary cholesterol.
- There is still much we need to learn about the diet and disease relationship.

# Should We Be Taking Sodium Intake With a Grain of Salt?

## Has sodium been getting a bad rap?

A new study would have you believe so<sup>[1]</sup>. As a dietitian who has worked with hundreds of people who have diabetes and/or heart disease, I’ve probably talked myself blue about the importance of cutting back on sodium. The reality is that it’s hard to eat less. Wouldn’t it be great if we could start shaking salt on our foods again or reach for a handful of potato chips without feeling twinges of guilt?

## To be fair, sodium isn’t all that bad.

After all, it’s needed to help regulate fluid balance in the body. And our kidneys do a great job of controlling how much sodium we keep in our bodies, excreting any excess in the urine. But in the event that your kidneys aren’t working so well (maybe due to diabetes, for example), sodium tends to stick around, making it harder for your heart to pump, and raising blood pressure.

The 2010 Dietary Guidelines for Americans tell us that we’re supposed to reduce our sodium intake to less than 2300 milligrams (mg) per day – that’s about a teaspoon of salt. Most of us consume at least 3400 mg per day. If you happen to be over the age of 51, or African American or have high blood pressure, diabetes or chronic kidney disease (which cumulatively is about half of the American population) your

*“Reduce our sodium intake to less than 2300 milligrams (mg) per day – that’s about a teaspoon of salt.”*

goal, according to the Guidelines, is no more than 1500 mg per day. Most of our sodium comes from processed foods such as cold cuts, hot dogs, canned soup, cheese, and pizza. Even some cereals, salad dressings and desserts are surprisingly high in sodium.

A study published in the May 4 issue of the Journal of the American Medical Association begs to differ with the whole notion that too much sodium can cause problems. The authors of this study followed almost 3700 European men and women for eight years, measuring urine sodium excretion, blood pressure and cardiac events, such as heart attack, heart failure and stroke.

By Amy Campbell, MS, RD, CDE  
Manager, Clinical Education Programs,  
Healthcare Services  
Joslin Diabetes Center



## The results?

The people who excreted the lowest amount of sodium in their urine were 56% more likely to die from heart disease compared to those excreting higher amounts of sodium. (On a population basis, urinary sodium reflects average salt consumption). And the amount of sodium excreted seemed to have little effect on blood pressure. These findings go against the grain of what dietitians, physicians and other health professionals have been telling us for years: too much sodium may raise blood pressure, which in turn, may increase mortality rate. But, as with many studies, there were some weaknesses with the design, including and the fact that other potentially confounding factors weren’t considered, such as physical activity and calorie intake.

## What does this mean for you?

It’s hard to ignore the many other, well-designed studies linking a high sodium intake with high blood pressure. And since one in three Americans has high blood pressure, it makes sense, at least at this time, to cut back on sodium, along with reaching a healthy weight and fitting in more physical activity. So, as tempting as it may be to reach for the salt, my advice is to keep the salt shaker in the cupboard and grab the pepper mill instead! ✨

## References:

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## MESSAGES

- Most of our sodium comes from processed foods such as cold cuts, hot dogs, canned soup, cheese, and pizza. Even some breakfast cereals, salad dressings and desserts are surprisingly high in sodium.
- One recent study published in JAMA found people who excreted the lowest amount of sodium in their urine were 56% more likely to die from heart disease compared to those excreting higher amounts of sodium.

# How to Fuel Your Body for Exercise.

Food is fuel for exercise, and equally so for recovery. Without the right mixture of fuel your body won't perform at its best, and you won't get the results you desire.

A lot of people think what they eat only matters if they are training for a marathon or other high endurance sport. But the truth is, it is also very important for the average person, the non-athlete, who is strictly trying to get in better shape for their overall health and perhaps trying to lose some weight as well. If embarking on a new exercise regime it is very important that one considers this, so as not to get discouraged about slow progress.

By Keri Gans, MS, RD, CDN  
Nutrition Consultant, Author,  
The Small Change Diet



in the morning before breakfast I also suggest a small snack, instead of waiting until after breakfast.

As for a post exercise meal, since your muscles need protein for recovery and growth, I highly recommend trying to eat something within one hour. If breakfast, lunch or dinner fall into that timetable then a snack may not be needed. Keep in mind though that too more protein is not necessarily better and you do not need to start stocking up on protein powder or high protein energy bars. A simple balanced snack or meal will do the trick.

**Some of my favorite snack ideas are:**

- One slice of whole wheat bread with tablespoon natural nut butter (peanut, almond, cashew or soy).
- One cup oatmeal made with a cup of non-fat or low-fat milk.
- One cup of non-fat or low fat Greek yogurt with a cup of berries.
- Half cup of low-fat cottage cheese with medium peach.
- Eight-ounce low-fat chocolate milk.
- One hard-cooked<sup>[1]</sup> egg with a small banana.
- String cheese (or another single serving package) with an apple.
- 1 ounce serving of nuts (walnuts, almonds, pistachios, cashews) and a piece of fruit.
- Individual can of tuna (water-packed) on a whole-grain crisp bread cracker.
- Three slices turkey breast on a small 100% whole grain pita.

The other important thing to remember when talking about fuel for exercise is how you eat the rest of the day. If you work out for an hour, have a nutrient-dense snack (as above) before and/or after, but then eat junk the rest of the day, you are surely defeating the purpose. An overall healthy diet is important first and foremost; an excellent exercise routine is not enough on its own.

I encourage all my patients to eat three meals a day, plus one to two snacks. And most importantly to build balanced meals consisting of a one-quarter plate of high fiber carbohydrates (whole wheat pasta, whole wheat couscous, oats, barley, or quinoa), one-quarter plate of lean protein (eggs, seafood, skinless poultry, sirloin, beans, or tofu) or low-fat dairy (milk, yogurt, cottage cheese, or cheese), half plate of fruits and vegetables and to include healthy fats (avocado, olive oil, or nuts). Without proper nutrition, our bodies cannot perform

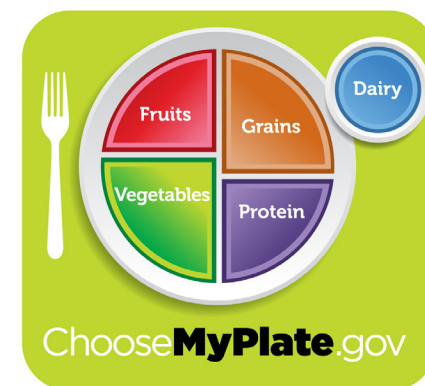
at their best and our personal health and exercise goals impossible to reach. ✨

**References:**

1. To hard-cook an egg, eggs should be taken off the heat when they come to a boil and then rest in the boiling water for 15 mins before cooling.

**MESSAGES**

- A combination of high fiber carbohydrates and protein is ideal pre and post exercise, the carbohydrates for quick energy and the protein to build and maintain muscles.
- As for a post exercise meal, since your muscles need protein eating something with high quality protein within one hour is recommended.



- Make at least half your grains whole grains
- Vary your veggies
- Focus on fruit
- Get your calcium rich foods
- Go lean with protein
- Find your balance between food and physical activity
- Keep food safe to eat

Continue from page 1

## Breakfast – The Meal of Health.

Importantly, the active ghrelin (appetite-stimulating hormone) tended to decline during this period and was significantly lower than levels found in breakfast skippers yet greater than in those consuming normal protein breakfasts.

Timlin et al. (2008) reported during a 5-year longitudinal study among adolescents (Project EAT) that increased breakfast frequency contributed to improved nutrient intake and decreased BMI. Alfenas et al. (2010) demonstrated that normal weight adult subjects fed high-quality protein (casein, whey, soy at ~25 g protein/meal) over 7-day periods tended to decrease total daily energy intake; satiety, postprandial thermogenesis, and respiratory quotient were also affected. Interestingly, satiety assessment indicated a greater sense of fullness with the dairy proteins vs the soy protein, even though the meals were isocaloric. Similarly, Vander Wal et al. (2008) demonstrated an egg-based breakfast was more effective than a bagel-based meal in leading to weight loss among obese adults without impacting typical blood lipid profiles. Grief and Miranda (2010) also demonstrated breakfast and exercise are important for weight management.

Breakfast consumption among children and adolescents is also associated with improved cognitive and physical performance. In a recent review, Benton (2010) noted the critical impact of nutrients such as iodine, iron, zinc, and folic acid during nutrient-sensitive periods of brain growth and neurodevelopment, particularly during the last third of pregnancy and the first two years of life. Pollitt and Mathews (2008) noted that in the absence of breakfast, there is impaired cognitive function and learning abilities, particularly among nutritionally at-risk children. Interestingly, Mathayya et al. (2007) observed that the introduction of mid-morning snacks to 7-to-9-year-old children often improved memory. Kleinman et al. (2002) reported similar improved academic performance as well as nutritional status among children participating in school breakfast programs.

These findings illustrate the importance of breakfast in improving cognitive function and the potential value of a protein-rich morning meal in maintaining or possibly reducing body weight. These outcomes are critical for school-age children and represent important factors in curbing obesity within this at-risk population. ✨

**References:**

1. References cited in this article are available from the author. Roger Clemens; Contributing Editor, Chief Scientific Officer, ETHorn, La Mirada, Calif. rclemens@ethorn.com

**MESSAGES**

- Numerous studies during the past decade indicate that breakfast composition, particularly protein quality, and breakfast frequency may influence weight management and cognitive function, especially among children and adolescents.
- Recent research demonstrated that high-protein breakfasts fed 5 times/week to adolescents who typically skipped the morning meal, contributed to greater postprandial fullness.

# Color in Foods is More Than Just Pleasing to the Eye.

Age-related macular degeneration (AMD) is the leading cause of blindness in the Western world and is associated with lower levels of macular pigments, lutein, zeaxanthin and their metabolites. The retina is also susceptible to oxidative damage due to light and the relatively high content of polyunsaturated fatty acids. Thus, epidemiological studies were designed to investigate the effects of carotenoids and other dietary antioxidants on the risk of developing AMD. A 1994 study showed that certain carotenoids were associated with a lower risk of AMD and that the strongest association was found for lutein plus zeaxanthin. Additionally, a higher frequency of intake of spinach and collard greens was associated with a substantially lower risk for AMD (Seddon et al., 1994). Some subsequent epidemiological studies found similar effects, but in other studies the effects were not statistically significant. This mixed pattern of results suggests that consumption of foods rich in lutein and zeaxanthin may help reduce the risk for developing AMD.

*“Consumption of fruits, vegetables and eggs that are good sources of lutein and zeaxanthin, may help decrease the risk of developing AMD.”*

The Dietary Guidelines for Americans, since their inception in 1980, have exhorted us to eat a variety of foods including a variety of fruits and vegetables. In the earlier editions of the Guidelines primary rationale for fruit and vegetable variety was to assure adequate intakes of vitamins and different types of dietary fiber. Then in 1995 and subsequent revisions, the Guidelines more specifically emphasized the importance of color in the selection of fruit and vegetable variety as in *“Choose dark-green leafy and deep-yellow vegetables often”*. The importance of a varied diet to provide a range of pigmented compounds has also been popularized through books such as David Heber’s *“What color is your diet?”*

We don’t often think of eggs as contributing plant-based pigments to our diet. However, the yellow color of egg yolks is a reflection of the exposure of hens to the carotenoids, lutein and zeaxanthin, through their feed, especially if corn is a component, or free-range access to plants. In general, the greater the exposure the more intense the yolk color.

By Robbie Burns, PhD  
President,  
Nutrition Implications, LLC



Lutein and zeaxanthin are commonly added to poultry feed and the recent USDA National Nutrient Database (SR23) reports that on average one extra large egg provides 282 mcg lutein plus zeaxanthin.

Although lutein and zeaxanthin are both yellow, common dietary sources include dark green vegetables such as kale, spinach and broccoli, as well as corn and oranges. Foods which are the major contributors of lutein and zeaxanthin to the diet have been analyzed. This information in conjunction with food intake data from the National Health and Nutrition Examination Survey (NHANES) indicates that the 50th percentile of lutein plus zeaxanthin intake is about 1.6 mg per day for adults (Mares-Perlman et al., 2001). With the development of improved analytical techniques, more recent estimates show that lutein intakes are approximately 3 to 10 times higher than intakes of zeaxanthin (Johnson et al, 2010). The ratio increases with age and also reflects the prominent dietary patterns among different ethnic groups, being lowest

for Mexican Americans. Eggs are estimated to contribute between 30% and 40% of the average total zeaxanthin intake but less than 10% of total lutein intake of the ethnic groups analyzed (Johnson et al, 2010).

Lutein and zeaxanthin are both in the xanthophyll subclass of the carotenoids and are not precursors to vitamin A. They have, however, other important biological roles. Due to specific binding proteins they are concentrated in the lens and retina of the eye where they absorb blue light and function as antioxidants. Other carotenoids are not similarly concentrated in the retina and the xanthophylls are not concentrated to the same degree in other tissues, thereby providing clues that lutein and zeaxanthin may have unique roles in eye health. In the central retina or macula, zeaxanthin is the prominent carotenoid, whereas lutein dominates in the peripheral retina (Lindshield and Erdman, 2006). The only source of these compounds is the diet as they cannot be synthesized by the body.

Dietary intake per se may not tell the whole story, especially with carotenoids where bioavailability is a key factor. For instance, in healthy men the bioavailability of lutein was higher from lutein-enriched eggs than from other sources such as spinach or lutein supplements (Chung et al., 2004). Additional factors, including small amounts of dietary fat in salad dressings, which impact the bioavailability of carotenoids are described further in Lindshield and Erdman (2006). In addition, the earlier studies estimated intakes of lutein plus zeaxanthin, but due to their differential concentrations in regions of the retina, one may be more important than the other. Newer food composition data will facilitate a separation of the effects of lutein from those of zeaxanthin.

In addition to epidemiological studies examining associations between risk for AMD and the intake of lutein and zeaxanthin and foods that are rich sources, intervention studies have looked at the impact of supplementation on AMD. Development of AMD occurs over many years; therefore investigators have used macular pigment density as an intermediate marker. The provision of additional (add al to addition) lutein and/or zeaxanthin can increase macular pigment density, but the relationship of this increase to protection against AMD is uncertain (see Trumbo and Ellwood, 2006).

Nevertheless, the plausible biological mechanism along with promising epidemiological data, prompted the initiation of a large intervention trial, known as the Age Related Eye Disease Study 2, where daily doses of 10 mg lutein and 2 mg zeaxanthin are being evaluated in people with high risk for AMD progression (Bernstein, 2009). Since AMD develops over many years, it will be some time before data are available.

Considering the prevalence of AMD in older individuals coupled with its irreversibility and limited treatment options, the prudent approach is elimination of all known risk factors such as smoking and prevention through dietary choices. Although there is still not definitive scientific proof, the available evidence indicates that consumption of fruits,

vegetables and eggs that are good sources of lutein and zeaxanthin, may help decrease the risk of developing AMD. Doing so poses little to no risk and will likely confer broader health benefits both through other natural components of such foods and the increased dietary diversity. \*

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## MESSAGES

- Certain carotenoids are associated with a lower risk of AMD, the strongest association was found for lutein plus zeaxanthin.
- The yellow color of egg yolks is a reflection of the exposure of hens to the carotenoids, lutein and zeaxanthin, through their feed, especially if corn is a component, or free-range access to plants.
- While eggs contain small amounts of lutein and zeaxanthin relative to some vegetable sources, research shows that these nutrients may be more bioavailable from eggs than from richer sources.

## HAPPENING AT ENC

### Anna Shlachter – new to our ENC staff.

ENC is very pleased to announce that Anna Shlachter, MS, RD, LDN has joined our staff as Program Manager, Nutrition and Research. Anna is a Registered and Licensed Dietitian who completed her MS at *Illinois State University* and her Dietetic Internship at *Edward Hines Jr. VA Hospital*. Anna previously worked in a public health setting at the *Women, Infants and Children (WIC) Program* as the Nutrition Education Coordinator/ Sr. Dietitian.

Anna has held leadership roles within the dietetics profession at the local and state levels. She is the Immediate Past President of the *Illinois Dietetic Association* and is the ADA *Let’s Move Liaison for Illinois*. She enjoys educating other health professionals and the public. \*

