PROTEIN

Optimizing Intake for Muscle Gain & Weight Loss
Webinar Tips

- Ask questions in webinar dashboard
- Q & A at conclusion
- Webinar will be recorded
Introductions

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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
The amino acid pool is the basis for protein metabolism.
~50% of ingested protein is extracted by splanchnic tissues (gut, liver) prior to entering circulation.

Remaining ~40% of ingested protein is catabolized:
- Energy
- Ureagenesis
- Neurotransmitter production

~10% (2.2 g) de novo protein synthesis

20 g milk-based protein ingested
Recap

- Dietary protein is broken down into amino acids which are then absorbed from the GI tract into the bloodstream.

- Dietary protein, and protein from the body contribute to the overall amino acid pool.

- About 50% of dietary protein makes into the bloodstream, and only 10% goes to new protein synthesis.
Muscle Gain VS Weight Loss
2. How Much Protein Should We Consume Per Day?
There May Be a Ceiling Above 2.2 g/kg For Growth
Muscle Growth

~1.6 g/kg/day

Daily Protein Intake
3. How Much Should We Consumed Post Workout To Maximize Muscle Protein Synthesis?
Sustained Moderate Feeding Is Superior to High Dose Boluses
**Myofibrillar muscle protein synthesis**

Muscle Protein Synthesis, Whole-Body Resistance Exercise And Protein

Infusion of L-[Ring-$^{13}$C$_6$] phenylalanine tracer

Figure 1. Schematic diagram of infusion trial protocol
Greater MPS at Higher Intakes
Muscle Protein Synthesis

Acute Protein Intake

40 grams post workout

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.
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”
Dietary protein increases fullness throughout the day
Resistance training
Dietary Protein

Muscle Synthesis

Insulin Or Protein

Muscle Breakdown

Calorie deficit
40 Men

~1.2 g/kg

Changes in Body Weight and Composition

40% Calorie Deficit
+ 6 Day/Week Exercise

~2.4 g/kg

Changes in Body Weight and Composition
<table>
<thead>
<tr>
<th>Population</th>
<th>Intervention</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight women</td>
<td>Calorie deficit + resistance training + either 0.8 g/kg or 1.3 g/kg protein</td>
<td>High potential to mass losses/gained</td>
</tr>
<tr>
<td>Normal and overweight men and women</td>
<td>Calorie deficit + resistance training + 1.0 g/kg or 2.2 g/kg protein</td>
<td>Reduced losses/gained in higher protein groups</td>
</tr>
<tr>
<td>Normal weight males</td>
<td></td>
<td>Reduced losses/gained in lower protein groups</td>
</tr>
<tr>
<td>Obese and obese women</td>
<td>Calorie deficit + exercise +低卡饮食</td>
<td>No difference in losses/gained</td>
</tr>
</tbody>
</table>

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).
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.