Is Protein the Missing Link in the Obesity Story?

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Ongoing ‘Battle of the Bulge’
Fact or Fiction:
There is an Optimal Ratio of Macronutrients
“While protein is an important macronutrient in the diet, most Americans are already currently consuming enough and do not need to increase their intake. As such, protein consumption, while important for nutrient adequacy, is not a focus of this document.”

(2005 Dietary Guidelines for Americans, Ch 5)
Protein Recommendations

Recommended Dietary Allowance (RDA)

* Dietary protein recommendations have traditionally been based on preventing deficiency

Acceptable Macronutrient Distribution Range (AMDR)

* A range of intake for promoting optimal health
Optimal Protein Recommendations Overlooked

Protein Intake (by % of calories)

Research Shows: High-Quality Protein Important to Healthful Diet

James H. Hill, PhD, and Richard D. Masters, MPH, MD, RD

ABSTRACT

The underappreciated role of muscle in health and disease

Robert K. Wolfe

ABSTRACT

The importance of muscle mass, strength, and muscle function in the prevention and treatment of chronic conditions cannot be overstated. Muscle mass and function are inversely related to the risk of developing chronic conditions such as heart disease, diabetes, and sarcopenia. A recent study published in the American Journal of Clinical Nutrition investigated the role of muscle mass and function in the prevention of chronic conditions. The study found that individuals with higher muscle mass and function were at a lower risk of developing chronic conditions. The study also found that muscle mass and function were positively associated with physical activity levels. These findings highlight the importance of maintaining muscle mass and function in the prevention and treatment of chronic conditions. Public health campaigns should focus on promoting physical activity and muscle building to improve health outcomes.

KEY WORDS: Strength, muscle, protein metabolism, sarcopenia, chronic conditions
The subcommittee has identified the need to determine “what pattern of dietary protein intake is associated with achieving recommended nutrient intakes.”
Protein Diets: Defined

**Lower Protein Diet**
10-15% of calories from protein

**Moderate/Higher Protein Diet**
20-35% of calories from protein
Protein is made up of building blocks and provides structural parts for a number of important body parts that allows it to function.
Essential Amino Acids

• 20 amino acids needed for the body to make protein

• Amino acids not made by the body that must be provided in the diet are called “essential amino acids”

• Essential amino acids stimulate and support muscle protein synthesis
Protein’s Role in Health

Build muscle
Deliver oxygen to tissues
Boost immunity
Provide energy
Aid satiety/fullness
Build better brains
Help metabolize other nutrients
Build stronger bones
Manage weight
Protein intake higher than the RDA may help adults prevent or manage cardiovascular disease and type 2 diabetes.

Elevated protein intake, in combination with controlled energy intake was found to be an effective and practical weight-loss strategy. Animal protein had a greater positive effect than plant proteins.

Sarcopenia is the progressive loss of muscle mass with age. 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 with each meal.

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.

Protein and Weight Control

Potential effects of protein

- Increased satiety
- Increased calorie burning
- Preservation of lean muscle mass during weight loss
- Increased fat loss
Misconceptions About Animal Proteins and Health

Habitual consumption of eggs does not alter the beneficial effects of endurance training on plasma lipids and lipoprotein metabolism in untrained men and women


Effects of dietary protein intake on indexes of hydration


Dietary protein intake and renal function

Animal Proteins Can Favorably Modulate Responses to Aerobic Exercise and Changes in Energy Balance

The effects of nutritional supplementation throughout an endurance run on leucine kinetics during recovery


Level of dietary protein influences whole body protein turnover post-exercise


Level of dietary protein impacts whole body protein turnover in trained males at rest


Acute energy deprivation affects skeletal muscle protein synthesis and associated intracellular signaling proteins in physically active adults


Dietary protein intake impacts human skeletal muscle protein fractional synthetic rates after endurance exercise

Benefits of Higher Protein Intakes During Weight Loss

16 week diet and exercise program

A diet with higher protein and reduced carbohydrates combined with exercise increases fat loss compared to a diet with higher carbohydrates and reduced protein.

Benefit of Dietary Protein During Weight Loss

Obese, middle-aged women who followed higher protein diets combined with exercise lost more body fat (and minimized loss of lean mass) compared to counterparts following a higher carbohydrate diet.

Higher Protein Intake and Exercise Beneficial

Subjects who consumed protein closer to the time of exercise achieved more lean body mass than subjects who consumed protein in the morning and evening.

Higher protein meals are associated with increased satiety over a 24-hour period.

Mikkelsen, Toubro and Astrup, AJCN, 72: 1135-41, 2000
Over a 5-week period, men with untreated type 2 diabetes who followed a higher protein diet improved glycemic control.

Protein’s Association with Reduced Blood Pressure

Change in Systolic blood pressure

Control Diet
Higher Protein Diet

Modest substitution of carbohydrate-rich foods with protein-rich foods may lower blood pressure in hypertensive persons.

In Considering Animal Protein

• Complete – high quality-proteins (provides sufficient amounts of essential amino acids)

• Enables sensible diet design (difficult to construct a low calorie diet that provides protein content of similar quality with plant foods)
Animal Foods = High Quality Protein
“Dried beans and peas are excellent sources of fiber and low glycemic carbohydrates which make them excellent carbohydrate foods but they have low protein quality and high energy to protein ratio which make them poor protein foods.

If the goal is to increase dietary protein, plant proteins have lower nutritional value than animal proteins and hence require greater total protein and greater total total nitrogen to achieve the same health benefits.”

- Donald Layman, Ph.D., University of Illinois
The Caloric Cost of Plant Protein

Based on 25 grams protein

- 7 tablespoons peanut butter: 670 calories
- Three ½ cup servings black beans: 374 calories
- 1 ¼ cups raw tofu: 236 calories
- 3 ounces lean beef: 180 calories
Protein Intake in the United States

Protein intake/ body weight

RDA
0.6
0.8
1.0
1.2
1.4
2.0
3.0-

LOW
AMDR
3.0-
2.0-

HIGH
AMDR

NHANES 1999-2000 (CDC)

LOW
AMDR

LOW
AMDR

Men

Women

RDA

0.6
0.8
1.0
1.2
1.4
2.0
3.0-

20-39
40-59
60+

Age (y)

0.6
0.8
1.0
1.2
1.4
2.0
3.0-

20-39
40-59
60+

Age (y)
Importance of Maintaining Muscle Mass

The goal of weight management is fat loss and muscle maintenance

Protein intake greater than the RDA but well within the ADMR can combat the loss of muscle mass

Recommend consuming 25 – 35 grams of high-quality protein (equivalent to an ~4 oz. serving of meat), or approximately 10 grams of essential amino acids per meal

Translating Research to Practice

Weight Management

- **Concept of Energy Balance**
- **Protein in Diet Design**
  - Distribution of protein throughout day’s menu plan
Summary and Recommendations

DISCOVER THE POWER OF PROTEIN
Thank You!

DISCOVER THE POWER OF PROTEIN