Sports Nutrition
The Role of Protein
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Sports Medicine

Agenda
• Protein Requirements
• Ensuring Adequate Protein
• The role of supplements
• Recovery protein
• Other elements of muscle building

Sports Medicine

13 yo football player
• 155 cm (5’1’’), 55 kg (115 lb)
• Dad wants him to gain muscle
• Teammates more muscular
• Wants recommendation for protein supplement

Sports Medicine

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Factors Involved in Muscle Building

- Genetics
- Testosterone
- Protein
- Calories
- Exercise Stimulus

Amino Acids, Protein, & Muscle

- Proteins are made from building blocks called amino acids (AA’s)
- Branched chain amino acids (leucine, isoleucine, valine)

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Protein Function

• Make up 45% of total body weight
• Make up enzymes, hormones, hemoglobin, myoglobin, most other structures including, of course, muscle
• Function as a source of energy when body is in state of starvation or undergoing intense exercise
• Proteins in the body, such as muscle, are broken down during this state (catabolism) to produce energy

Protein Metabolism

Dietary protein (containing 20 amino acids) 

Digestion 

FREE AMINO ACID POOL IN BLOOD AND TISSUE 

TRANSPORT PROTEIN (muscle etc) 

Excretion of urea (nitrogen) 

CO2 (carbon) 

Misleading Advertising

• *Aminoprime converts 100% of dietary proteins into muscle building amino acids*
• *Aminoprime amplifies the digestion and synthesis of high protein meals*
Protein Necessary for Muscle Building

• Protein requirement for children, teens, young adults 0.8-1.2 gm/kg/d  
• Protein requirements for strength athletes are no greater than 1.8 – 2.0 gm/kg. Few studies demonstrate greater needs in body builders  
• Meal protein balance is key along with recovery protein

Case #1 - Is Diet Enough?

• Let's say your son weighs 55 kg (about 115 lb). In order to get 2 gm of protein per kilogram body weight, he would need to eat about 110 mg of protein.

• Chances are he’s getting all the protein he needs just by eating a typical American diet.

60 kg Athlete

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>Bacon &amp; egg taco, banana, 8 oz milk</td>
<td>19 gm</td>
<td>8 gm</td>
</tr>
<tr>
<td>Lunch</td>
<td>Grilled chicken sandwich, fries, apple, 8 oz milk</td>
<td>27 gm</td>
<td>8 gm</td>
</tr>
<tr>
<td>Snack</td>
<td>Peanut butter &amp; jelly sandwich, ice tea</td>
<td>4 gm</td>
<td></td>
</tr>
<tr>
<td>Dinner</td>
<td>2 pork chops Broccoli, baked beans 8 oz milk</td>
<td>48 gm</td>
<td>7 gm</td>
</tr>
<tr>
<td>Dessert</td>
<td>½ cup ice cream</td>
<td>2 gm</td>
<td></td>
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<tr>
<td>TOTAL DAILY PROTEIN</td>
<td></td>
<td>131 gm</td>
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Protein Requirements

• HS athlete, endurance – 1.2-1.4
• HS athlete, power – 1.6-1.8
• Adult endurance athlete, low intensity – 0.8-1.0
• Adult endurance athlete, high intensity – 1.2-1.4
• Master’s athlete – 0.8-1.0

Protein Timing

• Protein distribution is important
• Physiological need dictates protein at EVERY meal
• Busy student athletes often miss breakfast

Diet versus Supplements

• Supplements can never COMPLETELY replace basic good nutrition
• Some supplements may contain harmful substances, + drug test
• Food is 100% legal
• Why waste the $$?
Recovery Protein

- Both whey & casein protein after exercise have resulted in similar net gains in muscle protein
- Protein should be ingested < 2 hours following resistance exercise
- Minimum 6-10 gm

Case #2 – College Baseball Player

- Unable to gain muscle mass
- Lifting weights 5 days per week
- Drinking protein shakes
- Also working 16 hrs/wk

Other Factors Influencing Anabolism (muscle building)

- Adequate calories
  - Total caloric intake must be adequate to make use of protein for anabolism rather than energy production
- Recovery – inadequate rest
- Stress – stress hormones (cortisol, epinephrine) are catabolic
- Emphasize both eccentric & concentric training
Key Points

- Protein requirements vary by age & exercise intensity
- Maximum 2 gm/kg/d
- Protein must be ingested at EVERY meal, including within 2 hrs of exercise
- Other factors affect muscle building
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