

# Protein Throughout the Day for a healthy whey of life®

*The importance of increased levels of the amino acid leucine and dietary protein to promote lean muscle growth, improve body weight management, and increase appetite control.*

A concise summary of a technical presentation given by Heather J. Leidy, Ph.D at the Institute of Food Technologists Expo in Chicago, July 2013.

## Protein Consumption

Accepted dietary protein recommendations are based on the minimal amount needed to prevent deficiencies under the assumption that eating the basic amount of protein is important, but consuming more than the minimum offers no further value. In reality, there is scientific evidence that consuming the low-end range of the Recommended Daily Allowance (RDA) for protein may be a health liability and that adults may benefit from higher protein intake (Figure 1).

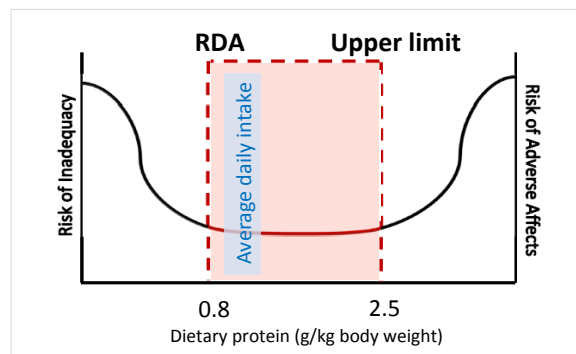


Figure 1. Dietary Protein Intake

## Benefits of a Higher Protein Diet

New research demonstrates that dietary protein intakes above minimum requirements can improve adult health and provide benefits for the treatment and prevention of diseases including:

- Body weight management\*
- Metabolic syndrome (Type II Diabetes)
- Heart disease
- Sarcopenia
- Osteoporosis

In addition increased intake of high quality protein can also benefit athletic performance by improving strength and endurance.<sup>(1,2)</sup>

\* Focused in the presentation/summary.

## Weight Management

DiETING often produces short-term weight loss, but maintaining the loss is difficult. High protein diets can result in greater weight and fat loss while preserving lean muscle mass. Clinical studies of increased dietary protein during calorie restriction resulted in not only significantly more weight loss, but also the loss being proportionately more from fat rather than muscle tissue.<sup>(3,4)</sup> Increased dietary protein following weight reduction resulted in a significantly lower percent of weight regained over a 6 month period (20% regained versus 60% for those subjects consuming normal protein levels). The lower percent body fat was sustained in those subjects consuming a higher protein diet.<sup>(5)</sup>

## Mechanisms of Action

There are several mechanisms to explain the benefits of a high protein intake for body weight management.

- Thermic effect of food (energy used to metabolize food consumed)
  - o The body's resting energy expenditure is greater with a higher protein intake.<sup>(3)</sup> This is mainly due to muscle protein synthesis after each meal.<sup>(6,7,8,9,10,11)</sup>
- Satiety (improved appetite control)
  - o Protein controls how much we eat during the day. In comparison with a normal protein diet, a high protein diet helps delay cravings and results in fewer calories being consumed at subsequent meals.<sup>(4,12,13)</sup>
  - o Subjects consuming a high protein diet reported feeling less hungry than those eating normal protein levels (4 hours after a meal).<sup>(14,15)</sup>
  - o This is supported by hormonal and brain activity evidence showing an increase in satiety.<sup>(12,16)</sup>

## Important Key Points About High Protein Diets

- **Quantity of Protein** – Sufficient amount of the amino acid leucine is needed as a signal to maximize lean muscle synthesis (2.5 g/meal).<sup>[6,7,8,9,10,11]</sup>
- **Quality of Protein** – Not all proteins are equal nutritionally; they do not have the same amino acid profile. High quality proteins are more effective in stimulating muscle protein synthesis and can be used in lower amounts to achieve optimal health benefits with the least calories.

Sources of Leucine	Leucine (%)	Leucine in 30g Protein (g)
Whey Protein Isolate	10.9	3.3
Milk Protein	9.5	2.8
Egg Protein	8.8	2.6
Muscle Proteins	8.0	2.4
Soy Protein Isolate	8.0	2.4
Wheat Protein	6.8	2.0

- **Timing of Protein Consumption** – It is important to consume high quality protein throughout the day. This is because muscle protein synthesis only lasts about 3 hours after time of consumption.
  - An even distribution of ~30g protein/meal for three meals causes a significant increase in protein synthesis.<sup>[17]</sup> However, Americans tend to load too much of their protein in the evening meal. A better approach would be an even distribution of 30g protein/meal throughout the day (Figure 2).

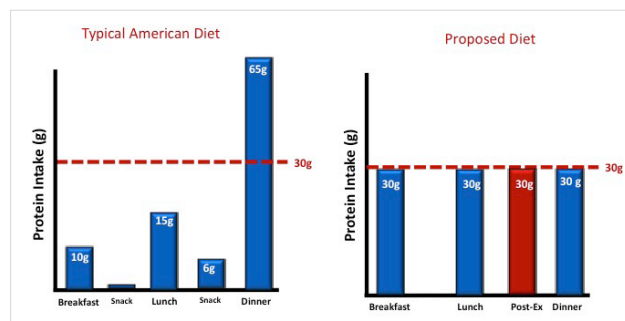


Figure 2. Protein Throughout the Day

## Breakfast is the Most Important Meal

- Breakfast determines your metabolic pattern - what you eat at the first meal can determine how your body burns fat for the rest of the day.
- If the first meal is high in carbohydrates and low in protein, the rush of insulin shifts your body from burning fat to storing fat and even converting the carbohydrates you eat into new fat.
- Dr. Heather Leidy's research group demonstrated that eating a high carbohydrate, low protein breakfast led overweight young women to desire more snacks and ones that were high in carbohydrate and fat. Women consuming higher protein breakfasts had less desire to snack.<sup>[13]</sup>



## REFERENCES

1. Cermak, et al., *AJCN* 2012; 96: 1454-64
2. Bray, et al., *JAMA* 2012; 307 (1): 47-55
3. Wycherly, et al., *AJCN* 2012; 96: 1281-98
4. Skov, et al., *Int J Obesity* 1999; 23(5): 528-36
5. Lejeune, et al., *Brit J Nutr* 2005; 93: 281-89
6. Symons et al., *AJCN* 2007; 86: 451-56
7. Norton, et al., *Nutrition & Metabolism* 2012; 9: 67
8. Symons et al., *JADA* 2009
9. Anthony, et al., *J Nutr* 2000; 130: 139-45
10. Anthony, et al., *J Nutr* 2000; 130: 2413-19
11. Layman and Walker, *J. Nutr* 2006; 136: 319S-323S
12. Leidy and Racki, *Int J Obesity* 2010; 34(7): 1125-33
13. Leidy, et al., *American J Clinical Nutr* 2013; 97(4): 677-88
14. Leidy, et al., *Obesity* 2007; 15(5): 1215-25.
15. Leidy, et al., *Obesity* 2010; 18(9): 1725-32
16. Leidy, et al., *Obesity* 2011; 19(10): 2019-25.
17. Mamerow, et al., *Experimental Biology* 2012; Abstract #1013.5; Protein Distribution Effect on Satiety



**Dr. Heather Leidy** is an Assistant Professor in the Department of Nutrition & Exercise Physiology of the School of Medicine at the University of Missouri. She received her BS in Biology from Shippensburg University and went on to complete her MS and PhD work in the Inter-departmental Physiology Program at Penn State University. Dr. Leidy continued with a Post-doctoral Fellowship in the Ingestive Behavior Research Center within the Department of Foods and Nutrition at Purdue University. Dr. Leidy's research focuses on the metabolic, hormonal, and neural regulation of appetite, food intake and body weight in overweight and obese individuals across the lifespan. She has over 10 peer-reviewed, original research publications in obesity-focused research and has given over 20 presentations at various scientific conferences including endocrinology, Experimental Biology, The Obesity Society, and American College of Sports Medicine. She was awarded a 2009 KUMC BIRCH Award for research in her field.