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

DID YOU KNOW THAT EGGS ARE PART OF THE MEDITERRANEAN DIET?

Hundreds of scientific studies have shown the health-promoting properties of the Mediterranean Diet. Often associated with fish, olive oil, and red wine, the Mediterranean Diet also includes other foods such as eggs. We are excited to announce our new education material, created with the Mediterranean Foods Alliance, describing the Mediterranean Diet and the history of eggs within this healthy eating plan. Please visit the Patient/Client Educational Materials tab on our website, www.eggnutritioncenter.org to download this tool and others available from ENC.
Research continues to advance our understanding of muscle metabolism and the broader public health consequences of manipulating dietary protein intake. In recent years, multiple research publications, opinion papers, and lay press articles have argued that protein intakes greater than 1.0 g/kg/day may confer health benefits beyond those afforded by the current Recommended Dietary Allowance (RDA) for protein (0.8 g protein/kg/day).

The RDA for protein describes the minimum amount of protein required daily to prevent deficiency for a healthy adult population. It specifies a standard for health policy and public health concerns. But how useful is the RDA in a prescriptive capacity? Does it provide specific guidance on choosing healthy meals? Consider the following:

- Muscle protein synthesis (a research “surrogate” for the potential to build and repair muscle) gets maximally stimulated in response to a rapid and robust increase in plasma (intracellular) amino acids.
- For most healthy adults, a meal containing approximately 30 g of high-quality protein will maximally stimulate muscle protein synthesis.
- While some groups with greater energy demands (e.g., athletes, patient populations) may benefit from slightly more protein per meal and per day, increasingly large servings of protein (i.e., >40-50 g) likely provide a limited additional protein synthetic advantage.
- The human body has limited capacity to transiently store “excess” dietary protein from a large single meal and use it to acutely stimulate muscle protein anabolism at a later time.

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Industry-sponsored research in many fields has been under the microscope for some time, and rightly so. We’re all familiar with the cigarette company studies in the 1960s and 1970s that largely exonerated cigarettes as a cause of various disease conditions, until it became known that large volumes of data had been suppressed and, in some instances, falsified. These egregious acts played a large role in forestalling our understanding of the dangers of cigarette smoking. They also had an impact on the way the public viewed industry research…with a jaundiced eye and a belly full of skepticism.

Of course, the cigarette industry is far from the only culprit that played loose with the facts in order to sell their products. We in the food and nutrition supplement industries have to be candid about this, and recognize that claims made on various products are sometimes based on marginal or minimal data, or worse. Published research often becomes the selling point that can make or break a product, thus putting companies (particularly smaller companies) in a position where they may feel the need to cut corners in an effort to obtain the halo of credibility that a published trial can bring to their product. As one might imagine, this “industrialization” of science can lead to erroneous findings, claims based on too little science, and a muddying of the scientific waters that can make it hard to separate solid findings from hypotheses in the morass of data generated by these studies.

That said, this is in no way meant to suggest that all industry-funded research is inherently bad, and that non-industry funded academic research is always pristine. This fact was brought to mind when I read a recently published university study suggesting that consumption of animal protein from various sources was unhealthy and disease-promoting. The authors went as far as suggesting (with little data to support their assertion) that consumption of animal protein is as unhealthy as cigarette smoking. These claims, based largely on animal data and extrapolations from available epidemiological data, made for great newspaper copy, but were they supportable? I took the study to various researchers who were familiar with the database from which the findings were gleaned, and their collective verdict was unanimous: all wondered how a study of this nature was accepted for publication, and none believed that the study conclusions were supported by the data presented in the paper.

So who are we to believe? And what sources of data should carry the most weight when evaluating the benefits or risks of a given food, nutrient, or diet? This is difficult to say with certainty. Clearly, an ability to discern good science from bad is the best barometer. Being able to decipher the methods used in a given study, and the insight to know if the study conclusions are in sync with the data, are the best touchstones. Of course the reputation and track record of the researchers need to be taken into account, but this should be far from the only consideration. Well-developed, well-controlled studies should supersede other considerations.

How can an industry-funded institution like Egg Nutrition Center hope to be viewed as a credible entity in this sea of cynicism? As a 23-year industry veteran who has overseen clinical research at a number of food and ingredient companies, I have asked myself that question many times. And I believe the best we can do is align ourselves with credible people, specifically researchers with a track record for excellence in their field. We can encourage them to publish their work, whether their findings align with our commercial interests or not. We must understand that science is not an all-or-none proposition, that not all results will come out as we’d like, and that the preponderance of evidence on a given hypothesis will ultimately shape our acceptance or rejection of that hypothesis. That is the best we can do, and that is what we strive to do.

We have published on our website (eggnutritioncenter.org) a set of guiding principles that serve as a means of integrating integrity into our research program. The principles—originally developed under the guidance of ILSI-North America and peer reviewed by more than 40 health researchers and major journal editors—have been published in various journals, including The Journal of Nutrition, The American Journal of Clinical Nutrition, and Journal of the American Dietetics Association (now titled Journal of the Academy of Nutrition and Dietetics). They outline the desired conduct of the researchers and the funding source in all funded studies. We proudly display these principles on our website as an acknowledgment that industry-funded research is often viewed skeptically, and our earnest desire to “do the right thing” to allay this skepticism in the health profession community.

Mitch Kanter, PhD, has been Executive Director of Egg Nutrition Center since 2009.
In the fall of 2015, the U.S. Department of Agriculture (USDA) and Health and Human Services (HHS) plan to publish the 9th edition of *Dietary Guidelines for Americans*. Updated every 5 years, these guidelines serve as the federal nutrition policy document and, as such, are the basis of communications and guidance at federal, regional and state levels for food assistance programs, food and health organizations, industry and community-based educators and advocates.

The dietary guidelines process is designed to be grounded in science and be transparent. The official *Dietary Guidelines for Americans* policy is based on scientific input from an independent Dietary Guidelines Advisory Committee (DGAC). Appointed members of the 2015 DGAC met publicly for the first time in June 2013 to discuss responsibilities, prioritize evidence to be considered, and establish sub-committees. Expert and public comments were heard at the second public meeting in January 2014 and a third meeting was held in March, via webcast, and provided subcommittee updates and presentations from invited guests. Over the next year, the DGAC will review scientific evidence, consider submitted comments, and formally report findings to the Secretaries of USDA and HHS. This publicly available report will serve to inform policy makers as they revise and re-issue federal policy in the form of the 2015 *Dietary Guidelines for Americans*.

Public review and opportunities to submit commentary are available at several stages of deliberation and development. The DGAC specifically requested input from the public and private sectors on food safety, examples of food system sustainability, and on food industry actions to reduce sodium, added sugars, and specific fats (and the impact on nutrients increased in consequence)\(^2\). Submitted comments can be reviewed on the DGAC website\(^2\).

Starting with the 2010 guidelines and continuing with 2015, the USDA maintains an online Nutrition Evidence Library (NEL) that utilizes systematic methodology designed to objectively review, evaluate, and synthesize research to answer important nutrition and health-related questions. More than 100 Evidence Summaries have been completed, organized alphabetically with topics ranging from “A” (for adiposity related topics) to “W” (for whole grain related summaries).

Evidence reviews for the 2015 guidelines will be posted on the NEL website coinciding with the DGAC final report.

The dietary guidelines process is iterative (historically on a 5-year cycle). Current guidelines focus on adults and children 2 years and older, but comprehensive guidance for the birth to 24 month age group will be included starting with the 2020 Dietary Guidelines\(^3\). For 2015, several areas of science have progressed to the point of active deliberation by the DGAC. Notably, these deliberations are taking a holistic approach, with sub-committees actively considering evidence on:

- Food and Physical Environments
- Food Sustainability and Safety
- Diet and Physical Activity Behavior Change
- Dietary Patterns, Foods and Nutrients and Health Outcomes

“Based on public deliberations... this is clearly a time for change.”

While sustainability isn’t a new societal issue, whether it is a key factor in developing dietary guidelines depends on whether evidence is sufficient to support specific scientific recommendations. Invited expert Dr. Kate Clancy cited evidence in testimony to the DGAC that while sustainable, healthy diets are “plant-based,” modeling studies show this does not imply “no meat,” but rather low meat diets\(^4,5\). The DGAC reviewing the scientific evidence specifically requested input from public and private stakeholders on “Sustainability metrics that have been implemented or are in development\(^2\).” To the extent science and relevant metrics are available, the 2015 DGAC is interested in dietary advice that is sustainable over the long-term.

Based on public deliberations, the 2015 DGAC clearly indicated this is a time for change. One might anticipate the 2015 DGAC Report driving toward a broader perspective that is future-oriented with an actionable set of guidelines. However, this remains to be determined until the final report is published.

Whether you want to stay informed or participate in the 2015 development process, or you are actively using current dietary guidelines and tools, the following sites are available for additional information:

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Polycystic ovary syndrome (PCOS) is the most common endocrine disorder among women of reproductive age, affecting 6-10% based on the National Institutes of Health 1990 criteria, and up to 15% using the Rotterdam 2003 criteria. The primary diagnostic criteria for the disease include hyperandrogenemia, ovulatory dysfunction, and polycystic ovaries. Secondary features including insulin resistance, elevated circulating insulin and obesity, are also present in nearly two-thirds of women with PCOS and these features may be mechanistically linked. In PCOS, elevated insulin may contribute to excess adiposity by limiting fat mobilization and oxidation, making weight maintenance and weight loss a significant challenge. Obesity, specifically abdominal or ectopic adiposity, may contribute to the severity of symptoms and progression of comorbidities associated with PCOS. Thus, dietary intake plays a very important role in the management of PCOS.

Weight loss is often the first recommendation for overweight or obese women with PCOS and several studies have demonstrated that weight loss through caloric restriction leads to improvement in metabolic outcomes. However, qualitative aspects of the diet may be just as important in alleviating primary and secondary features of the syndrome. Specifically, diets reduced in carbohydrate (CHO) may have a profound impact on body composition and fat distribution by eliciting a lower postprandial glucose and the subsequent insulin secretory response when compared to diets higher in CHO content. At the University of Alabama at Birmingham (UAB), we previously conducted a controlled-feeding study in healthy overweight/obese women in which we observed a significant reduction in intra-abdominal adipose tissue in response to a diet reduced in CHO content during weight maintenance conditions, and a preferential loss of fat mass during weight loss conditions. These findings suggest that a carbohydrate-restricted diet may be an optimal dietary approach to selectively deplete total and abdominal adiposity, especially among women with PCOS, given their prevailing hyperinsulinemia.

To test this idea, our research group, led by Dr. Barbara Gower, conducted a study that evaluated the effects of a weight maintenance diet moderately reduced in CHO on body composition, fat distribution and metabolic outcomes in women with PCOS. Thirty women with PCOS were enrolled in this study. They consumed a reduced-CHO diet with a low glycemic load (41:19:40% energy from CHO:protein:fat) for 8 weeks and a standard diet for 8 weeks with a high glycemic load (55:18:27% energy) separated by a 4-week washout period. All food was provided to the participants for each 8-week experimental period by the UAB Clinical Research Unit (CRU) Metabolic Kitchen. For the entire study, participants reported to the CRU several times each week to be weighed and to collect food for off-site consumption. At the beginning and end of each diet period, body composition was measured by dual-energy x-ray absorptiometry (DXA) scan and fat distribution was measured by computed tomography scanning.

Although the diets were designed to be weight maintaining, participants lost a small amount of body weight during each diet arm. However, there were differential effects between diets in the type of weight that was lost. The reduced-CHO diet arm resulted in significantly greater loss of fat mass compared to the standard diet. Surprisingly, the standard diet resulted in loss of lean mass. Further, the reduced-CHO diet induced significant reductions in adipose tissue depots considered to be metabolically harmful, i.e. intra-abdominal adipose tissue (-5%) and intermuscular adipose tissue (-12%). The reduced-CHO diet also had a number of other beneficial effects on metabolic outcomes that were not observed following the standard diet arm. There were significant reductions in fasting insulin, fasting glucose, and total testosterone as well as improvements in insulin sensitivity and the cholesterol profile. The data also indicate that the reduction in total testosterone may have been driven by the reduction in fasting insulin.

Taken together, the results from this study suggest that, even in the absence of caloric restriction, a moderate reduction in carbohydrate intake may have profound favorable effects on body composition, fat distribution and CHO and lipid metabolism in this patient population. Carbohydrate intake is a major determinant of insulin secretion. Consuming a diet reduced in carbohydrate with a low glycemic load may permit greater lipolysis and ultimately influence energy partitioning by limiting insulin secretion in the postprandial and fasted state. In light of these findings, the recommendation of a diet reduced in CHO to women with PCOS may be warranted in order to limit adiposity and improve overall metabolic and reproductive health.

Dr. Amy M. Goss is with the Division of Nutritional Sciences at the University of Alabama at Birmingham.

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Athletes and exercisers of all ages are looking to recover faster after workouts. Whether a client is a professional athlete or someone training hard in the gym after a long day of work, it is essential that post-workout nutrition be part of the workout itself to gain maximal benefits.

Proteins are made up of building blocks called amino acids. “Complete proteins” like meat, chicken, eggs, dairy, and soy foods contain all the essential amino acids that your body requires, but cannot make on its own. Other proteins known as “incomplete proteins” (peanut butter, nuts, seeds, beans, and other plant proteins) do not contain all of the essential amino acids. Thus, when eating a plant-based diet, the need to consume a variety of foods over the course of the day is important to get in all the required amino acids.

Post-workout is a time to consume high-quality or complete proteins to promote recovery. One of the most often asked questions of sports dietitians is, “Which protein is best post-workout?” The answer: a complete protein rich in leucine, an essential branch chain amino acid (BCAA). Leucine, compared to other amino acids, has been shown to independently stimulate muscle protein synthesis. Optimally, physically active people have been advised to consume 3-4 g leucine post-workout, which can be accomplished by eating 25-30 g of high-quality protein. While a variety of protein choices contain leucine, animal sources such as milk and egg protein provide a higher quantity compared to plant-based proteins such as soy, wheat, and pea. Whey protein isolate contains the highest concentration of leucine and tends to be highly palatable, thus making it a great choice after exercise. Whey protein is a milk protein and can be found in dairy products such as milk, cheese, and yogurt in addition to whey protein isolate powder and many ready-to-drink post-workout shakes. The convenience and availability of whey protein often makes it easy for athletes to quickly consume post-workout, however other protein-based ready-to-drink products are available. If an athlete or exerciser chooses not to consume an animal-based protein (whey or egg), plant-based proteins can be substituted. It is important to note that a larger quantity of plant-based protein might be needed to reap the same benefits.

Timing is important

Ideally, athletes should take in nutrition post-workout as quickly as possible. Exercise puts the body in a state of catabolism or breakdown, whereas nutrition puts the body in an anabolic or building mode. So the faster nutrition is consumed, the faster recovery begins. In the two hours immediately after a workout, the body is highly efficient at digesting and absorbing nutrients to start the recovery process. The goal is to consume a snack with simple carbohydrate and 25 g high-quality protein within 45 minutes after the completion of exercise. If it can be done in 5 minutes, even better! The carbohydrate needed is based on the duration and intensity of the workout and should be individualized to the athlete and type of training in which he/she is participating.

A meal containing carbohydrate and quality protein should be consumed within 30 to 90 minutes after a post-workout snack. Whereas healthy fats and vegetables are not optimal when contained in the post workout snack, due to their effect of slowing digestion, including them in small amounts in the post-workout meal is fine. Here are some examples of post-workout snacks and meals:

**Post-workout snack 0-45 minutes after exercise:**
- 16-24 oz low-fat chocolate milk
- 1 scoop (25 g) whey/egg protein powder mixed in 8 oz low-fat milk with fresh fruit
- 1 scoop (25 g) whey/egg protein powder mixed in 8 oz 100% fruit juice

**Post-workout meal 45 minutes-2 hours after exercise:**
- Egg omelet with ½ cup veggies, 2 slices whole wheat toast with 100% fruit jelly and 8 oz low-fat milk
- Sandwich on whole wheat bread with turkey, 1 slice 2% cheese, veggies, and 1-2 Tbs. hummus paired with a hard-boiled egg and banana
- 4-5 oz lean beef, 1 cup starchy vegetables like corn, a large sweet potato and 8 oz low-fat milk

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Athletes and exercisers alike need to pay as much attention to their post-workout nutrition as they do to their workout in order to see maximal benefits. Focusing on quality protein is key to promoting recovery and muscle synthesis after exercise.

Amy Goodson, MS, RD, CSSD, LD is the sports dietitian for Ben Hogan Sports Medicine in Fort Worth, Texas and is the consulting sports nutritionist for the Dallas Cowboys, Texas Rangers, FC Dallas Soccer, TCU Athletics; and also works with high school athletes as well as amateur and professional golfers.

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Dietary Guidelines for Americans
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On-Line Resources:
- [http://www.nel.gov](http://www.nel.gov) for the USDA Nutrition Evidence Library

Dr. Barbara Lyle worked for more than 25 years in the food industry on new products, technology platforms, and nutrition research before starting the independent consulting firm B Lyle Inc., with an interest in motivating mainstream consumers to purchase “better for you” products and helping companies fuel and meet evolving consumer well-being needs.

References:

Reduced carbohydrate diet in PCOS
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Protein speeds recovery
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References:
Meeting a protein threshold (approximately 25-30 g/meal) represents a promising, yet until recently, largely unexplored dietary strategy to promote muscle health. The distribution of protein throughout the day is seldom discussed, despite the fact that National Health and Nutrition Examination Survey (NHANES) data (and often some personal introspection) demonstrate that many adults in the United States skew protein (and energy) consumption towards the evening meal (Figure 1).

We recently completed a 7-day crossover feeding study to measure changes in 24 h muscle protein synthesis in response to controlled diets with an even or skewed protein distribution in a healthy, non-athletic adult population. Using a stable isotope infusion (13C₆ phenylalanine), blood draws, and muscle biopsies, we found that over a 24 h period, muscle protein synthesis was 25% higher when the same quantity of protein was evenly distributed across breakfast, lunch and dinner compared to a more common skewed protein consumption pattern (Figure 2).

Note: both groups consumed 90 g of protein/day – or approx. 1.2 g protein/kg/day (50% more than the current RDA). If a smaller amount of protein is consumed each day, the negative effects of a skewed pattern could be even more prominent.

While these data support the potential of dietary protein distribution to ultimately improve outcomes such as muscle mass and function, there is clearly a need for trials of longer duration. However, for most individuals the potential advantages of consuming a moderate amount of high-quality protein three times a day (better satiety, blood glucose control, muscle growth and repair) clearly outweigh any potential disadvantage. The practical application of an evenly distributed protein strategy at meals is also quite simple:

- Add a few high-quality proteins to the breakfast meal. Greek yogurt, eggs, milk and nut butters are all good choices.
- Watch total energy intake. If adding protein to breakfast, consider reducing something else (balance and moderation, right?) such as sources of simple carbohydrates with low nutrient density (sugary cereals, donuts etc.).
- Try to moderate the amount of protein consumed at dinner. A 4-5 oz serving of beef, fish and chicken (about the size of an iPhone) contains ~30 g of protein. Plant proteins can be good too (quinoa, beans, nuts). Mix it up and try a variety of different protein sources.

Dr. Douglas Paddon-Jones is an Associate Professor at the University of Texas Medical Branch (UTMB) in Galveston, with a joint appointment in the Department of Internal Medicine, Division of Endocrinology. He is the General Clinical Research Center Director of Exercise Studies; a Fellow of the UTMB Sealy Center on Aging at UTMB; and vice-chair of UTMB’s Institutional Review Board (IRB).

References

**Messages**

- A recent study showed that muscle protein synthesis was 25% higher over a 24-hour period when the same quantity of protein was evenly distributed across breakfast, lunch and dinner, compared to the more common protein consumption skewed toward the evening meal.
- For most individuals, the potential advantages of consuming a moderate amount of high-quality protein three times a day clearly outweigh any potential disadvantage.