nutrition research update

Brought to you by The Egg Nutrition Center **December 2007**

a new look at high-quality protein and optimal health

The importance of high-quality protein, found in animal proteins such as eggs, dairy and meat, has long been misunderstood. Traditionally, dietary protein recommendations have been based on preventing deficiency and growth as opposed to promoting optimal health. However, research continues to reinforce the importance of protein for various health outcomes such as diabetes, cardiovascular disease, sarcopenia and body composition changes leading to obesity. A scientific symposium, *Protein Summit 2007 — Exploring the Impact of High-Quality Protein on Health*, convened 52 internationally recognized experts in protein research to discuss the collective body of scientific evidence for the role of dietary protein in optimizing health for adult populations.

Some of the Summit discussions debunked the long-held belief that adults eat more protein than they need. This notion is being challenged by research linking age-related diseases to both poor protein intake, and the decrease in one's ability to use amino acids as they age.(1,2) During aging, the optimum levels of essential amino acids (EAA) needed to stimulate muscle protein synthesis increases,(1,2) yet intakes are at the lower end of the AMDR range defined by the Dietary Reference Intakes.(1,2) Combined, this appears to be at the root of the age-related loss of muscle mass and strength known as sarcopenia and the parallel increases in body fat typical of adult populations. These changes in body composition have been shown to increase risk of obesity and type 2 diabetes.

Emerging research emphasizes the need for adults to get a higher content of EAAs in fewer daily calories.

measures of protein quality

The quality of any single dietary protein source is based on its amino acid composition and the digestibility of that protein. In general, animal proteins, such as eggs, provide higher-quality protein compared to vegetable-based proteins, due to their higher levels of the EAA lysine, threonine, valine, isoleucine, leucine, methionine, phenylalanine, tryptophan and histidine.

There are five measures used to test the quality of protein and to compare how different protein sources better support human health and development:(5,6)

enc egg nutrition center

a word from don

As a high-quality protein, eggs have traditionally been used as the gold standard for protein comparison. With emerging research showing a greater role for protein in human health and development than previously believed, the unique protein package of eggs — one that supplies all essential amino acids and helps with satiety and hunger control — helps to elevate its importance in the American diet.

Visit the ENC Website >>

that's a fact

While many people think the egg white has all the protein, the yolk actually provides nearly half of the protein found in an egg.

feedback

Tell us what you think about the issues, the newsletter, the organization. enc@enc-online.org.

share

Have a colleague that should be receiving this newsletter? Click here >>

- **Protein Efficiency Ratio (PER)** — A reflection of a food's biological value, by measuring protein retention by body tissues – weight gain per gram of protein ingested
- **True Digestibility (TD)** — A ratio of nitrogen absorbed from food to nitrogen ingested
- **Protein Digestibility Corrected Amino Acid Score (PDCAAS)** — Takes into account the level of limiting amino acids in protein as well as TD
- **Biological Value (BV)** — A measure of how efficiently food protein, once absorbed form the gastrointestinal tract, can be turned into body tissues. Egg white protein has a biological value of 100, the highest biological value of any single food protein.
- **Net Protein Utilization (NPU)** — Takes into account both TD and BV

Protein	PER	TD	PDCAAS	BV	NPU
Egg White	**3.8**	98	118	**100**	**94**
Milk	3.1	95	121	91	82
Beef	2.9	98	92	80	73
Soy	2.1	95	91	74	61

Eggs rank highest for three out of five of these evaluative measures, and are listed among the top for the remaining two protein quality measures. The protein found in eggs is superior to most and equal to other high-quality protein sources routinely found in the diet. There is no higher-quality protein than that provided in eggs.

eggs — a unique source of high-quality protein

Eggs are a source of good nutrition and especially high-quality protein, for relatively few calories. For years, eggs have been used as the standard of comparison for measuring protein quality due to its essential amino acid profile and efficient digestibility. In addition, eggs have one of the most concentrated sources of the amino acid leucine in the diet. Research has recently discovered that leucine is important for regulation of muscle protein synthesis and has been linked to controlling hunger by contributing to a stable blood sugar environment.(3,4) Eggs are a versatile, inexpensive, easily digestible high-quality protein that can be easily incorporated into a healthful diet.

in other science news

- New evidence recently reported in American Journal of Clinical Nutrition supports the emerging body of evidence showing increased high-quality protein needs in the elderly.
- This study shows that if an individual continues to ingest similar absolute quantities of high-quality protein as they age, there should be no overt impairment in their protein synthetic response.(7)
- This study concluded that despite potential differences in the efficiency of utilization, aging does not impair the

ability to acutely synthesize muscle protein following ingestion of common, high-quality protein food.(7)

references

1. Food and Nutrition Board, Institute of Medicine. Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein and amino acids. Washington, DC: National Academy Press, 2002.

2. Wolfe RR. The underappreciated role of muscle in health and disease. Am J Clin Nutr 2006; 84:475-82.

3. Layman D, Walker D. Potential importance of leucine in treatment of obesity and the metabolic syndrome. J Nutr 136:319S-323S, 2006.

4. U.S. Department of Agriculture, Agricultural Research Service, USDA Nutrient Data Laboratory, 2006. USDA Nutrient Database for Standard Reference, Release 19.

5. Schaafsma G. The protein digestibility-corrected amino acid score. J Nutr 130:1865S-1867S, 2000.

6. Hoffman J, Flavo M. Protein — which is best? J Sports Sci & Med 3, 118-130, 2004.

7. Symons, TB, et al. Aging does not impair the anabolic response to a protein-rich meal. American Journal of Clinical Nutrition, Vol. 86, No. 2, 451-456, August 2007.