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# **The Science of Protein**

**The Continued Exploration of the Impact of High-Quality  
Protein on Optimal Health**



# The Following Will Be Discussed

1. What is Protein?
2. Evolution of Protein Research
3. Protein's Role in Beneficial Health Outcomes
4. Current Protein Recommendations
5. Optimal Daily Protein Intake
6. Putting Protein Recommendations into Practice

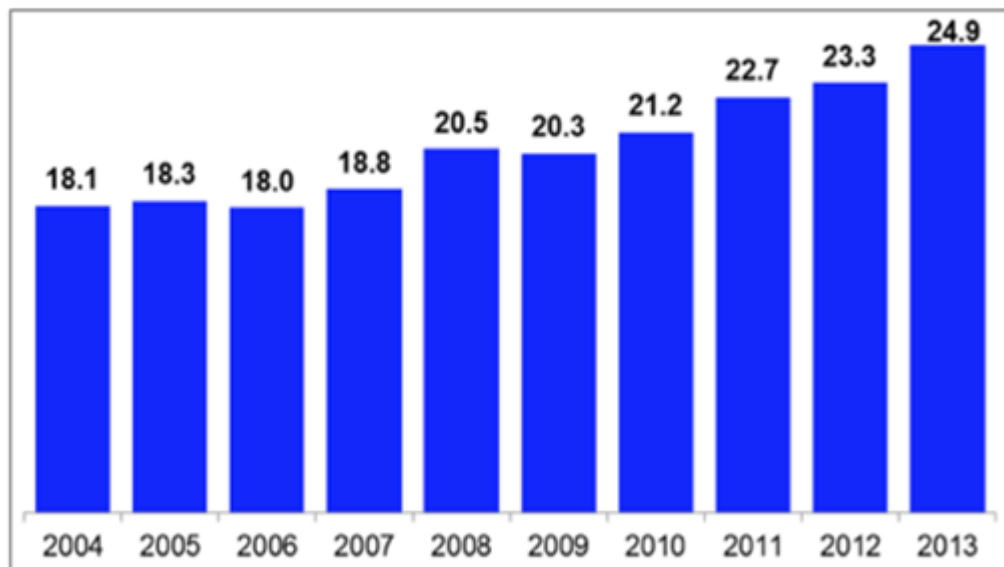


# Protein: Read All About It!

The image shows a Google search interface. The search bar contains the word "protein". Below the search bar, the "News" tab is selected and highlighted with a red underline. A red oval highlights the text "About 25,200,000 results (0.46 seconds)" below the navigation tabs. The background of the slide features a decorative pattern of overlapping, wavy, light purple and white lines.

# Consumer Interest Has Skyrocketed

**“What do you usually look for on the  
Nutrition Facts Panel?”  
Percentage of adults saying “protein”**



**Source: The NPD Group/Dieting Monitor (2013)**

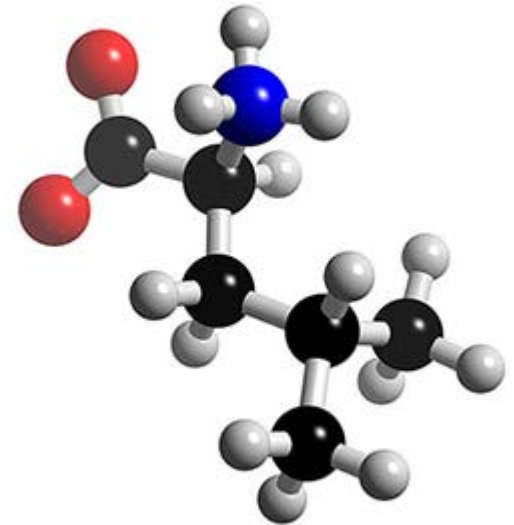
- 91% of Americans think that it is important to get enough protein in their diets (IFIC, 2014)
- 57% of Americans consider how much protein is in a food or beverage before purchase (IFIC, 2014)

# What Is Protein?



# Protein Is Made From Amino Acids, Which Are Essential Building Blocks for the Body

- Amino acids play numerous roles in the body, including:
  - Structural
    - Build, maintain and repair muscle
    - Build stronger bones
  - Transport
    - Deliver oxygen to tissues
  - Immune boosters



# Protein and Amino Acids Have Life-Sustaining Benefits

- There are **20 amino acids needed** for the body to make proteins
- Benefits include:
  - Providing energy
  - Building better brains
  - Aiding the metabolism of other nutrients
  - Promoting feelings of satiety/fullness
  - Managing weight

# Amino Acids Are Classified as “Essential” And “Nonessential”

- Essential: The body cannot make essential amino acids, so we must eat them in the diet
  - Essential amino acids stimulate and support muscle protein synthesis, which allows the body to make new muscle and repair old muscle
- Nonessential: The body can make these, so they don't have to be consumed in the diet



# Essential and Nonessential Amino Acids

- **9 essential amino acids:**

- Histidine
- Isoleucine
- Leucine
- Lysine
- Methionine
- Phenylalanine
- Threonine
- Tryptophan
- Valine

- **11 nonessential amino acids:**

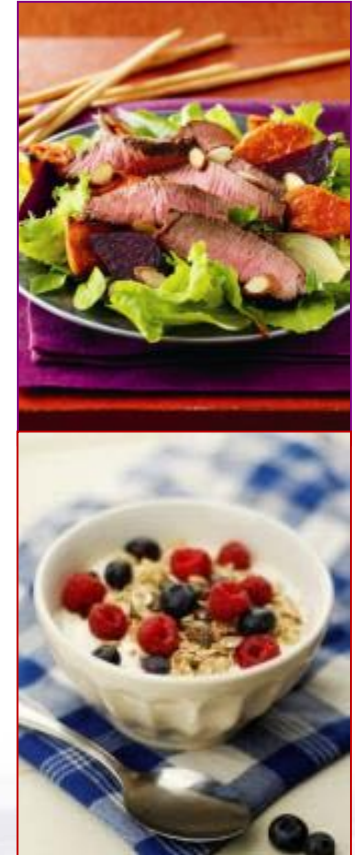
- Alanine
- Arginine
- Asparagine
- Aspartic acid
- Cysteine
- Glutamic acid
- Glutamine
- Glycine
- Proline
- Serine
- Tyrosine

# Proteins Are Classified as Either “Complete” or “Incomplete”

- Complete proteins contain all of the essential amino acids
- Incomplete proteins are missing one or more of the essential amino acids
- Complete proteins are considered “high biological value”
  - High biological value proteins contain all of the amino acids in a proportion similar to what is required by humans
  - Easy for your body to fully digest, meaning that all of that essential protein is available to be absorbed and used by the body

# Animal Sources and a Few Plant Sources Provide Complete Proteins

- Complete proteins include:
  - Meat, including beef, pork, chicken and fish
  - Eggs
  - Dairy, including milk, cheese and yogurt
  - Quinoa
  - Soy
- Incomplete proteins have a lower biological value and are found in other plant sources:
  - Beans and legumes
  - Nuts and seeds
  - Whole wheat
  - Rice



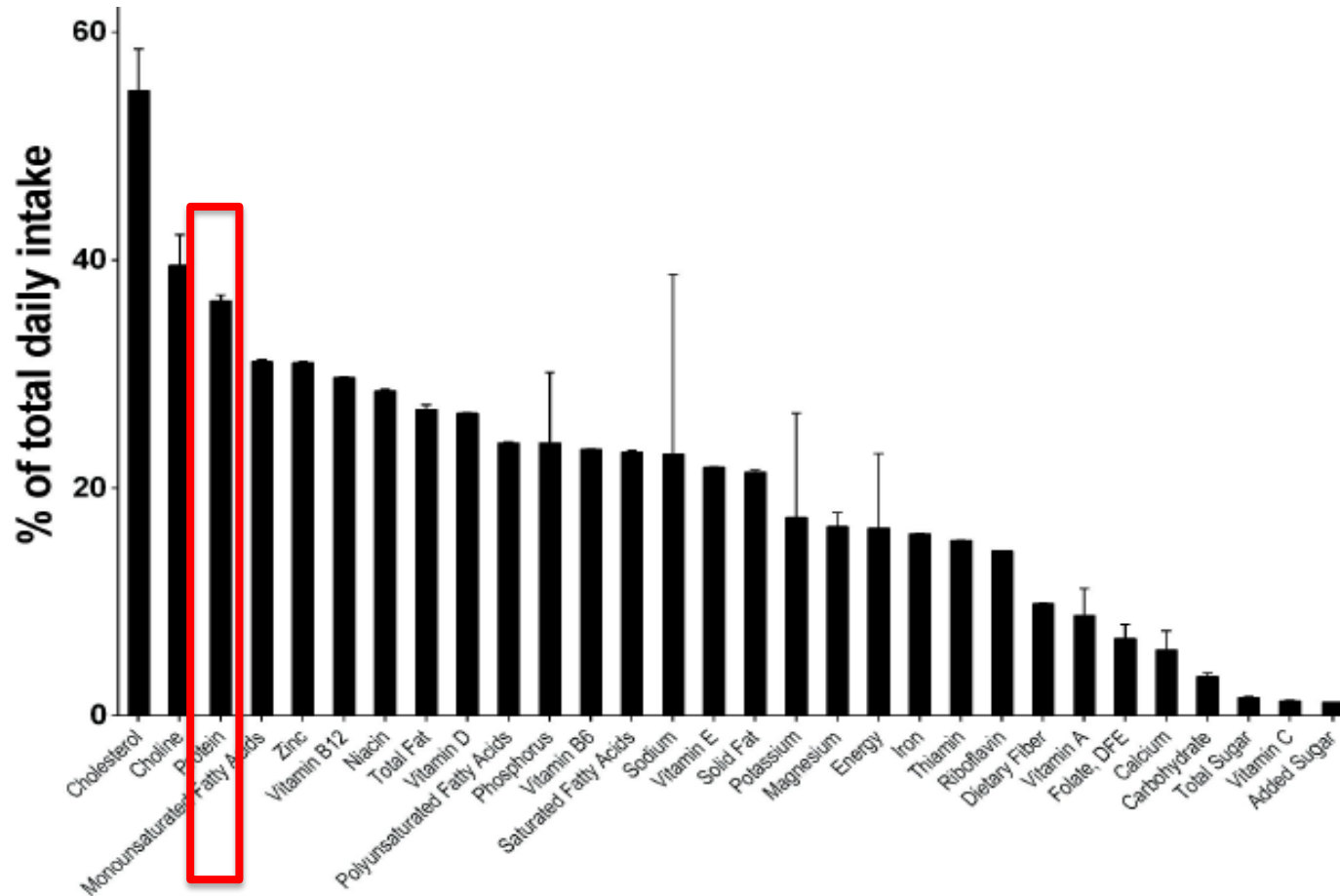


# Top Sources of Protein in the American Diet: Poultry and Meats

Food	Rank	%Total Protein
Poultry	1	10.0
Meats	2	9.5
Mixed dishes – meat, poultry, fish	3	7.5
Breads, rolls, tortillas	4	6.4
Milk	5	6.4
Cured meats/poultry	6	6.0
Mixed dishes – pizza	7	4.8
Cheese	8	4.8
Mixed dishes – grain-based	9	4.4
Mixed dishes – sandwiches	10	4.1
Eggs	11	3.2
Plant-based protein foods	12	3.2
Seafood	13	3.1

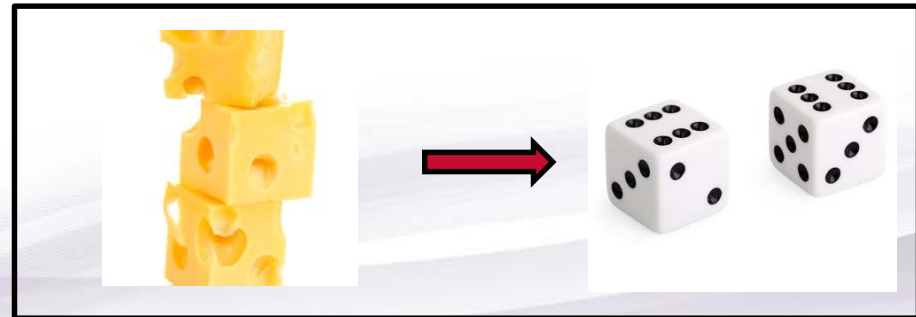
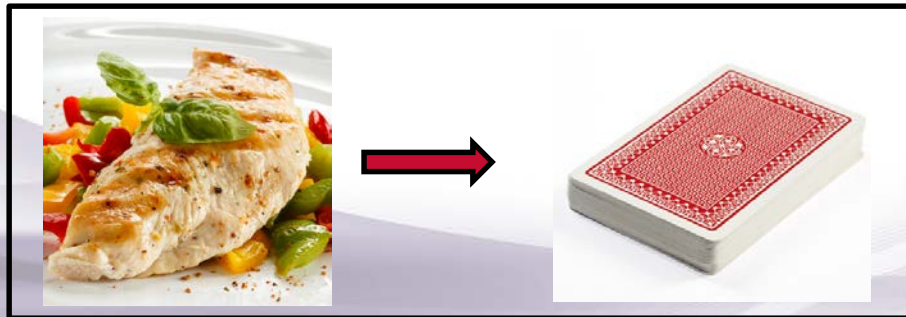
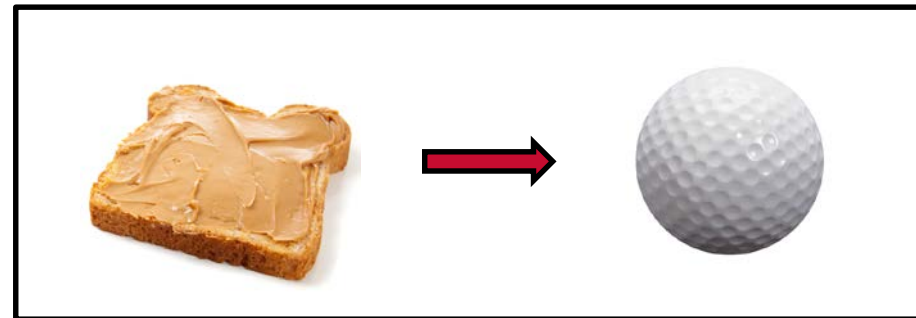
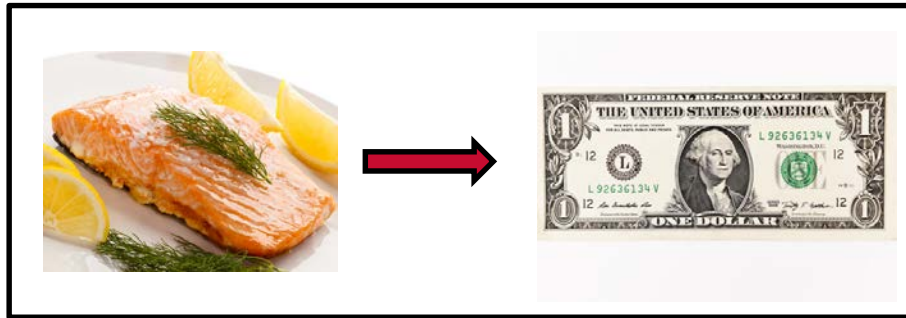
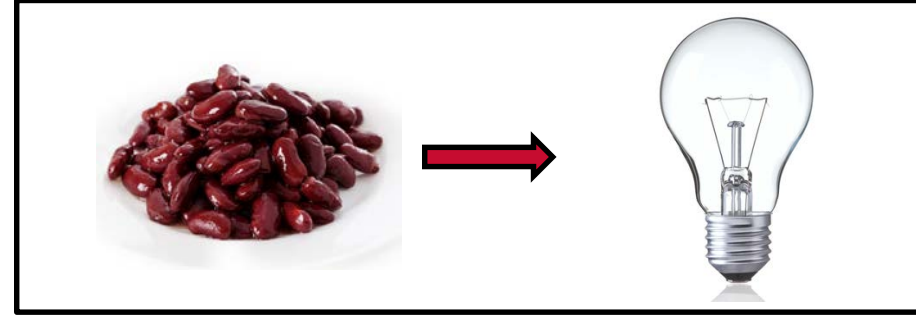
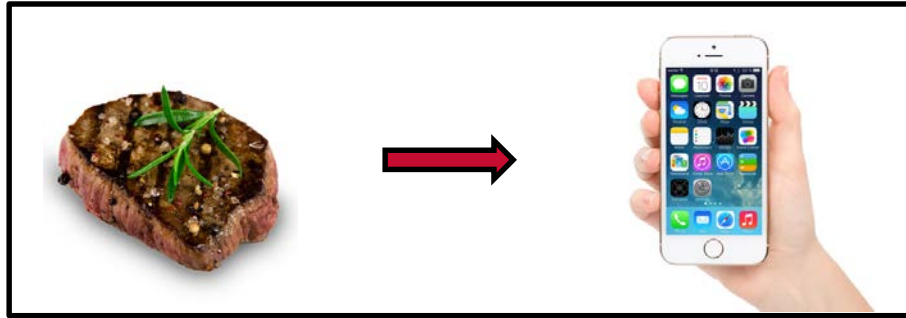
NHANES (2007-2010; N =<sup>12</sup> 17,386), Unpublished

# Achieving Nutrient Adequacy Via Commonly Consumed Protein Foods



Phillips, SM et al. Commonly consumed protein foods contribute to nutrient intake, diet quality, and nutrient adequacy. *Am J Clin Nutr.* 2015 Apr 29. pii: ajcn084079. [Epub ahead of print]

# Protein from Lean Sources: Portion Comparisons



# Protein Research



# Continuing the Exploration of Protein on Optimal Health

2007

Exploring the Impact of High-Quality Protein on Health



2013

Evaluating the Role of Protein in Public Health

PROTEIN SUMMIT 2.0



# Extensive Research Emerged From Protein Summit 2007



Introduction to Protein Summit 2007: Exploring the Impact of High-Quality Protein on Optimal Health<sup>1-4</sup>

Nancy R Rodriguez and Peter J Garlick

Dietary protein recommendations have traditionally been based on nitrogen balance studies. There is substantial literature documenting significantly positive effects of high-quality protein on health outcomes.

Current protein intake in America: analysis of the National Health and Nutrition Examination Survey, 2003–2004<sup>1-4</sup>

Victor L Fulgoni III

Protein, weight management, and satiety<sup>1-4</sup>

Douglas Paddon-Jones, Eric Westman, Richard D Mattes, Robert R Wolfe, Arne Astrup, and Margriet Westerterp-Plantenga

Amount and type of protein influences bone health<sup>1-4</sup>

Robert P Heaney and Donald K Layman

Protein quality assessment: impact of expanding understanding of protein and amino acid needs for optimal health<sup>1-4</sup>

D Joe Millward, Donald K Layman, Daniel Tomé, and Gertjan Schaafsma

Protein in optimal health: heart disease and type 2 diabetes<sup>1-4</sup>

Donald K Layman, Peter Clifton, Mary C Gannon, Ronald M Krauss, and Frank Q Nuttall

Role of dietary protein in the sarcopenia of aging<sup>1-4</sup>

Douglas Paddon-Jones, Kevin R Short, Wayne W Campbell, Elena Volpi, and Robert R Wolfe

Protein Summit: consensus areas and future research<sup>1-4</sup>

Robert R Wolfe

balances at higher intakes than the requirement (4). This result has often been discounted as artifactual, because of limitations of the nitrogen balance technique. Nonetheless, although adults are expected to be in neutral balance, ie, not growing on average,

Egg Nutrition Center, National Dairy Council, National Pork Board, and The Beef Checkoff through the National Cattlemen's Beef Association.

<sup>4</sup> Reprints not available. Address correspondence to NR Rodriguez, Department of Nutritional Sciences, University of Connecticut, Unit 4017, Storrs, CT 06269-4017. E-mail: nancy.rodriguez@uconn.edu.



# Body of Evidence on Role of Protein in Promoting Health

## Beef in an Optimal Lean Diet study: effects on lipids, lipoproteins, and apolipoproteins<sup>1-3</sup>

Michael A. R. Fisher, J. Gillis

**ABSTRACT**  
Background: Beef is a source of high-quality protein and has been shown to have beneficial effects on lipids and lipoproteins. Objective: We evaluated the effects of a lean beef diet on lipids and lipoproteins in a randomized controlled trial. Design: This study was a randomized controlled trial. Setting: The study was conducted in a laboratory setting. Participants: 50 men and women aged 40-60 years. Intervention: Participants were randomized to either a lean beef diet (12% of total energy from beef) or a control diet (12% of total energy from chicken). Measurements and Main Results: The lean beef diet significantly increased HDL cholesterol and decreased LDL cholesterol and triglycerides compared to the control diet. Conclusions: A lean beef diet may be beneficial for improving lipid and lipoprotein profiles.

The Journal of Nutrition  
Nutrition and Disease

Supplemental Material can be found at: <http://dx.doi.org/10.3945/jn.114.26044>

## A Moderate-Protein Diet Produces Sustained Weight Loss and Long-Term Changes in Body Composition and Blood Lipids in Obese Adults<sup>1,2</sup>

Donald K. Layman,<sup>1</sup> Ellen M. Evans,<sup>1</sup> Donna Erickson,<sup>1</sup> Jennifer Seyler,<sup>1</sup> Judy Weber,<sup>1</sup> Deborah Bagshaw,<sup>1</sup> Amy Gillis,<sup>1</sup> Tricia Pesta,<sup>1</sup> and Penny Kris-Etherton<sup>1</sup>

<sup>1</sup>University of Illinois, Department of Food Science and Human Nutrition, and <sup>2</sup>Department of Kinesiology and Community Education, Champaign, IL 61824 and <sup>3</sup>Department of Nutritional Sciences, The Pennsylvania State University, University Park, PA 16802

### Abstract

Diets with increased protein and reduced carbohydrates (PRO) are effective for weight loss, but the long-term maintenance is unknown. This study compared changes in body weight and composition and blood lipids after 6 wk weight loss (4 mo) followed by weight maintenance (8 mo) using moderate PRO or conventional high-carbohydrate diets. Participants ( $n = 45.4 \pm 1.2$  y, BMI =  $32.6 \pm 0.8$  kg/m<sup>2</sup>,  $n = 100$ ) were randomized to 2 energy-restricted ( $-500$  kcal/d or  $-2093$  kJ/d): PRO with  $1.6$  g/kg<sup>0.75</sup> protein and  $<170$  g carbohydrate or CHO with  $0.8$  g/kg protein and  $>200$  g carbohydrate. At 4 mo, the PRO group lost  $22\%$  more fat mass (FM) ( $-5.6 \pm 0.4$  kg) than the CHO group ( $-4.4 \pm 0.3$  kg) but weight loss did not differ between groups ( $-8.2 \pm 0.5$  kg vs.  $-7.0 \pm 0.5$  kg,  $P = 0.10$ ). At the PRO group had more participants complete the study (64 vs. 45%,  $P < 0.05$ ) with greater improvement compliance; however, weight loss did not differ between groups ( $-10.4 \pm 1.2$  kg vs.  $-8.4 \pm 0.9$  kg,  $P = 0.18$ ). Completion criterion of participants attaining  $>10\%$  weight loss, the PRO group had more participants (31 vs. 21 more men [ $-18.5 \pm 1.5$  vs.  $-12.3 \pm 0.9$  kg,  $P < 0.01$ ] and FM [ $-11.3 \pm 1.0$  vs.  $-7.9 \pm 0.7$  kg,  $P < 0.01$ ] than the CHO diet. The CHO diet reduced serum cholesterol and LDL cholesterol compared with PRO ( $P < 0.01$ ) at 4 mo, but did not remain at 12 mo. PRO had sustained favorable effects on serum triglyceride (TAG), HDL cholesterol, and TAG:HDL compared with CHO at 4 and 12 mo ( $P < 0.01$ ). The PRO diet was more effective for FM loss at composition improvement during initial weight loss and long-term maintenance and produced sustained reduction and increases in HDL-C compared with the CHO diet. *J. Nutr.* 139: 514-521, 2009.

### Introduction

Obesity is a major public health crisis in the United States. Diet strategies for successful long-term weight loss and maintenance remain relatively untested. High-carbohydrate, low-protein, low-fat (CHO) diets are often recommended for weight management (1-3). However, recent studies have shown that diets with increased protein and reduced carbohydrates (PRO) are often

more effective, at least for short-term weight loss (4, 5). However, long-term maintenance of weight loss is often not maintained (6, 7). Most studies usually lack control diet monitoring, a fact that provides support for the PRO diet (8, 9). We previously completed 2 effects of PRO and CHO diets on short-term weight loss (8, 16, 17).

Most studies evaluating PRO diets examined fewer than 40 participants that greater initial weight losses were not maintained at 12 mo, but compliance (9-12). However, few studies usually lack control diet monitoring, a fact that provides support for the PRO diet (8, 9). We previously completed 2 effects of PRO and CHO diets on short-term weight loss (8, 16, 17).

\* To whom correspondence should be addressed. E-mail: [dlayman@uiuc.edu](mailto:dlayman@uiuc.edu).

Meat Science 92 (2012) 174-178

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## Review Nutrient-rich meat proteins in offsetting age-related muscle loss

Stuart M. Phillips<sup>a</sup>

<sup>a</sup>McMaster University, Department of Kinesiology, Hamilton, ON, Canada

### ARTICLE INFO

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### ABSTRACT

From a health perspective, an unappreciated consequence of the normal aging process is the impact that the gradual loss of skeletal muscle mass, termed sarcopenia, has on health beyond an effect on locomotion. Sarcopenia refers to the loss of muscle mass and associated muscle weakness, which occurs in aging and is thought to proceed at a rate of approximately 1% loss per year. However, periods of inactivity due to illness or recovery from orthopedic procedures such as hip or knee replacement are times of accelerated sarcopenic muscle loss from which it may be more difficult for older persons to recover. Some of the consequences of age-related sarcopenia are easy to appreciate such as weakness and, eventually, reduced mobility; however, other lesser recognized consequences include, due to the metabolic role the skeletal muscle plays, an inability to effectively resist insulin that people

## Role of dietary protein in the sarcopenia of aging<sup>1-4</sup>

Douglas Paddon-Jones, Kevin R. Short, Wayne W. Campbell, Elena

### ABSTRACT

Sarcopenia is a complex, multifactorial process facilitated by a combination of factors including the adoption of a more sedentary lifestyle and a less than optimal diet. Increasing evidence points to a blunted anabolic response after a mixed nutrient meal as a likely explanation for chronic age-related muscle loss. There is currently insufficient longer-term research with defined health outcomes to specify an optimal value for protein ingestion in elderly individuals. However, there is general agreement that moderately increasing daily protein intake beyond  $0.8$  g/kg<sup>0.75</sup> may enhance muscle protein anabolism and provide a means of reducing the progressive loss of muscle mass with age. The beneficial effects of resistance exercise in aging populations are unequivocal. However, research has not identified a synergistic effect of protein supplementation and resistance exercise in aging populations. There is little evidence that links high protein intakes to increased risk for impaired kidney function in healthy individuals. However, renal function decreases with age, and high protein intake is contraindicated in individuals with renal disease. Assessment of renal function is recommended for older individuals before they adopt a higher-protein diet. *Am J Clin Nutr* 2008;77(suppl):1562S-65S.

### INTRODUCTION

Sarcopenia is a complex, multifactorial process facilitated by a combination of voluntary and involuntary factors including the adoption of a more sedentary lifestyle and a less than optimal diet (1-3) (Figure 1). Advanced sarcopenia is synonymous with physical frailty and is associated with an increased likelihood of falls and impairment in the ability to perform routine activities of daily living (1). Some loss of muscle is viewed as a largely inevitable yet undesirable consequence of aging. After reaching a peak in early adult years, skeletal muscle mass declines by  $\sim 0.5-1.0\%$  y<sup>-1</sup> beginning at about 40 y of age. In its early stages, a gradual loss of lean muscle mass may be masked by a concurrent increase in fat mass along with subtle lifestyle adaptations. However, a breakpoint can occur when a previously asymptomatic individual experiences an injurious event or is acutely/chronically disabled (4). In such instances, the loss of skeletal muscle is accelerated and may rapidly facilitate a debilitating loss of functional capacity.

Chronic muscle loss is estimated to affect 30% of people older than 60 y and may affect  $>50\%$  of those older than 80 y (5). Sarcopenia is associated with a 3- to 4-fold increased likelihood of disability, which in turn is associated with substantial socioeconomic and health care spending. One analysis estimated that in 2000, sarcopenia was responsible for \$18.5 billion in health care costs (6). As the number of people older than 65 continues

to include 2025,  $\sim 80\%$  of people aged 65 and older will be aged 75 and older (7). To estimate the impact of sarcopenia on the elderly population, we conducted a study in which 111 healthy adult men and women ( $n = 111$ ,  $38\pm 2.98$  y, BMI:  $26.1\pm 1.1$ ) participated in a 7-day crossover feeding study with 30 day washout to evaluate the acute and sustained effects of protein distribution on indices of satiety. Study diets were isoenergetic and isonitrogenous, containing 90 g total protein/day. The even protein distribution diet provided: 30 g (breakfast), 30 g (lunch) and 30 g (dinner). The skewed protein distribution diet provided: 10 g (breakfast), 15 g (lunch) and 65 g (dinner). Visual analog questionnaires measured hunger and fullness three hours after ingestion of each meal. On day one, subjects reported less hunger ( $p = 0.02$ ) and greater fullness ( $p = 0.04$ ) following the breakfast meal containing 30 g vs. 10 g of protein. Conversely, the skewed, high protein (65 g) evening meal had no greater effect on satiety than the more moderate 30 g protein meal ( $p = 0.2$ ). Following 7 days habituation to each diet, there was no change in satiety indices in response to the morning and evening meals. In conclusion, compared to a typical skewed daily protein intake, consuming a moderate amount of protein with each meal promotes satiety following breakfast and may enable more efficient and effective management of daily protein and energy intake.

Healthy adult men and women ( $n = 111$ ,  $38\pm 2.98$  y, BMI:  $26.1\pm 1.1$ ) participated in a 7-day crossover feeding study with 30 day washout to evaluate the acute and sustained effects of protein distribution on indices of satiety. Study diets were isoenergetic and isonitrogenous, containing 90 g total protein/day. The even protein distribution diet provided: 30 g (breakfast), 30 g (lunch) and 30 g (dinner). The skewed protein distribution diet provided: 10 g (breakfast), 15 g (lunch) and 65 g (dinner). Visual analog questionnaires measured hunger and fullness three hours after ingestion of each meal. On day one, subjects reported less hunger ( $p = 0.02$ ) and greater fullness ( $p = 0.04$ ) following the breakfast meal containing 30 g vs. 10 g of protein. Conversely, the skewed, high protein (65 g) evening meal had no greater effect on satiety than the more moderate 30 g protein meal ( $p = 0.2$ ). Following 7 days habituation to each diet, there was no change in satiety indices in response to the morning and evening meals. In conclusion, compared to a typical skewed daily protein intake, consuming a moderate amount of protein with each meal promotes satiety following breakfast and may enable more efficient and effective management of daily protein and energy intake.

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The Journal of Nutrition  
Nutrition & Epidemiology

## Higher-Protein Diets Are Associated with Higher HDL Cholesterol and Lower BMI and Waist Circumference in US Adults<sup>1-4</sup>

Serban M. Pasiakos,<sup>1\*</sup> Harris R. Lieberman,<sup>1</sup> and Victor L. Fulgoni III<sup>2\*</sup>

<sup>1</sup>Military Nutrition Division, US Army Research Institute of Environmental Medicine, Natick, MA, <sup>2</sup>Oak Ridge Institute for Science and Education, Oak Ridge, TN, and <sup>3</sup>Nutrition Impact LLC, Seattle, WA, and <sup>4</sup>USDA

### Abstract

Background: Higher protein diets are associated with higher HDL cholesterol and lower BMI and waist circumference in US adults. Objective: We evaluated the effects of a lean beef diet on lipids and lipoproteins in a randomized controlled trial. Design: This study was a randomized controlled trial. Setting: The study was conducted in a laboratory setting. Participants: 50 men and women aged 40-60 years. Intervention: Participants were randomized to either a lean beef diet (12% of total energy from beef) or a control diet (12% of total energy from chicken). Measurements and Main Results: The lean beef diet significantly increased HDL cholesterol and decreased LDL cholesterol and triglycerides compared to the control diet. Conclusions: A lean beef diet may be beneficial for improving lipid and lipoprotein profiles.

### ACCEPTED ARTICLE PREVIEW

Accepted Article Preview: Published ahead of advance online publication

The role of higher protein diets in weight control and obesity-related comorbidities

A Astrup, A Raben, N Geiker

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# Continued Exploration of Protein on Optimal Health at Protein

- Discussions identified effective strategies to help health professionals translate protein science to optimize their clients' protein intake for health and combat misperceptions related to protein



# Meeting Proceedings Advance Science and Detail Protein's Role Optimal

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- A supplement to the June 2015 edition of the *American Journal of Clinical Nutrition* contains five comprehensive reviews from presentations and discussions from Protein Summit 2.0



# Supporting Protein's Role in Beneficial Health Outcomes

**Weight Loss**



**Preservation of Lean Mass**



**Appetite Control**



**Protein**

**Reduced Weight Regain**



**Healthy Metabolism**



# The Role of Protein In Weight Loss and Maintenance

- Eating more protein, as part of a reduced-calorie diet, can support weight loss and maintenance by:
  - Boosting metabolism
  - Controlling/curbing appetite
  - Helping the body retain muscle while losing fat

Science suggests that a good goal for total protein intake, as part of a reduced-calorie diet, is about 1.2-1.6 grams of protein per kilogram of body weight, mostly from high-quality sources.



# Defining Meal Requirements for Protein to Optimize Metabolic

- Eating high-quality protein foods helps support a healthy metabolism, which can help optimize health by improving markers of health.
- The body's ability to effectively use the amino acids found in dietary protein can decline with age and with reduced physical activity.

Eating about 20-30 grams of high-quality protein at each meal can help support a healthy metabolism to improve markers of health.



# Protein and Healthy Aging

- Eating more high-quality protein combined with regular physical activity can help slow or prevent sarcopenia, the gradual muscle loss associated with aging.

Consuming between 1.0-1.5 grams of high-quality protein per kilogram of body weight (or 0.45-0.68 grams per pound of body weight) evenly throughout the day may be most effective to maintain muscle and support a healthy, vibrant life.





# Research Questions and Future Needs

- What is the sustained protein satiety effect over the long-term?
- What is the impact of dietary protein distribution at meals ?
- What are optimal levels of protein?
- What are the ideal types of protein-containing foods to help achieve nutrient adequacy?
- Should we be using the Protein Digestibility Corrected Amino Acid Score (PDCAAS) or the Digestible Indispensable Amino Acid Score (DIAAS) to evaluate dietary sources of protein?

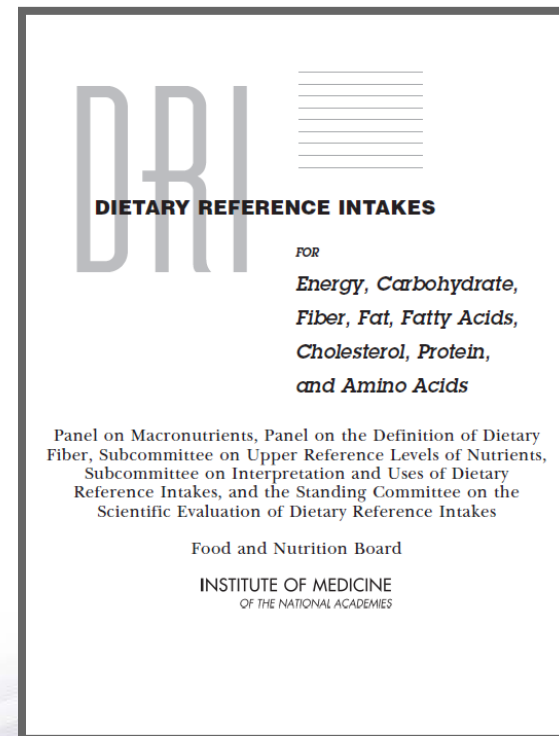


# Current Protein Recommendations



# Recommended Dietary Allowance For Protein: 0.8 g/kg body weight/day

- “An estimate of the minimum daily average dietary intake **level** that meets the nutrient requirements of nearly all (97-98%) healthy individuals”
  - **Protein:**
    - Women: 46 g/day
    - Men: 56 g/day
    - Or 0.8 g/kg body weight/day
  - **Fat:**
    - *Not determined*
  - **Carbohydrate:**
    - 130 g/day





# Acceptable Macronutrient Distribution Range For Protein: 10-35% of total calories

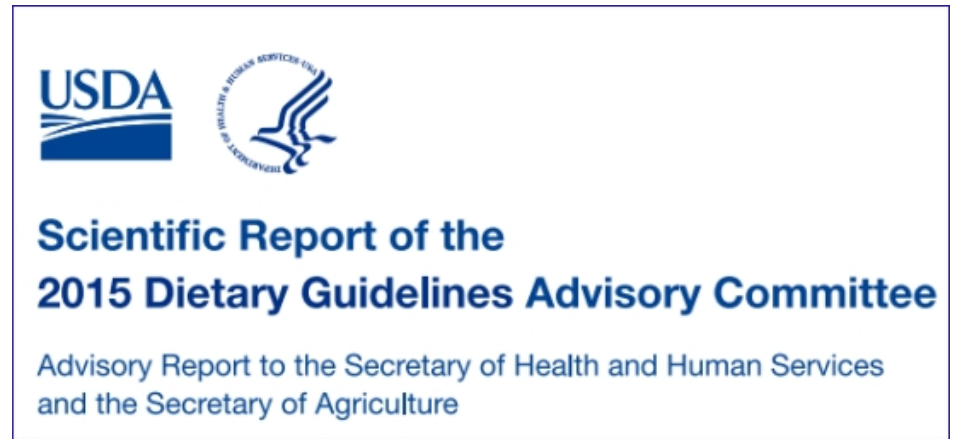
- The intake **range** “associated with reduced risk of chronic diseases, while providing adequate intakes of essential nutrients.”
  - **Protein:**
    - 10-35% of total calories
  - **Fat:**
    - 20-35% of total calories
  - **Carbohydrate:**
    - 45-65% of total calories



**INSTITUTE OF MEDICINE**  
OF THE NATIONAL ACADEMIES

# 2015 DGAC Report Shows Americans Getting Adequate Protein

“...intakes of protein (as grams/day) are adequate across the population and protein is not a shortfall nutrient.”



***Across all age groups and in both males and females, nearly 60 percent of the U.S. population meets the protein foods intake recommendation.***

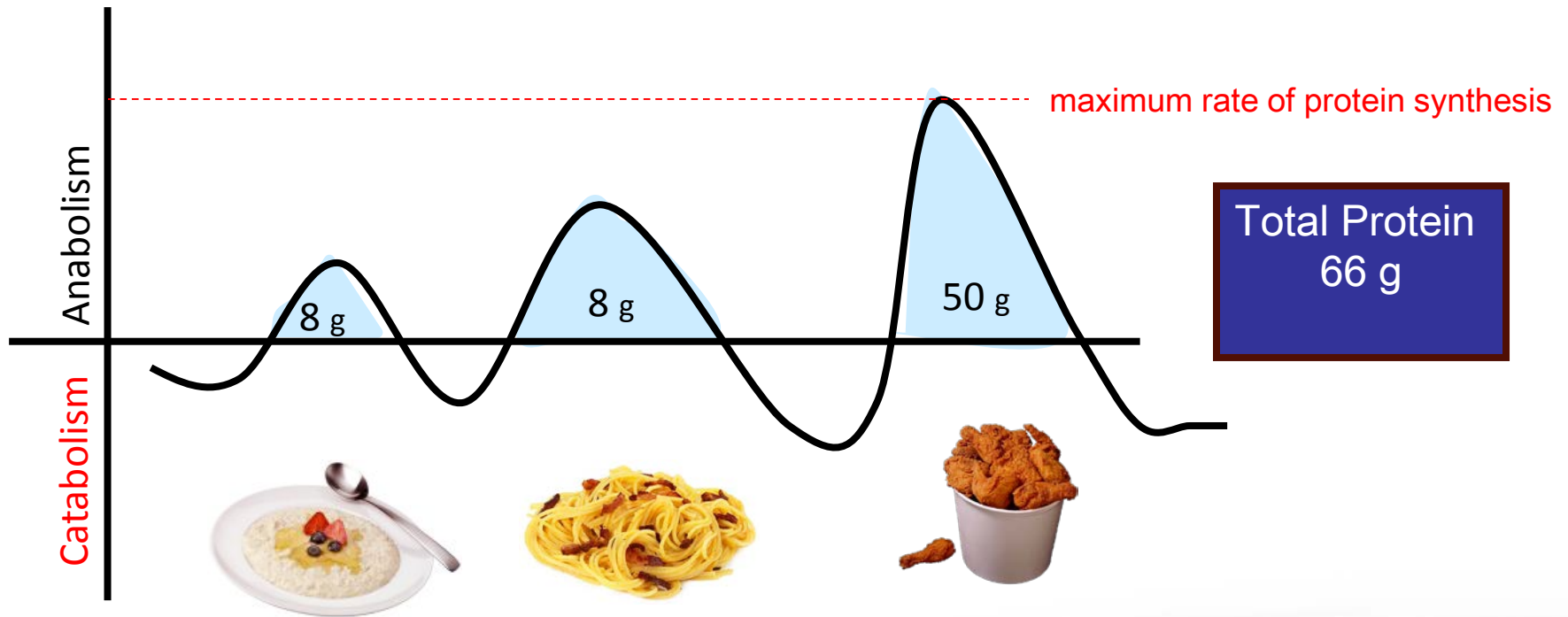
# Addressing Current Uneven Daily Protein Distribution

National Health and Nutrition Examination Survey (NHANES) data shows:

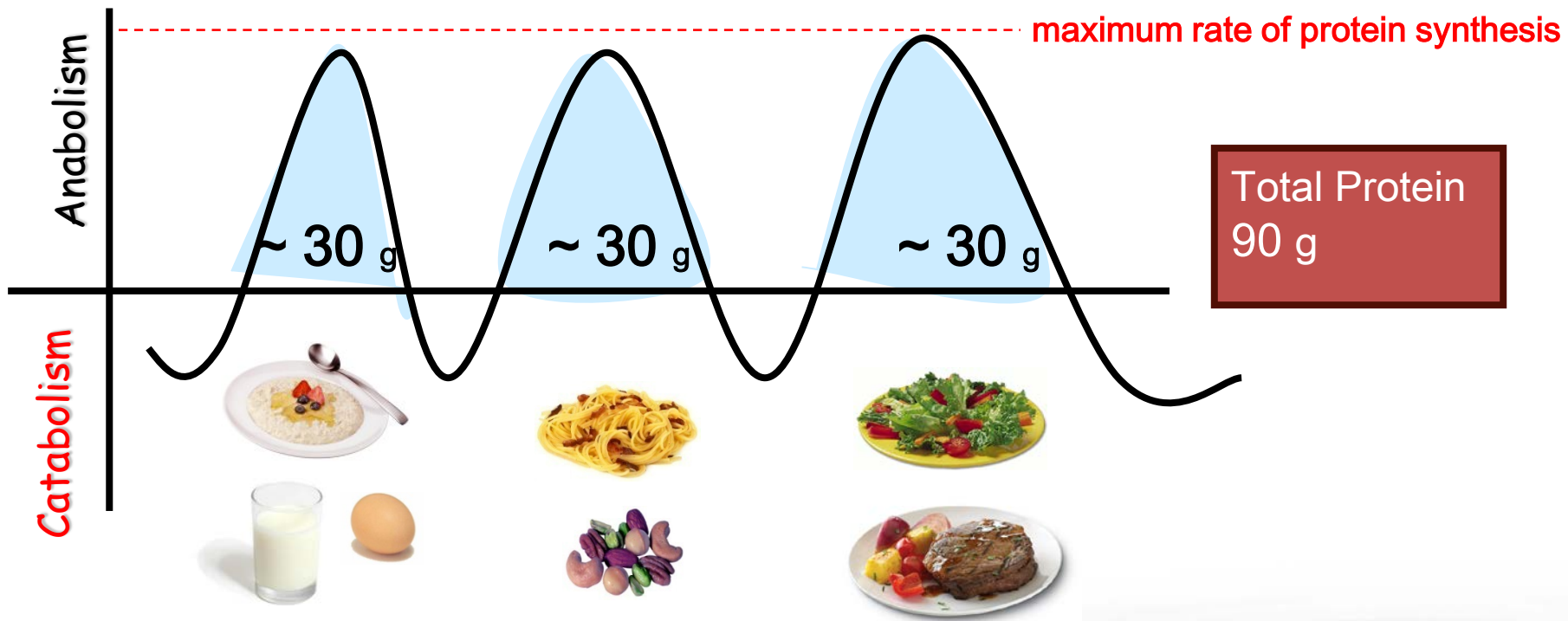
- People consume more than 65% of their daily protein in a single large dinner meal
- That leaves less than 35% distributed among other meals and snacks



# Recognizing Typical Daily Protein Distribution



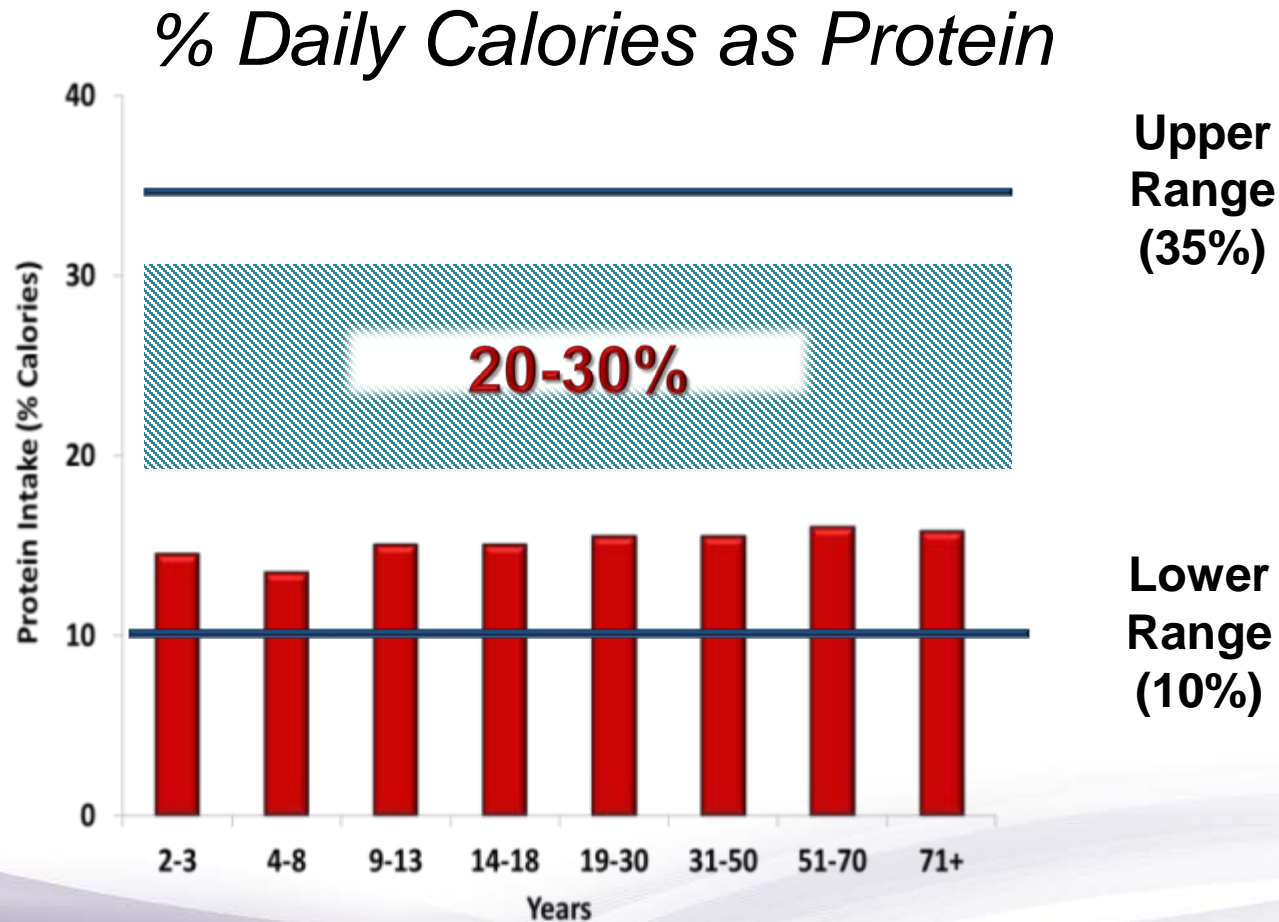
# Achieving Optimal Protein Intakes



Repeated maximal stimulation of protein synthesis  
→ increase / maintenance of muscle mass



# Is There A Case For More Protein?



# Case Study Part 1: Protein Needs

Two 41-year-old women, Amy and Betty, both weighing 125 lbs.

Protein needed to meet the RDA:

$$125 \text{ lbs.} / 2.2 \text{ kg/lb.} = \underline{56.8 \text{ kg}}$$

$$56.8 \text{ kg} \times 0.8 \text{ g pro/kg} = \underline{45.5 \text{ g protein}}$$

- Amy is sedentary and consumes about **1,400** calories/day. If she consumes the RDA, what percentage of her calories will come from protein?  
 $45.5 \text{ g protein} \times 4 \text{ kcal/g} = \underline{182 \text{ kcals}}$   
 $182 \text{ kcals} / 1,400 \text{ kcals} = \underline{13\% \text{ kcals}}$
- **Observation:** This percentage is within the AMDR, but on the low end
- Betty is moderately active and consumes **2,000** calories/day. If she consumes the RDA, what percentage of her calories will come from protein?  
 $45.5 \text{ g protein} \times 4 \text{ kcal/g} = \underline{182 \text{ kcals}}$   
 $182 \text{ kcals} / 1,850 \text{ kcals} = \underline{9.1\% \text{ kcals}}$
- **Observation:** This percentage is below the AMDR, which is particularly concerning because this woman is more active



# Case Study Part 2: Prescribing Protein Intake

Betty: 125 lb. moderately active female consuming 2,000 calories/day

- We know she needs 45.5 g of protein to meet the RDA, but this is only 9% of her total caloric intake, which falls below the minimum amount recommended by the AMDR.
- Using what you know about the AMDR and Betty's level of physical activity, how would you calculate her protein needs?
  - Estimated protein needs: ~20-25% total caloric intake
  - $2,000 \text{ kcal} \times 20\% = 400 \text{ kcal} / 4 \text{ kcal/g protein} = 100 \text{ g protein}$
  - $2,000 \text{ kcal} \times 25\% = 500 \text{ kcal} / 4 \text{ kcal/g protein} = 125 \text{ g protein}$
- Recommendation: Betty should consume between **100-125 g protein** per day, which is above the RDA but still well within the AMDR

# Applying Protein Recommendations to Everyday Life





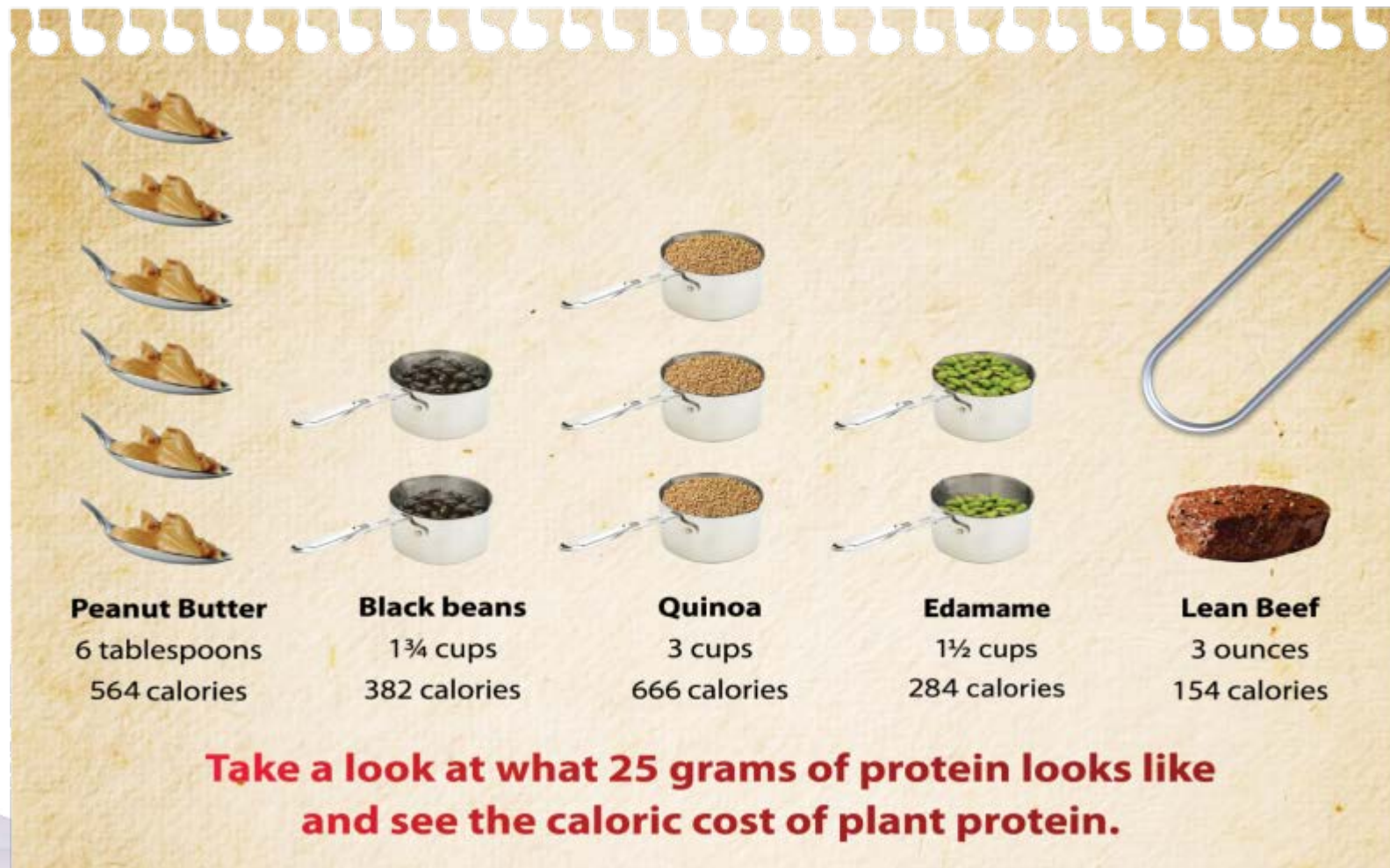
# Focus On High-Quality Protein Sources

Consume a variety of protein foods, but focus on high-quality sources of protein from nutrient-rich foods such as:

- Lean meats
- Poultry
- Fish
- Eggs
- Low-fat milk/dairy products



# A Look At Beef's Caloric Advantage





# Effective Translation of Current Dietary Guidelines: Understanding and Communicating the Concepts of Minimal and Optimal Levels of Dietary Protein

- Significant research shows that when they consume more high-quality protein within calorie goals, some people can:
  - Lose and maintain a healthy weight
  - Support a healthy metabolism
  - Age more healthfully
- On average, consuming between 20-30 grams of high-quality protein at each meal is associated with benefits for:
  - Improved metabolism
  - Healthy aging
  - Weight loss and maintenance, as part of a reduced-calorie diet



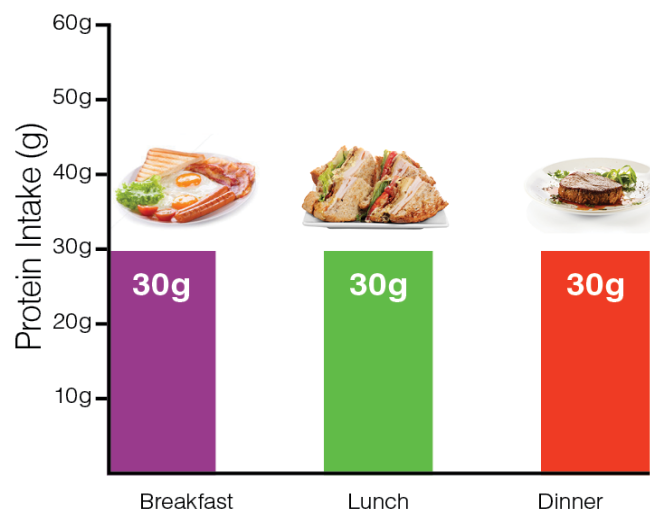
# Calculate the Amount of Protein Needed

- Use the AMDR (10-35% of calories) and/or absolute amounts of protein ranging from 0.8 to 1.6 g/kg/day to design practical diets to optimize protein intake based on health outcome goals

## 25-30 GRAMS

Aim for this amount (according to new research<sup>9</sup>) in each breakfast, lunch and dinner meal to:

- Improve daily muscle maintenance
- Protect against muscle loss
- Help with growth and repair
- Increase satisfaction and fullness







# Emphasize a Balanced Intake Approach

- Spread protein intake throughout the day at meals to increase the body's use of protein and optimize protein's health benefits



# Take the Protein Challenge!

## TAKE CONTROL

Protein gives you the control you need to take on the day and make the right food choices.

30 DAY  
*Protein*  
CHALLENGE



# Use Tools and Resources

[www.beefitswhatsfordinner.com/proteinchallenge.aspx](http://www.beefitswhatsfordinner.com/proteinchallenge.aspx)

## 30 DAY PROTEIN CHALLENGE

The 30 Day Protein Challenge is a simple way to change the way you eat protein throughout the day. For some time, researchers have known that there are health and wellness benefits to **consuming protein** in balanced amounts at each meal. By making simple changes over the course of 30 days, you too can make the shift and begin feeling the positive benefits of eating 25-30 grams of protein for breakfast, lunch and dinner!

### Journal

Write down everything you eat and drink, and the amount of protein it contains in your food journals or app and pay attention to your **meat and substitution levels** throughout the day.

### Review

Look at your food journal and see if you notice any changes to your **mood or substitution levels**.

### Rest

Eat as you normally would and don't worry about writing it down. Use this day to prepare a plan for days ahead.

### Protein Shift

Shift the amount of protein you eat throughout the day. Look for meals where you aren't getting enough protein and begin adding it or finding substitutions so you can stick within the same amount of calories.

### Protein Balance

Eat 25-30 grams of protein for all these meals. Remember, keep an eye on calories by choosing **leaner proteins**.

01

02

03

04

05

**Journal**

What did you eat? How did it make you feel?

06

Review: Identify where you may be able to shift your protein consumption.

**Reminder!** Are you finding any of your meals typically light on protein? Start thinking of how you might change that.

07

Rest Day: Eat as you normally would and don't worry about writing it down.

08

Protein Shift: Begin substituting in protein-rich options to your lowest protein meal.

09

Rest Day: Eat as you normally would. Continue to keep your food journal.

10

Protein Shift: Substitute in protein-rich options to your second lowest protein meal.

**Reminder!** If you are a breakfast skipper, make sure you eat a protein-rich breakfast this day.

## 30 DAY PROTEIN CHALLENGE

### STOCK YOUR PROTEIN PANTRY

Here's a helpful guide to stock up on protein staples so you can easily enjoy flavorful, protein-rich meals any time of the day.

#### MEAT/EGGS (cooked)

3 oz Strip Steak	25g	180 kcal
3 oz 95% lean Ground Beef	22g	140 kcal
3 oz ground chicken	20g	160 kcal
3 oz ground turkey	22g	165 kcal
3 oz ground pork	26g	160 kcal
3 oz lamb chops	23g	160 kcal
3 oz pork tenderloin	22g	120 kcal
3 oz pork chops	24g	200 kcal
3 oz roasted ham	21g	135 kcal
3 oz skinless chicken breast	26g	130 kcal
3 oz deli roast beef	17g	155 kcal
3 oz deli turkey	12g	90 kcal
3 oz deli ham	14g	110 kcal
3 slices cooked bacon	11g	160 kcal
1 large egg	6g	90 kcal
1 oz beef jerky	15g	115 kcal

#### DAIRY

6 oz nonfat Greek plain yogurt	17g	100 kcal
6 oz nonfat yogurt	9g	110 kcal
1 oz Swiss cheese	8g	105 kcal
1 oz American cheese	5g	100 kcal
1 oz cheddar cheese	7g	115 kcal
1 cheese stick/string cheese	5-8g	70-85 kcal
6 oz low-fat cottage cheese	27g	195 kcal
8 oz skim milk	8g	85 kcal

#### BEANS

1/2 cup cooked pinto beans	8g	120 kcal
1/2 cup cooked black beans	8g	115 kcal
1/2 cup cooked kidney beans	7g	105 kcal
1/2 cup cooked garbanzo beans	7g	135 kcal
1/2 cup cooked edamame	8g	95 kcal
1/2 cup tofu	10g	95 kcal

#### FISH/SEAFOOD

3 oz canned tuna	20g	110 kcal
3 oz fillet of catfish	16g	90 kcal
3 oz fillet of tilapia		
3 oz fillet of salmon		
3 oz crabsmeat		
3 oz shrimp		
3 oz lobster		

#### GRAINS

1/2 cup cooked brown rice		
1/2 cup cooked quinoa		
1/2 cup cooked amaranth		
1 cup cooked oatmeal		

#### NUTS/SEEDS

2 tbsp peanut butter	8g	190 kcal
2 tbsp almond butter	7g	195 kcal

## PROTEIN BENEFITS

### WHY FOCUS ON PROTEIN?

Heart healthy diets with high quality lean protein help lower cholesterol (the bad kind), reduce the risk of chronic disease and reduce high blood pressure.

Protein helps support strong, lean bodies.

Feeling hungry? People who eat a higher-protein diet (about 30% of daily calories from protein) feel more satisfied, which may help prevent overeating.

Get more from your workout! Studies show exercise is more effective when paired with a higher-protein diet, and beef provides the amino acids necessary for building and replenishing muscles.

Beef gives you body more of the high-quality protein you need to achieve and maintain a healthy weight and preserve and build muscle.

50% of your recommended Daily Value of protein

a 3-oz serving of beef provides 25 grams of protein and 10 essential nutrients in one tasty package.

## 30 DAY PROTEIN CHALLENGE

Day of Challenge \_\_\_\_\_ Date \_\_\_\_\_

Time	Pre-Meal Hunger Rating (0-10)	Pre-Meal Mood	Meal (list foods & beverages)	Protein Total (g)	Post-Meal Hunger Rating (2 Hours After Eating)	Post-Meal Mood (2 Hours After Eating)

**Food & Hunger Journal**

Congratulations on joining the 30 Day Protein Challenge! As you get started, use this daily food diary to track your meals to identify your daily protein intake and examine how the meals you eat make you feel. You can also use it to guide meal and snack choices to feel the positive benefits of eating more balanced protein for breakfast, lunch and dinner!

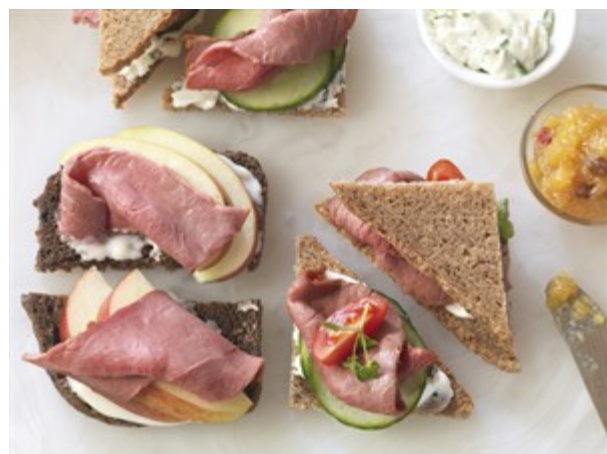


# Get Recipes for Satisfying Meals Delivering 25-30 grams of Protein

**Breakfast**



**Lunch**



**Dinner**



Optimize protein intake throughout the day



# Final Thoughts

- High-quality protein has unique benefits for health, especially to achieve and maintain a healthy body weight, improve the way the body metabolizes food and support healthy aging
- Research shows that health benefits can be achieved by enhancing high-quality protein intake within daily calorie goals and shifting timing of intake more evenly throughout the day
  - The ideal protein intake is approximately 1.0 to 1.6 g/kg/day (above the RDA but well within the AMDR for protein) and distributed throughout the day.
  - Evenly distributing high-quality protein intake throughout the day, or about 20-30 grams at breakfast, lunch and dinner, is optimal to achieve health benefits



# Final Thoughts

- Failure to consume nutrient-dense foods, in particular nutrient-dense protein sources, makes it difficult to meet recommended dietary goals for various nutrients.
- Animal proteins provide more and higher quality protein than plant foods, often for fewer calories.
- Protein should be balanced with other nutrient-rich foods on the plate like fruits, vegetables and whole grains.
- Dietitians and health professionals should be encouraged to promote protein as the first choice in meeting energy requirements and to emphasize spreading protein intake throughout the day.



**Funded by  
the Beef Checkoff.**

# Thank You!

[www.BeefNutrition.org](http://www.BeefNutrition.org)





# PROTEIN SUMMIT *2.0* Evaluating the Role of Protein on Public Health

