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PROTEIN

Optimizing Intake for Muscle Gain & Weight Loss

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Webinar Tips

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Introductions

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Protein

How to Optimize Protein for Muscle Gain & Weight Loss

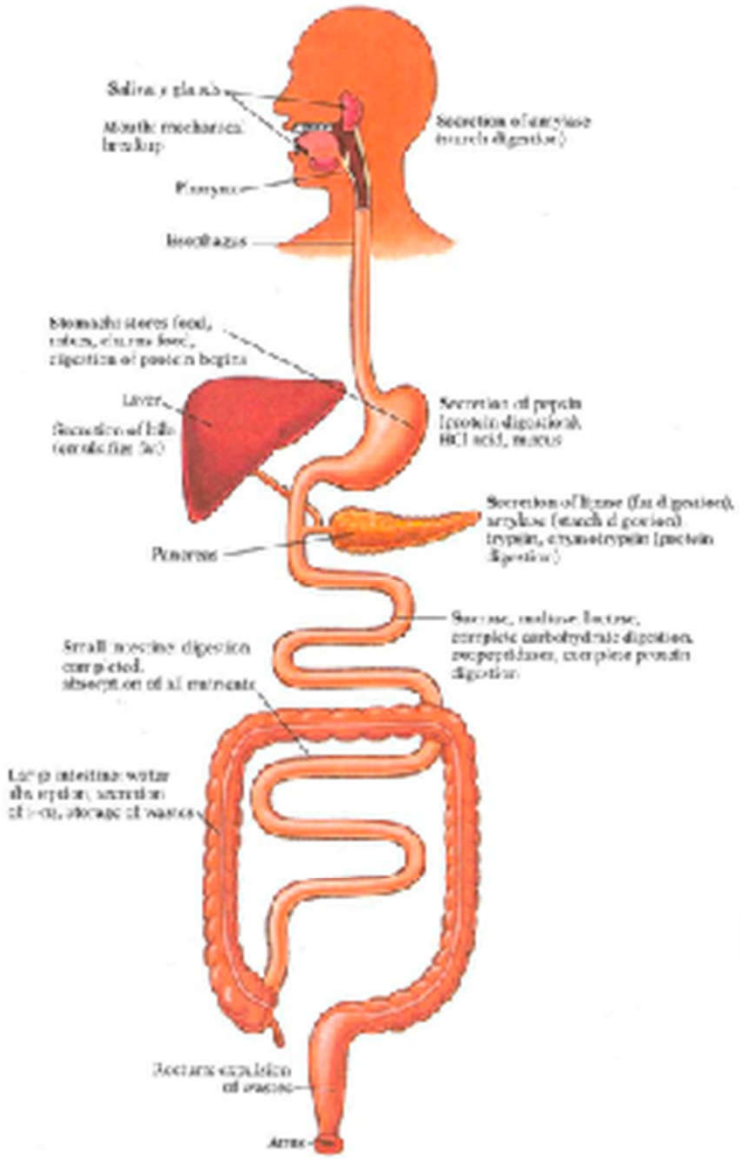
Presented By: Brad Dieter, PhD, MS

Agenda

1. Understanding protein, its role in physiology, and protein metabolism.
2. How much protein should you consume to maximize weight (fat) loss.
3. How much protein should you consume to maximize muscle growth?

A Crash Course On Protein Structure and Function

1. A Crash Course On Protein Metabolism



Mouth

Whole Proteins

Stomach

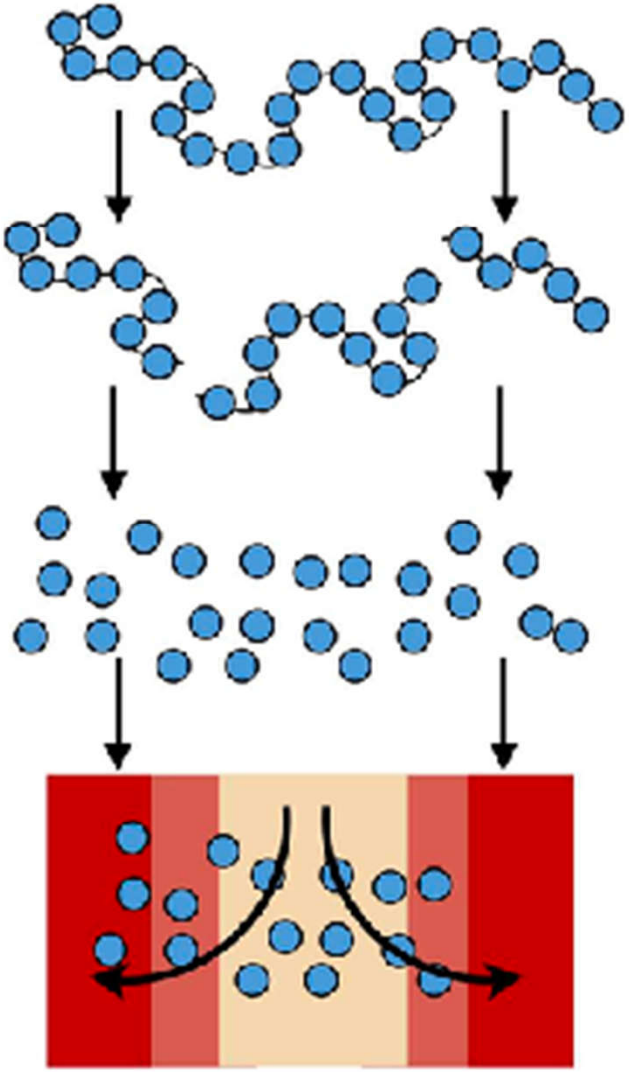
Smaller Peptides

Small Intestine

Individual Amino Acids

Intestinal Lining

Active Absorption



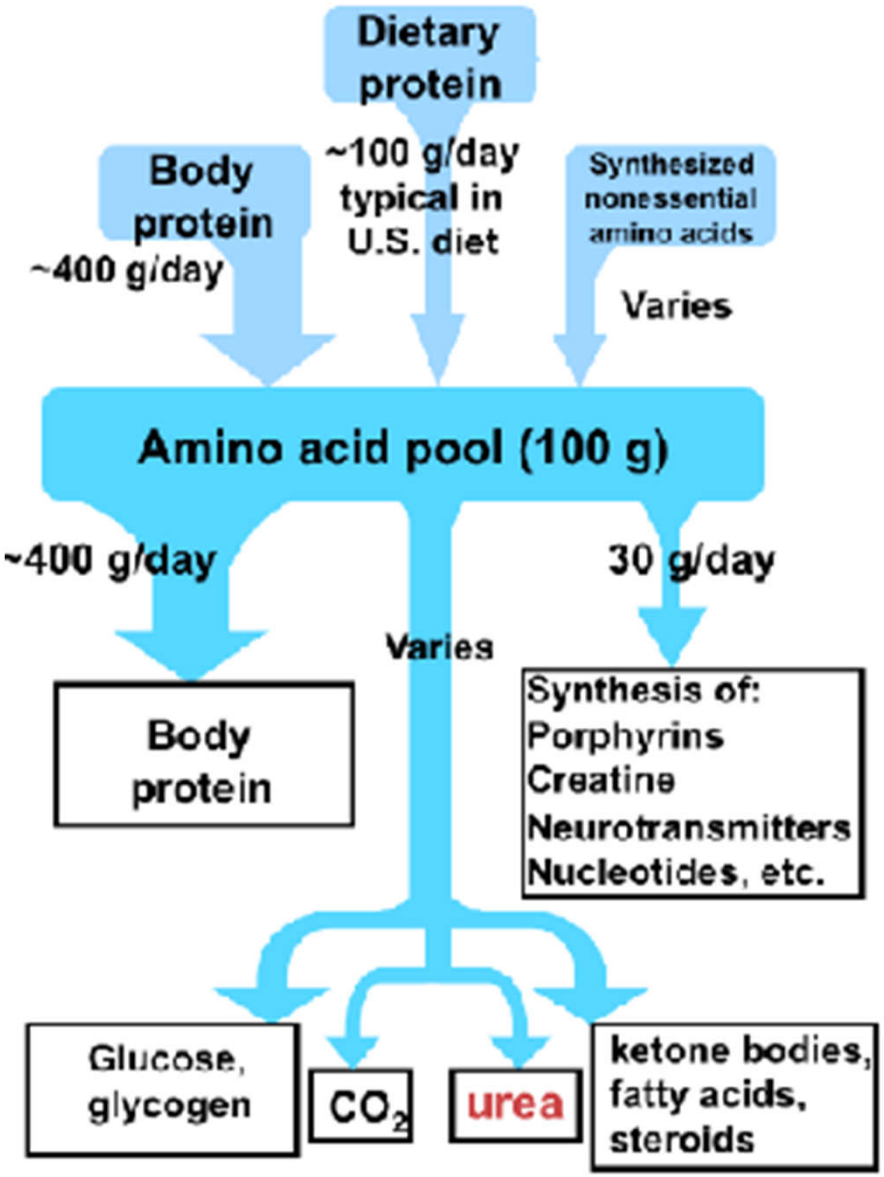
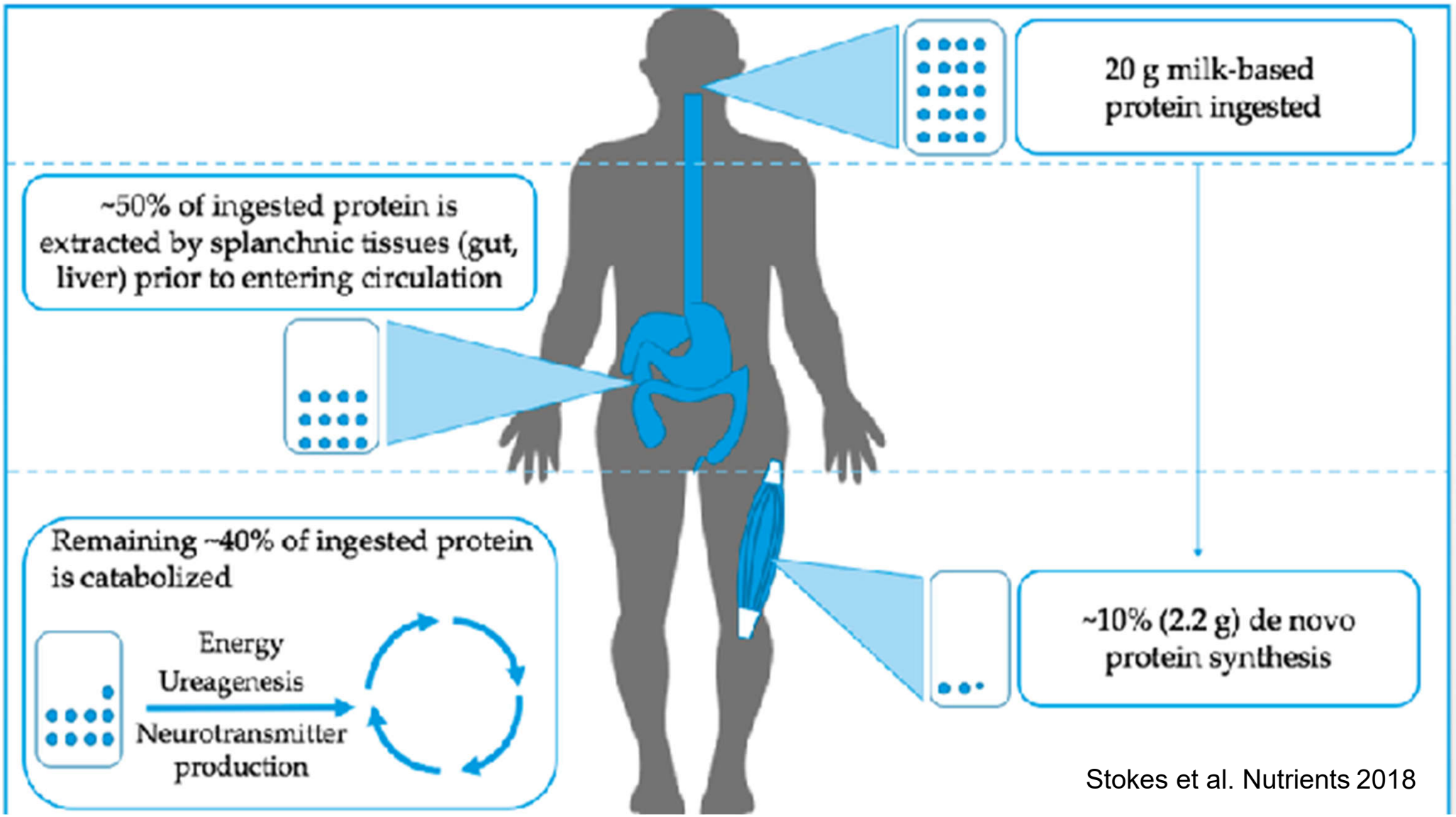


Image c/o memorangapp

The amino acid pool is the basis for protein metabolism



Stokes et al. Nutrients 2018

Recap

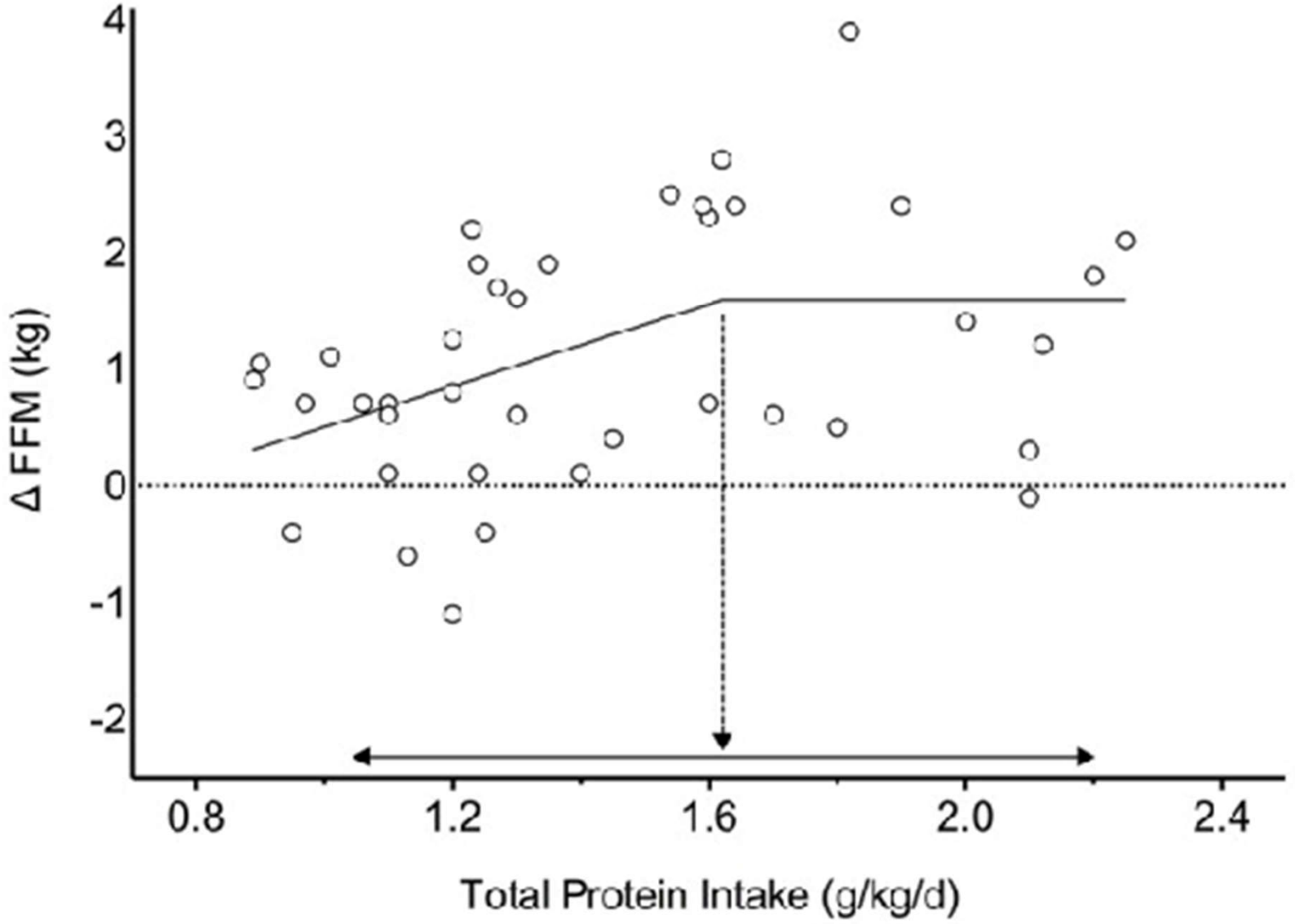
- Dietary protein is broken down into amino acids which are then absorbed from the GI tract into the blood stream.
- Dietary protein, and protein from the body contribute to the overall amino acid pool.
- About 50% of dietary protein makes into the blood stream, and only 10% goes to new protein synthesis

Muscle Gain

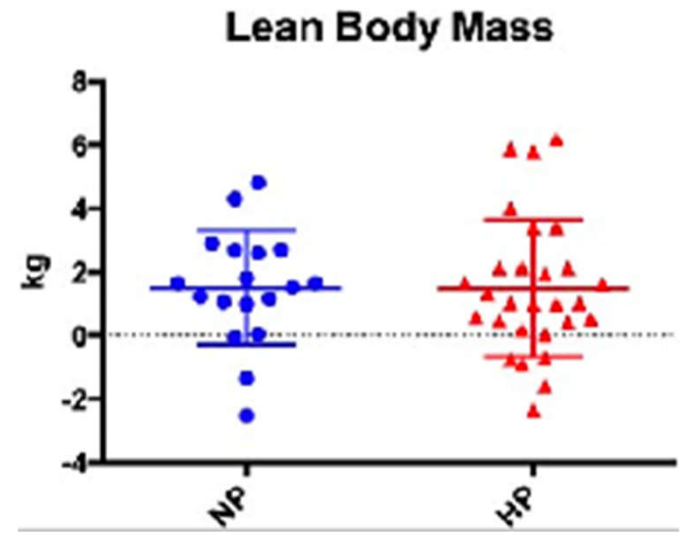
VS

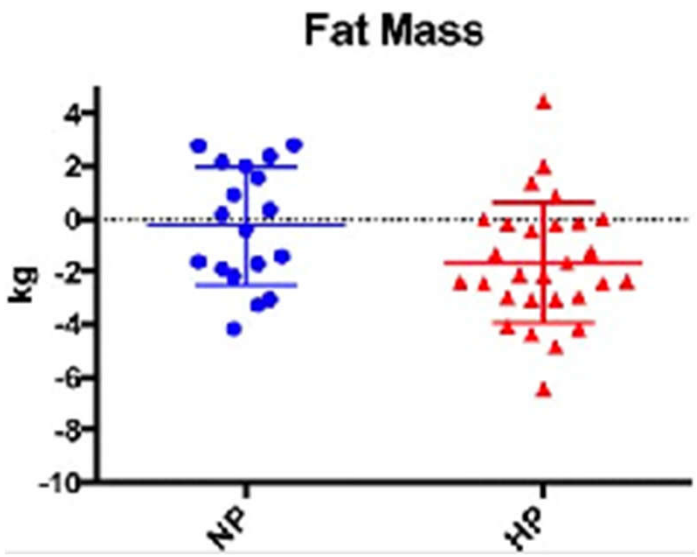
Weight Loss

2. How Much Protein Should We Consume Per Day?

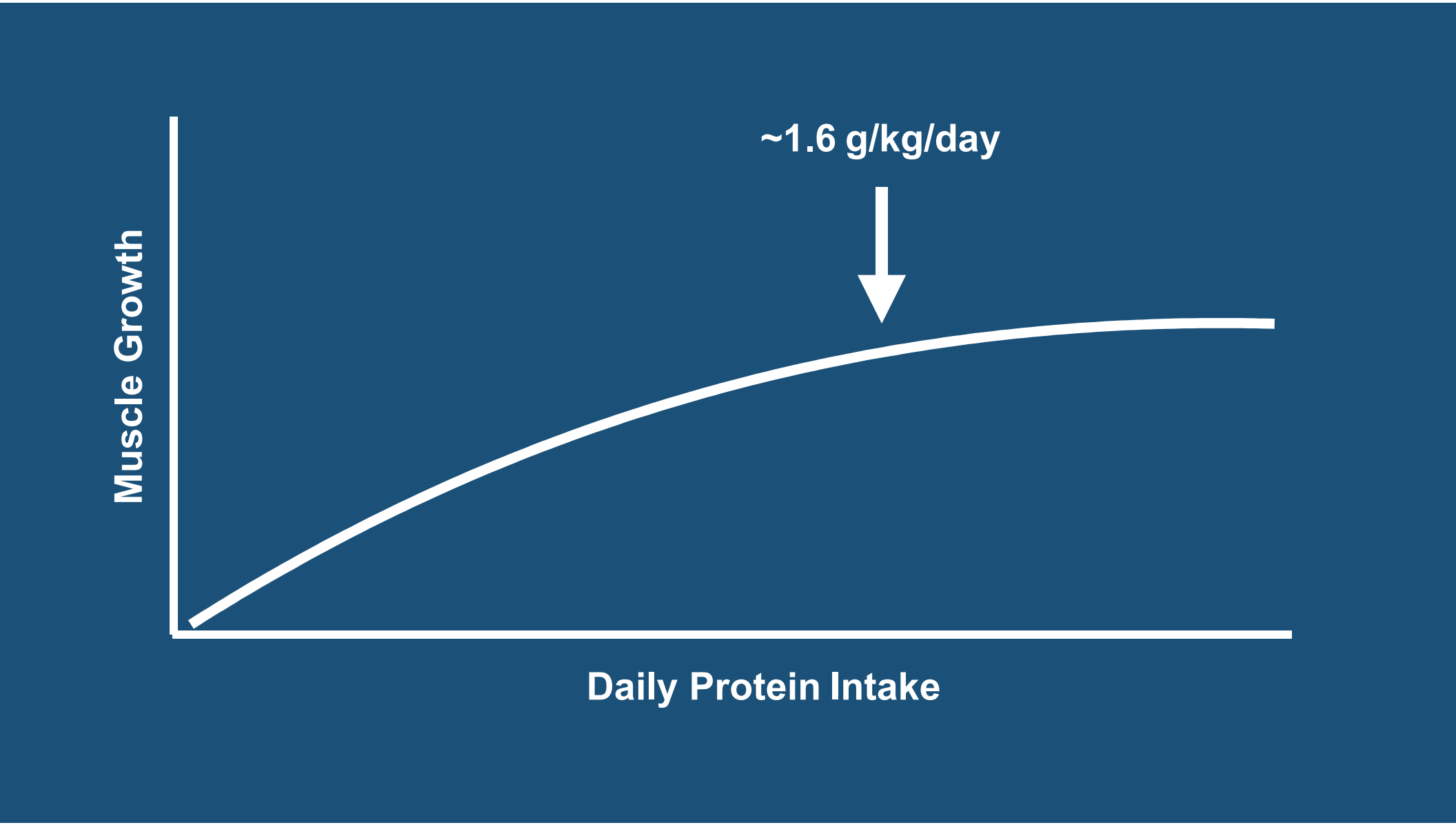

4
3
2
1
0
-1
-2
Δ FFM (kg)
0.8
1.2
1.6
2.0
2.4
Total Protein Intake (g/kg/d)

There May Be a Ceiling Above 2.2 g/kg For Growth

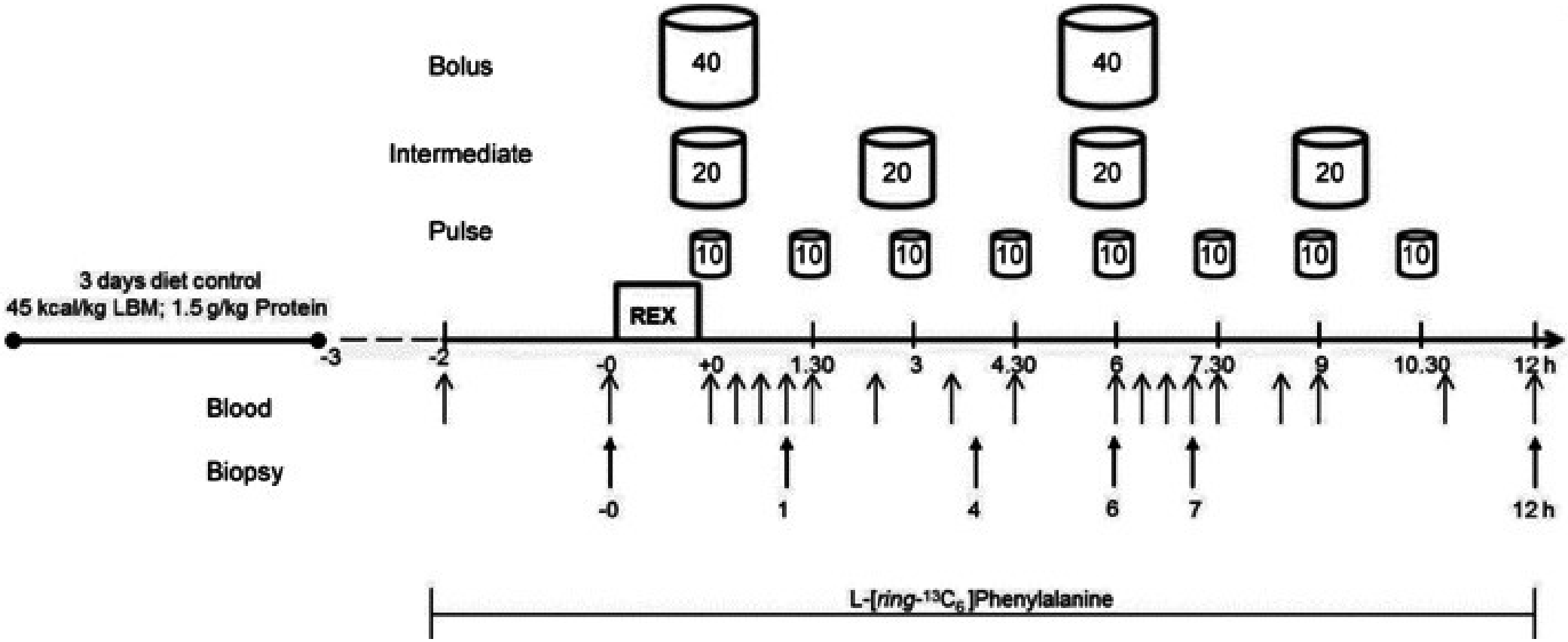




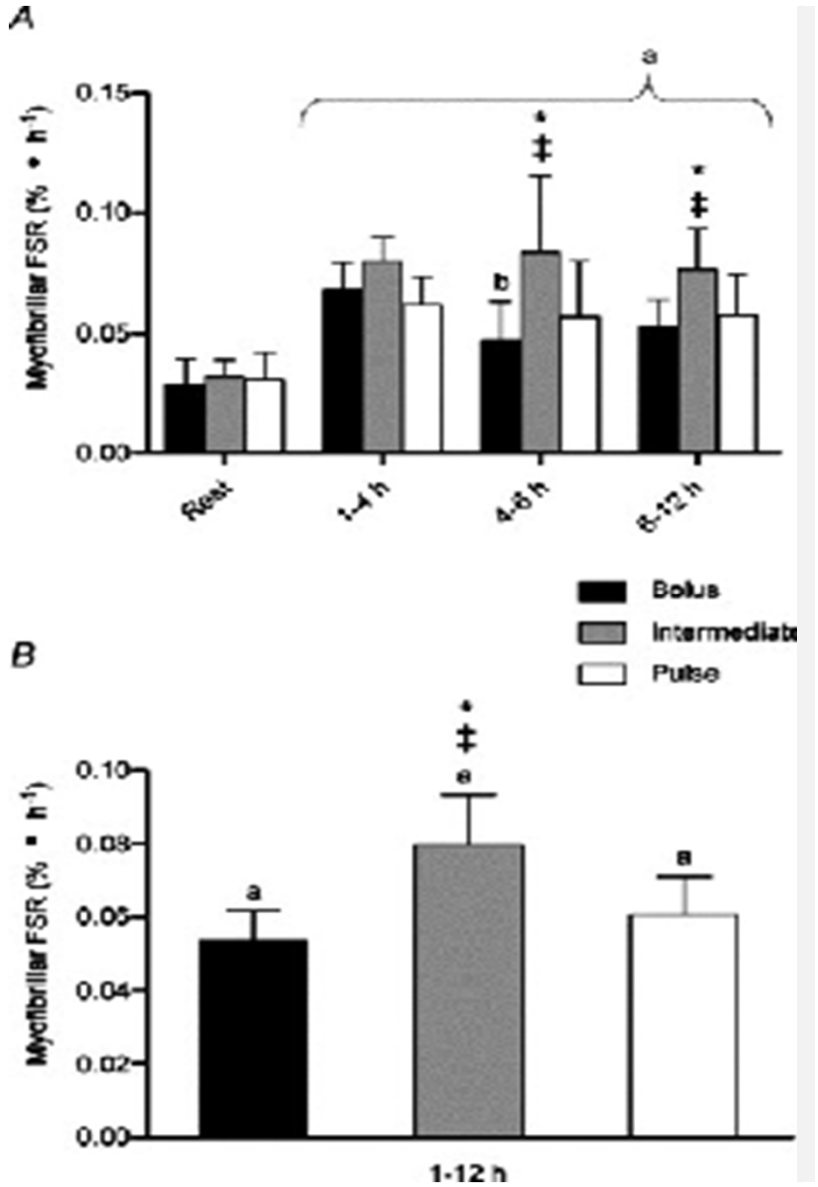
Antonio et al. Journal of the International Society of Sports Nutrition. 2015


~1.6 g/kg/day
Muscle Growth
Daily Protein Intake

3. How Much Should We Consumed Post Workout To Maximize Muscle Protein Synthesis?


Bolus
40
40
Intermediate
20
20
20
20
Pulse
10
10
10
10
10
10
10
10
3 days diet control
45 kcal/kg LBM; 1.5 g/kg Protein
REX
-3
-2
-0
+0
1.30
3
4.30
6
7.30
9
10.30
12 h
Blood
Biopsy
-0
1
4
6
7
12 h
L-[ring-13C6]Phenylalanine

Sustained Moderate Feeding Is Superior to High Dose Boluses



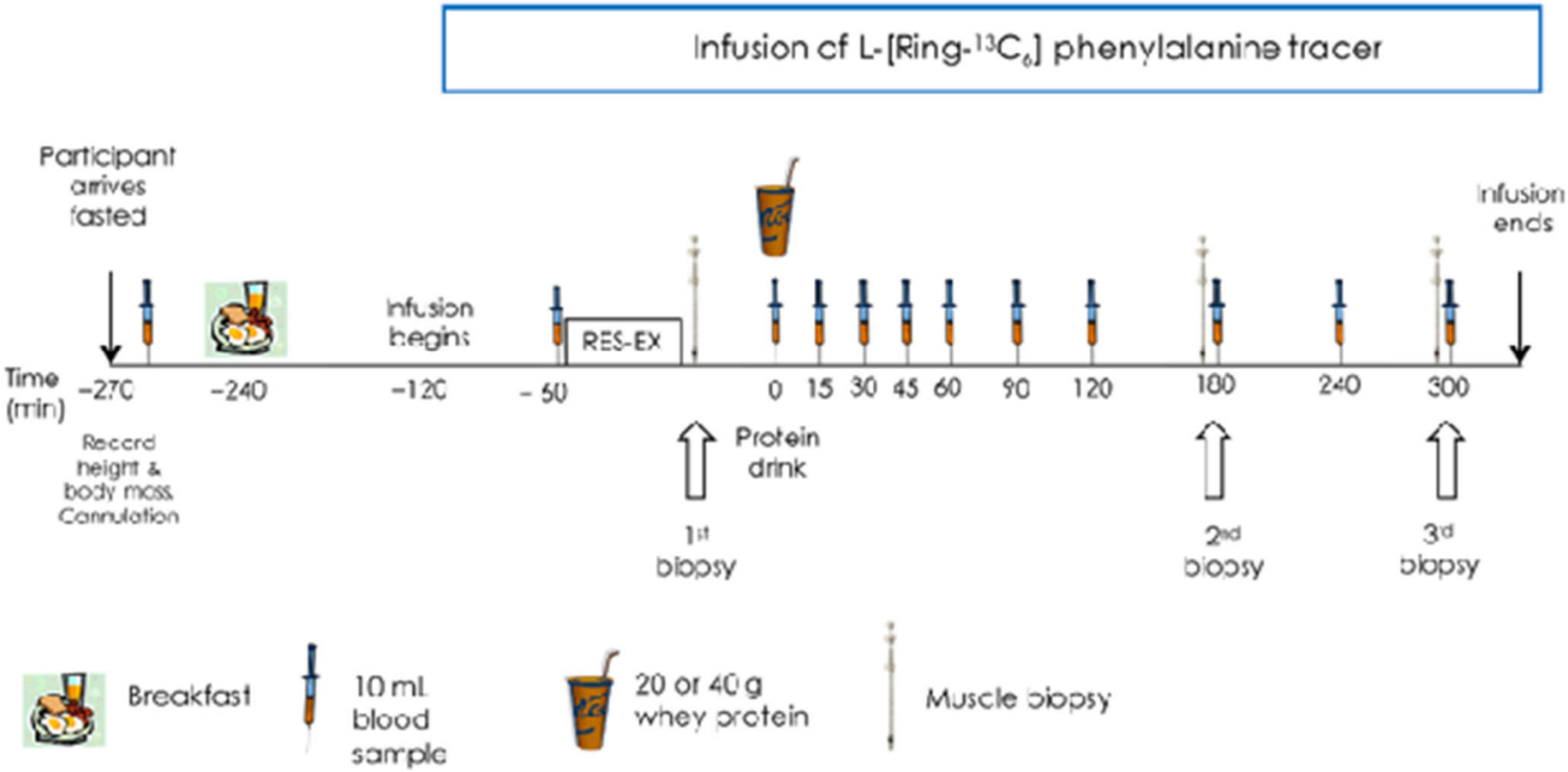
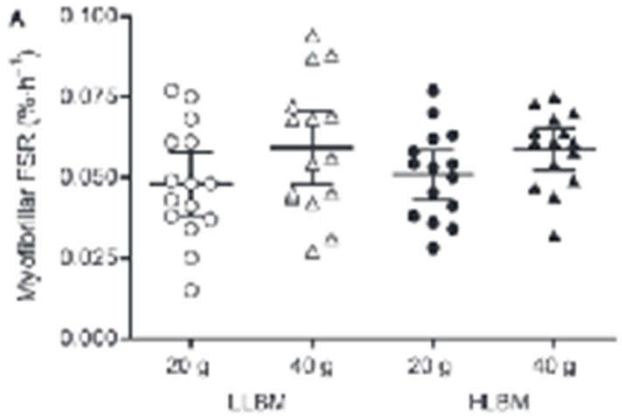


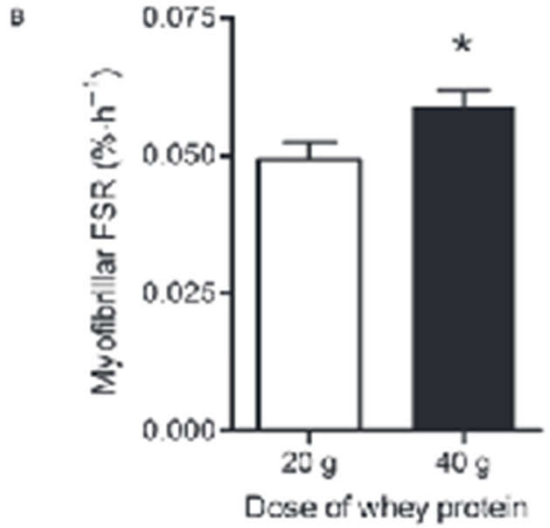
Figure 1. Schematic diagram of infusion trial protocol.

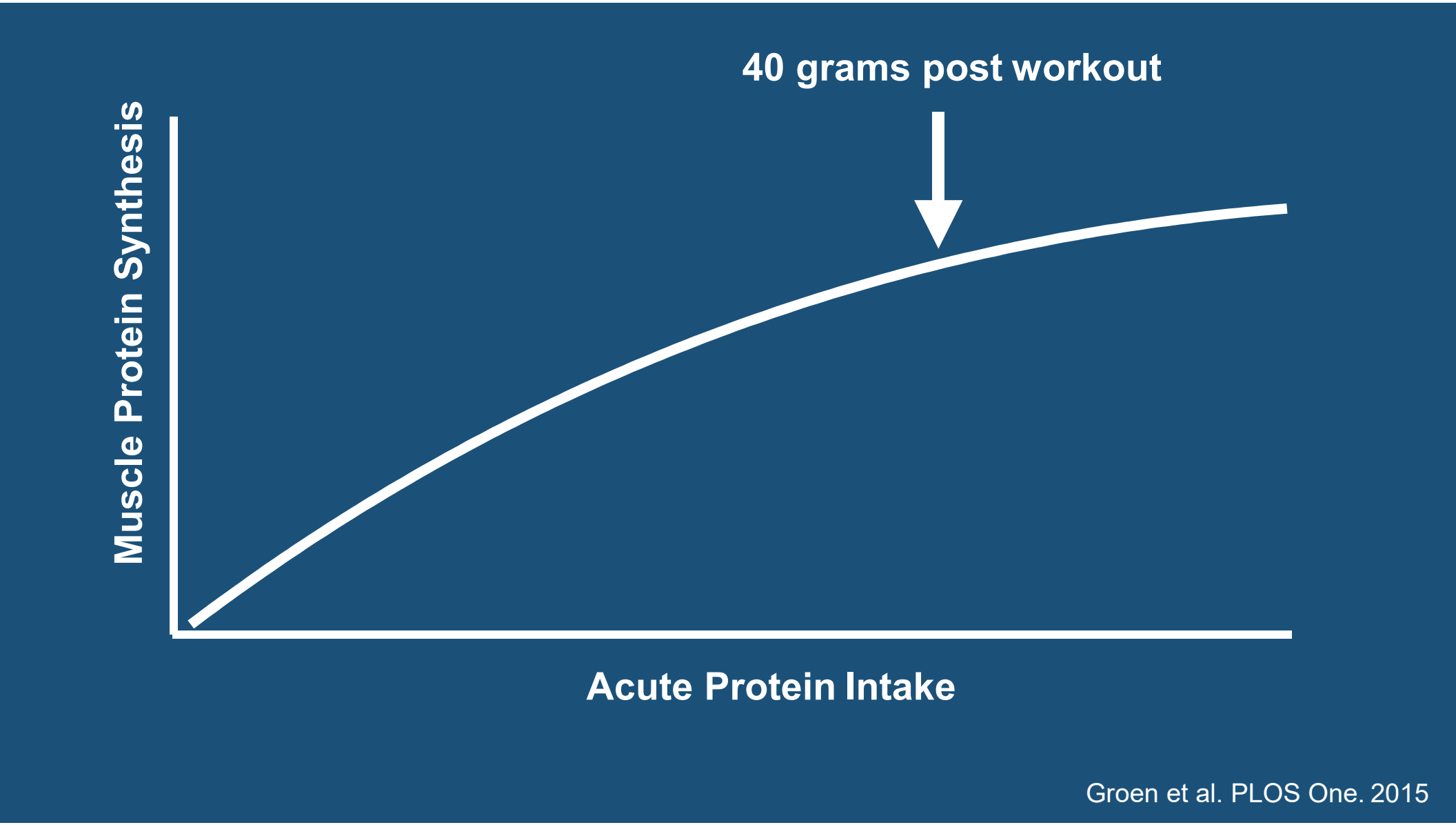
Greater MPS at Higher Intakes

Myofibrillar muscle protein synthesis

There was no significant interaction between protein dose and LBM group nor was there a statistically significant difference in myofibrillar FSR (determined for the entire







Groen et al. PLOS One. 2015

Recap

- Studies that have looked at high protein intakes show no measurable benefit on muscle growth above ~2.2-2.3 g/kg, indicating a ceiling on growth. This is supported by meta-analysis.

- The true ceiling may be closer to 1.6 g/kg. More studies need to be conducted on finding the peak intake for muscle growth.

- 40 grams post workout is most likely the best “bang for your buck” for most grown adults.

Application

Resistance training and protein are both critical to muscle growth.

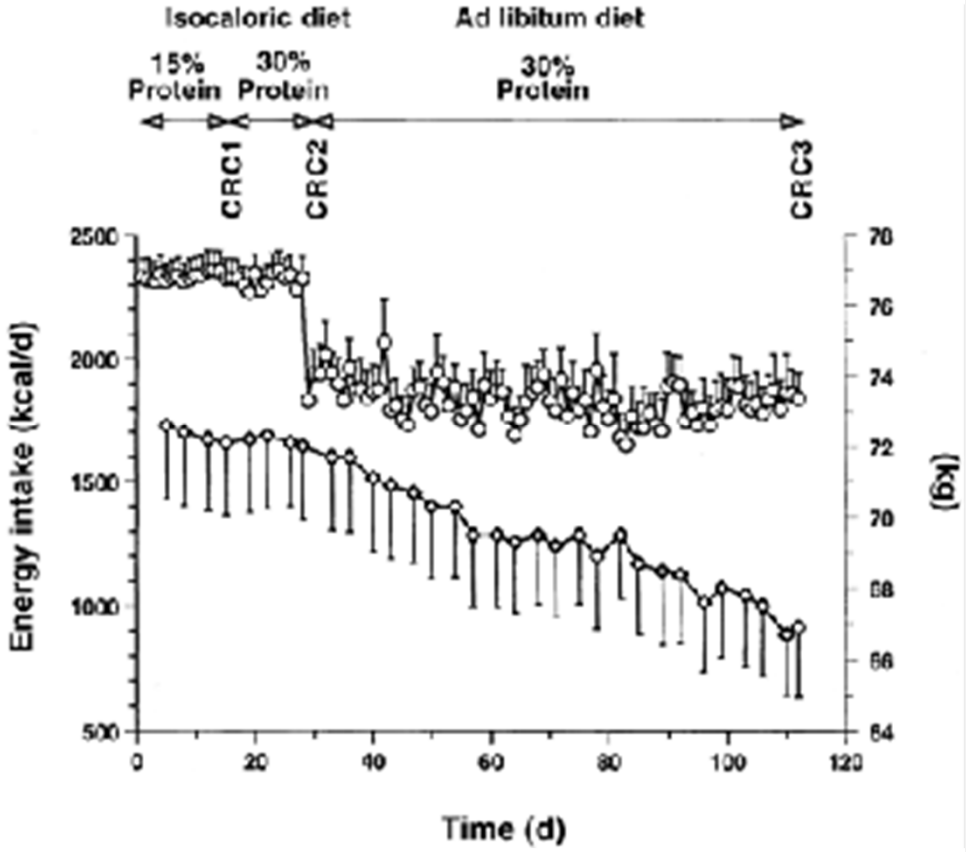
Consume ~0.4 g/kg within a few hours post exercise.

Meals should be spaced out 3-5 hours apart.

Consuming protein within 1-3 hours before bed can prevent overnight reductions in muscle protein synthesis.

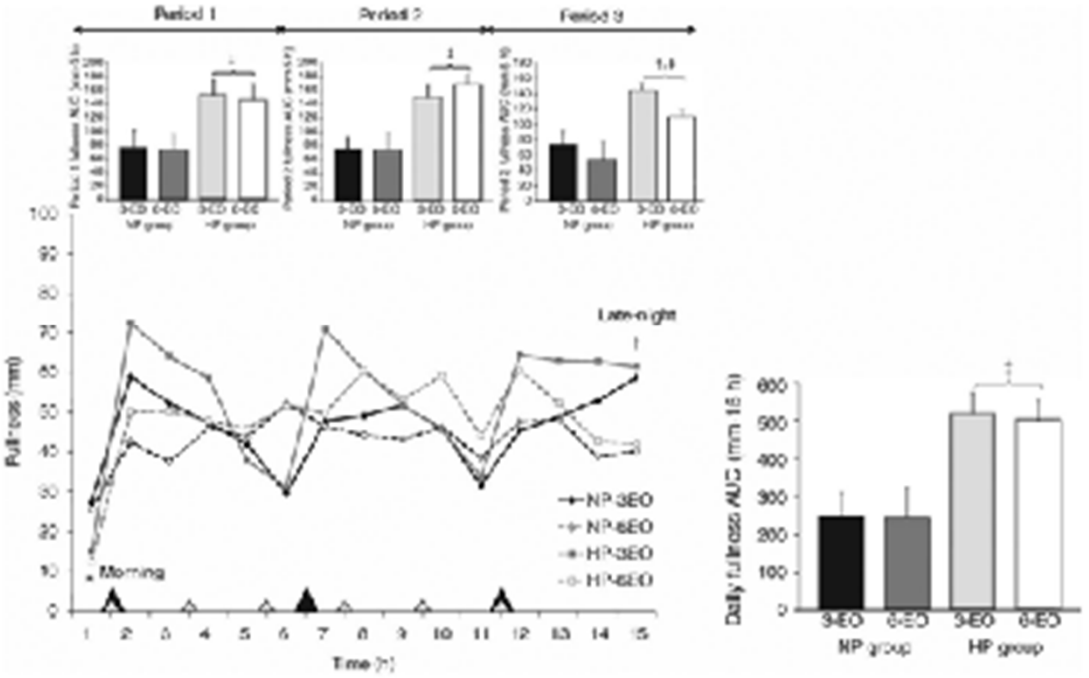
4. How does protein impact weight loss?

Dietary protein can lead to “eating less”



Weigle et a . 2005

Dietary protein increases fullness throughout the day



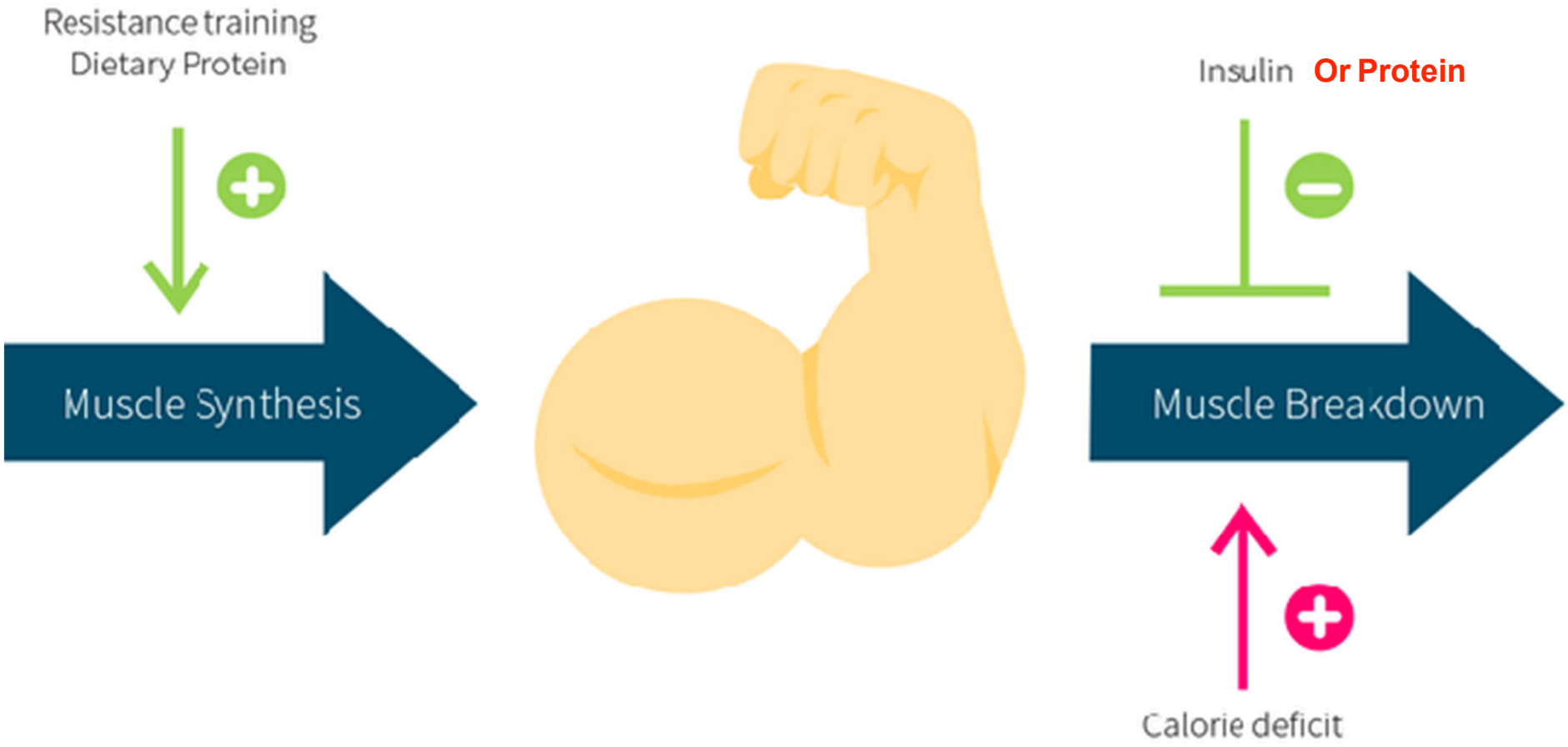
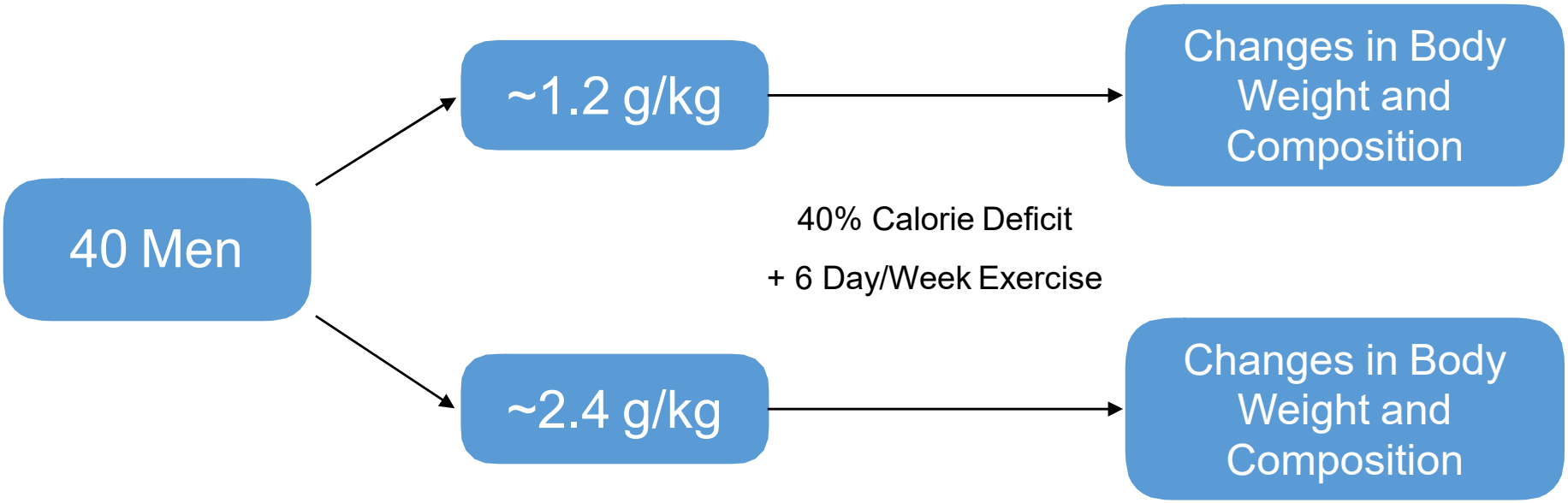


Image c/o Examine.com


40 Men
~1.2 g/kg
~2.4 g/kg
40% Calorie Deficit
+ 6 Day/Week Exercise
Changes in Body Weight and Composition
Changes in Body Weight and Composition

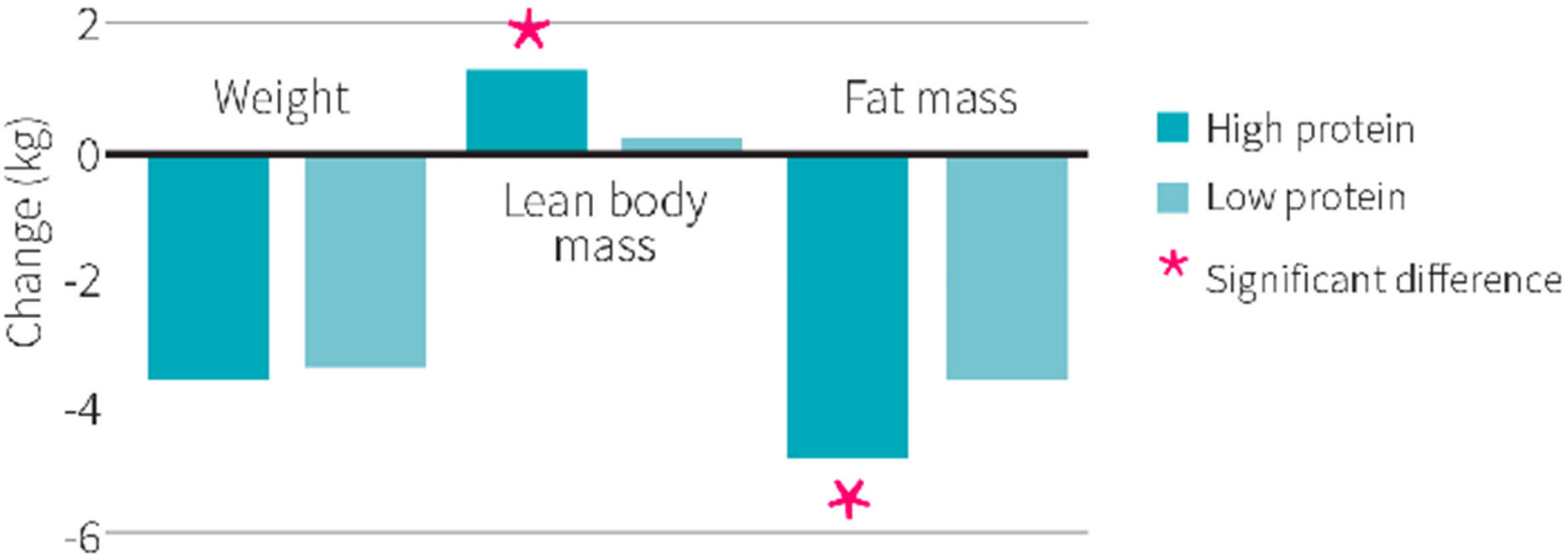


Image c/o Examine.com

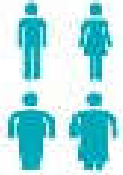
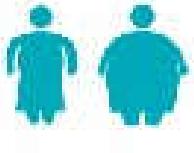
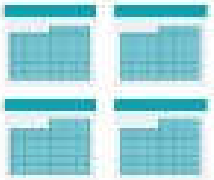
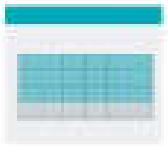
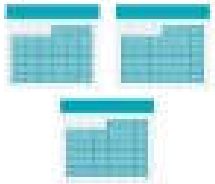
	Josse et al. J Nutr. 2011 Sep.	Pasiakos et al. FASEB J. 2013 Sep.	Mettler et al. Med Sci Sports Exerc. 2010 Feb.	Mateo-Gallego et al. Clin Nutr. 2015 Jan.
Population	 Overweight women	 Normal and overweight men and women	 Normal weight males	 Obese (BMI and [illegible]) men and women
Duration	 4 or 8 wks	 21 days	 3 weeks	 3 months
Intervention	Calorie deficit + resistance training + either 0.8 g/kg or 1.3 g/kg protein	Calorie deficit + cardio & resistance training + 0.8 g/kg or 1.6 g/kg or 2.4 g/kg protein	Calorie deficit + resistance training + 1.0 g/kg or 2.3 g/kg protein	Calorie deficit + exercise + protein supplement (1.04, 0.8 or 1.3 g/kg protein
Results	 High potential to [illegible] lean mass gained	 Reduced lean mass gain in higher protein groups	 Reduced lean mass loss in higher protein group	No difference in lean mass

Image c/o Examine.com

Recap

- Higher protein intakes (~1 g/lb) can cause people to eat less calories overall, in part by increasing their feelings of fullness. This can lead to extra weight loss.

- Higher protein intakes (~1 g/lb) can help people maintain muscle mass and in some cases slightly increase muscle mass during periods of calorie deficits (aka dieting).

Application

Higher protein intake (~1 g/lb) can help suppress appetite and maintain muscle mass during deficit cycles (aka dieting cycles).

There is less emphasis on protein timing when dieting and total daily protein intake should be the big focus.

Resistance training is critical during periods of dieting and should be coupled with higher protein intakes.