

# ASN Publications

## The Journal of Nutrition Media Alerts

The following articles are being published in the May 2017 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.

- Protein intake and bodybuilders – is more better?
- New study highlights possible benefits of peanuts for cardiovascular health
- Full-dairy intake associated with lower risk for metabolic syndrome

### Protein intake and bodybuilders – is more better?

Consuming adequate protein is essential to life itself. Indeed, protein deficiency can lead to poor growth and development during infancy and childhood, weak muscles, anemia, compromised immune function, reproductive problems, and if severe enough even death. But how much protein do we need, and what factors might increase or decrease our requirements? The Institute of Medicine recommends that healthy adults consume about 0.8 grams of protein for every kilogram of body weight daily. This translates to about 0.4 grams of protein for every pound of body weight. So, if you weigh 150 pounds, you should consume about two servings of meat or three eggs each day to be assured of meeting your protein needs. However, there is growing evidence that protein requirements not only depend on body weight but also on overall body composition and physical activity patterns. More specifically, emerging research points to higher requirements for children and the elderly. A paper published in the May 2017 issue of *The Journal of Nutrition* also suggests that bodybuilders may require substantially more protein to meet their needs. This paper is accompanied by an editorial penned by Dr. Douglas Paddon-Jones (University of Texas Medical Branch) who provides additional reasons why these findings are important.

This study was led by Dr. Peter Lemon (Western University, London, Canada) who, with his collaborators, investigated protein requirements of eight young men actively engaged in rigorous strength training. On average, they weighed about 185 pounds and had very low relative body fat (13% of body weight). These researchers used a technique referred to as the “indicator amino acid oxidation method” to estimate protein requirements. This technique involves the use of a stably-labeled essential amino acid (amino acids are building blocks of protein) to track protein synthesis over a range of protein intakes.

These scientists found that the average protein requirement of the bodybuilders was substantially higher than that estimated previously by the Institute of Medicine. Using these higher values, the researchers posited that bodybuilders should consume about 1 gram of protein for every pound of body weight on a daily basis – a value more than double what is currently recommended. In his accompanying editorial, Paddon-Jones warns against marginalizing these findings as being merely applicable to bodybuilders. Instead, he suggests that these data (and others) warrant reexamination of current dietary guidelines regarding protein intake. In addition, he reminds us that more is not always better and, although elite bodybuilders might benefit from eating more protein, this may not be true for the rest of us.

**References** Bandegan A, Courtney-Martin G, Rafii M, Pencharz PB, Lemon PWR. [Indicator amino acid-derived estimate of dietary protein requirement for](#)

## Important Dates

**May 31.** Part 4 of NNRR Webinar Series. Register for free [here](#).

**Oct 15-20.** [IUNS-ICN Meeting](#) (Buenos Aires)

**June 9-12, 2018.** [Nutrition 2018](#), ASN's nutrition focused conference, debuts in Boston.

## Journal Links

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[male bodybuilders on a nontraining day is several-fold greater than the current recommended dietary allowance.](#) *Journal of Nutrition* 147:850-857.  
Paddon-Jones D. [Protein recommendations for bodybuilders: in this case, more may indeed be better.](#) *Journal of Nutrition* 147:723-723.

**For More Information:** To contact the corresponding authors, Drs. Peter Lemon and Douglas Paddon-Jones, please send e-mails to [plemo@uwo.ca](mailto:plemo@uwo.ca) and [djpaddon@utmb.edu](mailto:djpaddon@utmb.edu), respectively.

### [New study highlights possible benefits of peanuts for cardiovascular health](#)

Peanuts and foods made from them, like peanut butter, are as quintessentially American as apple pie and baseball. In fact, two US presidents (Thomas Jefferson and Jimmy Carter) were peanut farmers before their tenures in the White House. It turns out, however, that peanuts represent much more than tasty snacks and the foundation of America's much-loved and very popular favorite sandwich. Peanuts – which are actually legumes and not nuts – are also a great source of protein, vitamins, minerals, and a host of biologically active compounds. And although scientists don't understand the physiologic mechanisms involved, studies suggest that people who eat peanuts may have lower risks for diabetes and cardiovascular disease than people who don't. One possible reason for this is that peanut consumption helps lower the spike in blood lipids that typically follows a high-fat meal. To help test this, Dr. Penny Kris-Etherton (The Pennsylvania State University) and colleagues conducted a randomized, controlled, intervention trial (the gold-standard of nutrition research) with 15 healthy but overweight or obese men. You can read more about this study, which is briefly described below, in the May 2017 issue of *The Journal of Nutrition*.

To test their hypothesis that peanut consumption improves blood lipids and blood vessel function, Kris-Etherton and colleagues asked study participants to consume two different chocolate-flavored, dairy-based shakes – one containing 3 ounces of ground peanuts and the other with no peanuts. Both shakes, which were consumed one week apart in a randomized order, had similar amounts of calories, carbohydrates, fat, saturated fat, and protein. Blood was drawn before the shake was consumed and again 30, 60, 120, and 240 minutes later and analyzed for lipids, lipoproteins (HDL and LDL cholesterol), glucose, and insulin. Blood flow was also assessed as a measure of blood vessel integrity.

As hypothesized, consuming the peanut-rich beverage helped lower the expected increases in blood lipids. Peanut consumption also improved blood flow, particularly in study participants with elevated blood cholesterol levels to begin with. There were no effects on lipoproteins, glucose, and insulin. The research team concluded that the inclusion of peanuts as part of a high-fat meal improved blood lipid responses and blood vessel function – at least in otherwise healthy overweight or obese men. As such, they posit that more chronic peanut consumption may benefit artery health and, thus, decrease overall risk for cardiovascular disease.

**Reference** Liu X, Hill AM, West SG, Gabauer RM, McCrea CE, Fleming JA, Kris-Etherton PM. [Acute peanut consumption alters postprandial lipids and vascular responses in healthy overweight or obese men.](#) *Journal of Nutrition* 147:835-840.

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### [Diet, inflammation, and depression – are they related?](#)

The US Centers for Disease Control and Prevention (CDC) estimates that, in any two-week period of time, nearly 8% of Americans teens and adults could be classified as suffering from depression. In fact, major depressive disorders are associated with 8 million ambulatory care visits to physician's offices, hospital outpatient clinics, and emergency departments each year in the US alone. And experts estimate that between 20 and 25% of adults will suffer an episode of major depression at some point during their life. As such, finding the causes of depression (and importantly, learning how to avoid them) continues to be a public health priority around the world. In a paper published in the May 2017 issue of *The Journal of Nutrition*, researchers report their findings as to whether dietary choices might be important in this regard. More specifically, they were interested in whether increased consumption of foods might be associated with inflammation might be associated with risk of depressive symptoms, including mood changes,

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feeling lonely, thinking disorders, sleep and appetite disorders.

This study, led by Dr. Moufidath Adjibade (Nutritional Epidemiology Research Team and Epidemiology and Statistics Research Center Sorbonne Paris Cité), utilized data previously collected in association with the Supplémentation en Vitamines et Minéraux Antioxydants study, a randomized, double-blind, placebo-controlled trial originally designed to understand if taking antioxidant vitamins and minerals affects risk of developing cardiovascular disease and various forms of cancer. Here, they mined the data more to determine if the inflammatory potential of the diet (anti-inflammatory diets being characterized by foods rich in omega-3 fatty acids, niacin, vitamin C, vitamin E, and fiber) is related to risk of depression. Importantly, they also considered whether factors such as sex, smoking, and physical activity (known to also be related to depression) might modify the relationships of interest.

The researchers found that over a 13-year follow-up period, 172 of the 3523 participants developed depressive symptoms. Although the pro-inflammatory diet wasn't associated with depression risk when all study subjects were considered, it was when the data from men were analyzed separately. In fact, men consuming the lowest amounts of anti-inflammatory foods were more than twice as likely than those consuming the most anti-inflammatory foods to develop symptoms of depression during the study. This relationship was also found when considering smokers and physically inactive participants. The researchers concluded "promotion of a healthy diet with anti-inflammatory properties may help to prevent depressive symptoms, particularly among men, smokers, or physically inactive individuals." However, controlled intervention studies will be needed to determine if the association between diet and depression discovered here was due to coincidence or was, in fact, causal in nature.

**Reference** Adjibade M, Andreeva VA, Lemogne C, Touvier M, Shivappa N, Hébert JR, Wirth MD, Herberg S, Galan P, Julia C, Assmann KE, Kesse-Guyot E. [The inflammatory potential of the diet is associated with depressive symptoms in different subgroups of the general population.](#) *Journal of Nutrition* 147: 879-887.

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## The Journal of Nutrition Editor's Picks

- Protein intake among most children in low-income countries meet their requirements except during the transition onto solid foods
- Daily UVB exposure and sun enjoyment are important predictors of vitamin D status
- Positive whole-body protein balance is dependent on intake of protein after exercise in children

### [Protein intake among most children in low-income countries meet their requirements except during the transition onto solid foods](#)

Optimal health, along with appropriate growth and development of children is dependent upon sufficient levels of readily digestible protein. In low-income countries, children are often stunted, yet many existing observational and interventional studies suggest that protein intake is not deficient in the diets of children in these countries. In most of these studies the reported protein intake did not include an estimation of protein quality, which has a major impact on the readily available protein needed to meet the children's requirements. Therefore, it is important to determine if the intake of protein and amino acids is sufficient to meet the protein needs of children in low-income countries when protein quality is included in the analyses. Aresnault and Brown addressed this question and report on the results of their study in the May 2017 issue of *The Journal of Nutrition*. Manary and Callaghan provide a commentary on this paper in the same issue.

Data from seven studies conducted in Peru, Guatemala, Ecuador, Bangladesh (two), Uganda and Zambia were used for this analyses. Intake of children between 6 and 35 months of age had originally been determined using direct observation and food weighing or by 24 hour recall. The data were analyzed based on the children's age, with groupings of 6-8, 9-11, 12-17 (or 12-23), and 24-35 months of age. Amino acid values were assigned to the foods consumed using the USDA Standard Reference database and the International Minilist, and breast milk



amino acid values were obtained from the WHO/FAO/United Nations. Protein values were corrected for protein quality and digestibility using the protein digestibility-corrected amino acid score method.

The greatest incidence of protein inadequacy was found among children between 6 and 8 months of age, with the prevalence being highest among children in Peru (16%) and Bangladesh (24%). A major contributor to lower protein intakes among breastfeeding infants was because of the lower intake of complementary foods during the transition to solid foods. However, except for Bangladesh, the incidence of protein inadequacy was very low by the time children were 9-11 months of age. The authors conclude that these data suggest the protein intake in many low-income countries is insufficient to meet the requirements for healthy children. However, as the original paper authors and the authors of the commentary point out, many of these children are still stunted. It is not clear from these results what is the cause of the stunting. Possibilities include uncertainties associated with the assessment methods used to establish intake or if there are factors that may influence requirements, such as parasitic infections or low digestive enzyme production, etc. The authors of both papers suggest more work needs to be done using improved analytical techniques that will enable more accurate estimates of intake and requirements. Until that is done, an emphasis should be placed on improving complementary food use in order to meet the protein requirements of children in these low-income countries.

**Reference** Arsenault JE, Brown KH. [Dietary protein intake in young children in selected low-income countries is generally adequate in relation to estimated requirements for healthy children, except when complementary food intake is low.](#) *Journal of Nutrition* 147:932-939, 2017.

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### [Daily UVB exposure and sun enjoyment are important predictors of vitamin D status](#)

Vitamin D is primarily derived from skin UVB exposure or supplementation, as little is available from the diet. The formation of pre-vitamin D in the skin is initiated by UVB photons. The dose of UVB exposure depends on many factors, including latitude, time of day, season, weather and pollution, to name a few. Most studies that attempt to estimate UVB exposure, and thus the potential for vitamin D synthesis, use only season to predict levels. However, without an accurate estimate of UVB dose, it is not possible to study the role of sun exposure and other factors like supplementation on vitamin D deficiency. Importantly, using only season as a variable, it is not possible to accurately estimate the amount of sun exposure that is needed to prevent vitamin D deficiency during various times of the year or on specific places on the planet. O'Sullivan and colleagues address this problem in a study reported in the May 2017 issue of *The Journal of Nutrition*. They evaluated the impact of accurately measured ambient UVB dose, as well as subjective measures of sun enjoyment, supplement use and other factors on serum 25-hydroxyvitamin D [25(OH)D].

Subjects for this study (n= 5138) were all ethnically Irish individuals over 60 years of age participating in the University of Ulster and Department of Agriculture study. Subjects were interviewed and completed a questionnaire to collect sociodemographic, lifestyle and health status information. In addition to standard variables, the questionnaire included questions concerning oily fish consumption, sun holiday taken in the past 6 months, vitamin D supplement use, sun enjoyment and use of sun protection. Daily UVB radiation exposure was calculated using data from the Tropospheric Emission Monitoring Internet Service database, and the data was adjusted for clouds, surface elevation and reflectivity. Cloud interference was determined using data from the Meteosat Second Generation satellite data.

Median UVB exposure varied between seasons, as expected, but also by latitude even though there is a small latitude differential on the island. Both vitamin D supplementation and sun enjoyment by the participants were positively associated with serum 25(OH)D. Participants that enjoyed sun exposure tended to be vitamin D sufficient, whereas those that avoided the sun were at risk of being deficient. Incorporation of daily UVB exposure and sun enjoyment improved the prediction of individual vitamin D status in those subjects not consuming supplements. The authors conclude that both UVB exposure and sun enjoyment are important predictors of vitamin D status, and based on these observations that an accurate estimation of ambient UVB exposure can help us understand the role of other determinants on vitamin D status. They further

suggest that through this greater understanding it will be possible to develop appropriate sunshine exposure guidelines.

**Reference** O'Sullivan FO, Laird E, Kelly D, van Geffen J, van Weele M, McNulty H, Hoey L, Healy M, McCarroll K, Cunningham C, Casey M, Ward M, Strain JJ, Molloy AM, Zgaga L. [Ambient UVB dose and sun enjoyment are important predictors of vitamin D status in an older population.](#) *Journal of Nutrition* 147:858-868, 2017.

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### **[Positive whole-body protein balance is dependent on intake of protein after exercise in children](#)**

Lean mass development in children is contingent upon consumption of adequate protein, but the recommended level to support normal muscle protein synthesis has been recently questioned. Importantly, it is not known if the habitual activity of children will influence protein requirements. For adults, the amount of protein consumed and the timing of the consumption relative to exercise bouts can affect tissue remodeling. One recent study has demonstrated that whole body protein balance is affected by post-exercise protein intake in healthy active children. However, because of the timing of samples used in that study it was not possible to exclude the effect of other meals consumed between delivery of the tracer and collection of the samples. Therefore, Volterman and colleagues conducted a study to evaluate the effects of post-exercise oral protein intake on whole-body leucine balance during a shorter period of time. They report the responses to variable levels of protein intake in the May 2017 issue of *The Journal of Nutrition*.

Thirty six (26 boys and 10 girls) healthy, and recreationally active children between 9 and 13 years of age were recruited for the study. Participants provided blood samples at baseline during which individual resting metabolic rates were determined. At that time, they were introduced to the exercise routine. For the day of testing, the subjects reported to the lab after an overnight fast where they consumed a small breakfast. Infusions of radiolabeled leucine were initiated just prior to starting the exercise bout. Blood and breath samples were collected 15 minutes after exercise and prior to their ingestion of the experimental beverages containing 0, 0.12, 0.22 or 0.33 g protein/kg body weight. Blood and breath samples were collected between 30 and 180 minutes after consuming the beverage.

Leucine balance was negative after exercise if the subjects consumed a carbohydrate drink devoid of protein after the exercise bout. The level of improvement in leucine balance was dependent upon the dose of protein contained in the drink, but as little as 5 grams of protein was sufficient to achieve a positive protein balance. Leucine oxidation reached maximal levels 60 minutes after consuming the beverage, and oxidation also demonstrated a relative dose-response during the 3-hour recovery period after exercise. The authors concluded from these data that consideration should be given to recommending the consumption of a protein source after physical activity in children in order to enhance whole-body anabolism to promote lean mass development.

**Reference** Volterman KA, Moore DR, Breithaupt P, Godin J-P, Karagounis LG, Offord EA, Timmons BW. [Post-exercise dietary protein ingestion increases whole-body leucine balance in a dose-dependent manner in healthy children.](#) *Journal of Nutrition* 147:807-815, 2017.

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