

High-Quality Protein Promotes Optimal Health

Introduction

Emerging research continues to suggest high-quality protein plays an increasingly important role in weight management, muscle development and maintenance and disease prevention, including sarcopenia and diabetes. Given these benefits, many researchers are rethinking current dietary protein recommendations. For the first time, 52 leading protein researchers from around the globe convened for a "Protein Summit" to evaluate and discuss the collective body of evidence for the impact of high-quality protein on optimal health.

The May 2008 edition of the **American Journal of Clinical Nutrition** contains a thought-provoking supplement that reflects the discussion, intellectual explorations, general consensus and future directions for research as identified by the scientists who attended this Summit. The six comprehensive reviews in the supplement represent a compilation of research specific to several chronic diseases and aging that Summit attendees agreed warranted individual consideration.



With the obesity epidemic growing and baby boomer generation aging, the benefits of high-quality protein have never been more critical. **Now, more than ever, it's important to re-think current dietary recommendations for high-quality protein and focus on achieving a level of protein intake to promote optimal health, not to simply meet needs to prevent protein deficiency.** Scientific evidence suggests that moderately increasing the proportion of protein in the diet may improve body composition, facilitate weight loss and improve weight maintenance following weight loss. Additional research has shown that moderately increasing daily protein intake beyond the Recommended Dietary Allowance (RDA) of 0.8 g/kg/day enhances muscle development and maintenance and reduces progressive loss of muscle mass with age (sarcopenia). Diets with increased protein and reduced carbohydrates have shown positive effects in treating type 2 diabetes and reducing risk factors for coronary heart disease.



The Acceptable Macronutrient Distribution Range (AMDR), developed by the Food and Nutrition Board of the Institute of Medicine, National Academies, is a range of intakes for macronutrients expressed as a percentage of total energy. The range for protein intake is 5-35 percent of calories from protein, depending on age. The majority of research in this supplement showing benefits from moderate or high protein diets looked at diets with protein levels at the high end of the AMDR: 20-35 percent of calories from protein.



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Key Findings

Current Protein Intake in America

Dietary protein recommendations have traditionally been based on preventing deficiency (i.e., the RDA), as opposed to promoting optimal health, muscle development and maintenance and disease prevention. The RDA is defined as the amount of a particular nutrient that would satisfy the needs of almost all (98%) of the specified population. However, the RDA is not the requirement of an individual or even a mean for individuals, but rather the amount of the nutrient that is almost certain to be *adequate* for all individuals in a specified population. "Current Protein Intake in America: Analysis of the National Health and Nutrition Examination Survey, 2003-2004" used national health and nutrition data to study Americans' current intake of protein. Despite popular perceptions, the government consumption data analyzed indicated most Americans are not over-consuming protein.

- A significant percentage of adolescent and older females do not consume enough protein, and in fact, very few Americans are consuming the protein recommendations from the government food guide, *MyPyramid* (17-21 percent of calories). The research report found the average percent of energy from protein ranged from 13.5 percent of calories in children 4-8 years old to 16 percent of calories in adults 51-70 years old.¹

- Protein intake higher than the RDA, yet within the AMDR, may help adults prevent or manage weight, sarcopenia, osteoporosis/osteopenia, cardiovascular disease and type 2 diabetes.

Weight Management and Satiety

"Protein, Weight Management and Satiety" found elevated protein intake, in combination with controlled energy intake, to be an effective and practical weight-loss strategy. With the overweight/obesity epidemic growing, this benefit of high-quality protein has never been more critical. The research report attributed protein's affect on weight loss to increased satiety (feeling of fullness), increased thermogenesis (metabolism), increased or maintained fat-free body mass and enhanced glycemic control. Importantly, studies have shown higher-protein diets limit weight regain after weight loss.

- Research has shown high protein meals increase thermogenesis and energy expenditure. Animal protein had a greater positive effect than plant proteins.²
- There is general consensus that permanent weight reduction is difficult to achieve with radical diet and lifestyle changes. A moderately higher-protein, energy-controlled diet may represent a feasible lifestyle adaptation that is more likely to result in improved weight loss and management.²



Protein, Muscle Maintenance and Sarcopenia Prevention

There are compelling data to support the ability of dietary protein to stimulate muscle protein synthesis and reduce muscle loss in aging individuals. However, "Role of Dietary Protein in the Sarcopenia of Aging" reported that 15 to 38 percent of adult men and 27 to 41 percent of adult women have dietary protein intakes below current recommended levels. This is particularly concerning as sarcopenia, or the progressive loss of muscle mass with age, is associated with a three- to four-fold increased likelihood of disability.³ One analysis estimated that in 2000, sarcopenia was responsible for \$1.5 billion in healthcare costs.³

- The most practical means of increasing skeletal muscle protein for the majority of older adults is to include a moderate serving of high-quality protein in each meal.³
- Recent data suggests a moderate 113 gram (4 ounce) serving of intact protein such as lean meat contains sufficient amino acids to acutely increase muscle protein synthesis by approximately 50 percent without exercise.³

Bone Health

Despite a widely held belief that higher protein intake has a detrimental effect on bone health, several studies have actually observed increased bone mineral content and decreased risk of fracture with increased protein intake. "Amount and Type of Protein Influences Bone Health" reported that research suggests that dietary proteins are as essential as calcium and vitamin D for bone health and osteoporosis prevention.

- Protein and calcium intake interact positively to affect bone health, and intakes of both must be adequate to fully realize the benefit of each nutrient on bone.⁴
- Optimal protein intake for bone health is likely higher than current recommended intakes, particularly for the elderly.⁴
- Some studies found meat as a protein source is associated with higher blood levels of insulin-like growth factor I (IGF-I), which is associated with increased bone mineralization and fewer fractures.⁴



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Key Findings, continued

Heart Disease and Type 2 Diabetes

Protein intake higher than the RDA may help adults prevent or manage cardiovascular disease and type 2 diabetes.⁵ "Protein in Optimal Health: Heart Disease and Type 2 Diabetes" reported diets with increased protein and reduced carbohydrates reduce risk factors for coronary heart disease (CHD) including reducing serum triacylglycerol, increasing high density lipoprotein (HDL) and reducing blood pressure. Diets with increased protein and reduced carbohydrates have also been investigated for treatment of type 2 diabetes with positive effects on glycemic regulation.⁵

- Studies evaluating health risks across the range of protein intakes found individuals with the highest protein intake had the lowest risk for CHD and the highest quality diets.⁵
- Earlier associations of dietary protein or protein foods with CHD may have been due to coincidental relationships with other modern lifestyle factors, such as total energy intake, daily physical activity, stress, inconsistent meal patterns and convenience foods.⁵

Protein Quality and Optimal Needs

"Protein Quality Assessment: Impact of Expanding Understanding of Protein and Amino Acid Needs for Optimal Health" assessed protein quality and dietary recommendations and found increasingly complex roles for protein and amino acids in, among other health benefits, regulating body composition and bone health, gastrointestinal function and bacterial flora and satiety. The research report found protein quality is as important as adequate quantity to achieve optimal health. Animal protein foods such as beef, pork, eggs, fish, poultry and dairy products are essential sources of high-quality protein.

- There is strong emerging evidence of a positive role for protein in promoting optimal health at intakes beyond the RDA of 0.8 g/kg/day.⁶
- Evidence suggests quality is important not only at the RDA, but also at higher intakes.⁶

What is High-Quality Protein?

When it comes to choosing proteins, it's important to realize that all proteins are not created equal. High-quality or complete proteins contain all the indispensable amino acids in the appropriate amounts needed by humans. The quality of a protein is also related to its digestibility, and animal proteins are highly digestible. For example, meat and cheese have a digestibility of 95 percent, whereas cooked split peas are about 70 percent digestible.⁷

Beef, milk, yogurt, pork, eggs, cheese, fish and poultry are complete high-quality proteins that are highly digestible and contain all the essential amino acids your body

needs to build and maintain muscle mass and manage weight, sarcopenia, osteoporosis/osteopenia, cardiovascular disease and type 2 diabetes. These animal proteins are nutrient powerhouses, providing the essential vitamins and minerals your body needs to be healthy.

Looking Ahead

Protein has a significant role in achieving and maintaining optimal health. Future dietary guidance should go beyond simply meeting needs to prevent protein deficiency and should focus on realizing a level of protein intake to promote optimal health.

The RDA of protein, 0.8 g/kg/day, should be considered the *minimal* amount of protein intake needed to prevent deficiency and is most likely inadequate even as a minimal value for active adults or elderly individuals. Although the *optimal* level of protein intake is still uncertain, researchers concluded it is greater than the RDA, and in fact, intake can increase to double the current RDA without risk of adverse responses. When scientifically determining the optimal level of protein, parameters related to muscle mass, strength and metabolic function should be considered.

Researchers at the Summit identified areas for future research that included, among others, studying the relationship between the pattern of protein intake over the course of the day and the functional response of the muscle. Future research should also focus on evaluating differences in the quality of individual proteins.

¹ Fulgoni III V. Current protein intake in America: analysis of the National Health and Nutrition Examination Survey, 2003-2004. *American Journal of Clinical Nutrition*. 2008. 87 (suppl): 1554S-7S.

² Paddon-Jones D, Westman E, Mattes R, Wolfe R, Astrup A, Westertep-Plantega M. Protein, weight management, and satiety. *American Journal of Clinical Nutrition*. 2008. 87 (suppl): 1558S-61S.

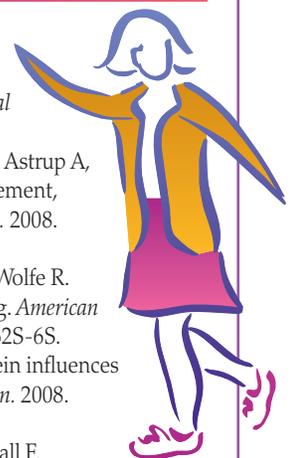
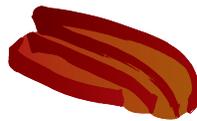
³ Paddon-Jones D, Short K, Campbell W, Volpi E, Wolfe R. Role of dietary protein in the sarcopenia of aging. *American Journal of Clinical Nutrition*. 2008. 87 (suppl): 1562S-6S.

⁴ Heaney R, Layman D. Amount and type of protein influences bone health. *American Journal of Clinical Nutrition*. 2008. 87 (suppl): 1567S-70S.

⁵ Layman D, Clifton P, Gannon M, Krauss R, Nuttall F. Protein in optimal health: heart disease and type 2 diabetes. *American Journal of Clinical Nutrition*. 2008. 87 (suppl): 1571S-5S.

⁶ Millward D, Layman D, Tomé D, Schaafsma G. Protein quality assessment: impact of expanding understanding of protein and amino acid needs for optimal health. *American Journal of Clinical Nutrition*. 2008. 87 (suppl): 1576S-81S.

⁷ Gropper S, Smith J, Groff J. *Advanced Nutrition and Human Metabolism*. Thomson Wadsworth. Belmont, California. 2005.



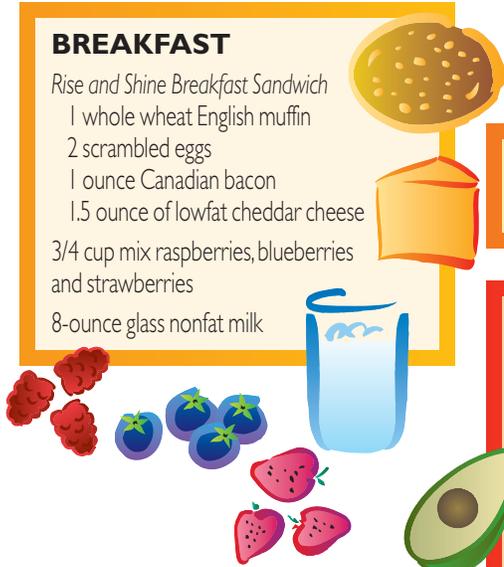
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High-Quality Protein Sample Meal Plan

BREAKFAST

Rise and Shine Breakfast Sandwich

- 1 whole wheat English muffin
- 2 scrambled eggs
- 1 ounce Canadian bacon
- 1.5 ounce of lowfat cheddar cheese
- 3/4 cup mix raspberries, blueberries and strawberries
- 8-ounce glass nonfat milk



SNACK

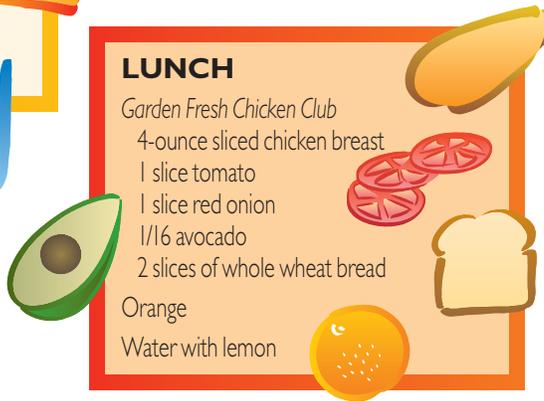
- 1 ounce walnuts



LUNCH

Garden Fresh Chicken Club

- 4-ounce sliced chicken breast
- 1 slice tomato
- 1 slice red onion
- 1/16 avocado
- 2 slices of whole wheat bread
- Orange
- Water with lemon



SNACK

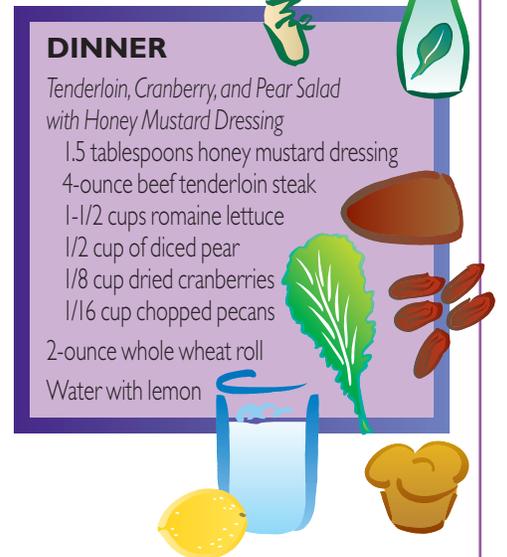
- 1 medium kiwi
- 1 cup lowfat yogurt



DINNER

Tenderloin, Cranberry, and Pear Salad with Honey Mustard Dressing

- 1.5 tablespoons honey mustard dressing
- 4-ounce beef tenderloin steak
- 1-1/2 cups romaine lettuce
- 1/2 cup of diced pear
- 1/8 cup dried cranberries
- 1/16 cup chopped pecans
- 2-ounce whole wheat roll
- Water with lemon



The Acceptable Macronutrient Distribution Range (AMDR) Requirements

AMDR for protein = 10 – 35% of energy (for adults)

- 2000 calorie diet x 10% of energy = 200 calories from protein (LOW range)
- 2000 calorie diet x 35% of energy = 700 calories from protein (HIGH range)

Our meal plan: 579 calories from protein (29% of calories from protein)

AMDR for carbohydrates = 45 – 65% of energy (for adults)

- 2000 calorie diet x 45% of energy = 900 calories (LOW range)
- 2000 calorie diet x 65% of energy = 1300 calories (HIGH range)

Our meal plan: 884 calories from carbohydrate (45% of calories from carbs)

AMDR for fat = 20 – 35% of energy (for adults)

- 2000 calorie diet x 20% of energy = 400 calories (LOW range)
- 2000 calorie diet x 35% of energy = 700 calories (HIGH range)

Our meal plan: 584 calories from fat (30% of calories from fat)

Total calories in our meal plan = 1977 calories