Identifying Proteins in our foods

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Nutrients found in food

- Fats
- Simple carbohydrates
  - Glucose
- Complex carbohydrates
  - Starch

Proteins
Proteins, proteins, everywhere
Why do we need proteins?
What are proteins made of?
Sources of amino acids
**Supplement Facts**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount Per Serving</th>
<th>% DV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>Calories from Fat</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total Fat</td>
<td>1.5 g</td>
<td>2%*</td>
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<tr>
<td>Saturated Fat</td>
<td>1 g</td>
<td>5%*</td>
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<tr>
<td>Cholesterol</td>
<td>55 mg</td>
<td>18%*</td>
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<tr>
<td>Total Carbohydrate</td>
<td>49 g</td>
<td>16%*</td>
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<tr>
<td>Sugars</td>
<td>45 g</td>
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</tr>
<tr>
<td>Protein</td>
<td>25 g</td>
<td>50%*</td>
</tr>
<tr>
<td>Calcium</td>
<td>30 mg</td>
<td>3%</td>
</tr>
<tr>
<td>Phosphorous</td>
<td>60 mg</td>
<td>6%</td>
</tr>
<tr>
<td>Sodium</td>
<td>360 mg</td>
<td>15%</td>
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<tr>
<td>L-Phenylalanine</td>
<td>3 g</td>
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<tr>
<td>L-Glutamine</td>
<td>3 g</td>
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<tr>
<td>L-Leucine</td>
<td>2.25 g</td>
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<tr>
<td>L-Valine</td>
<td>1.75 g</td>
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<tr>
<td>L-Isoleucine</td>
<td>1.25 g</td>
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*Percent Daily Value (DV) based on a 2000 calorie diet.
†Daily value not established.

**OTHER INGREDIENTS:** d-glucose, whey-protein hydrolysate, maltodextrin, natural and artificial flavors, and sucralose.

Store away from heat, light, and moisture.

Consult your physician before taking this supplement if you are pregnant, considering pregnancy, have a medical condition, or take any prescription drugs.
Lack of protein and amino acids in the diet

- Growth problems
- Loss of appetite
- Dizziness
- Lower energy/tired
- Increased anxiety/stress
- Possible death
What can we do with these amino acids?

Protein containing natural amino acid

Protein containing unnatural amino acid

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**Long-term goals:**
- build stronger proteins
- possible incorporation of our amino acids into certain drugs
- not as easily recognized by the body = last longer
- longer lasting drugs = less doses = lower cost
Identification of amino acids & proteins in foods
Testing for proteins and amino acids in foods

Buiret Test

- 5 drops of CuSO₄
- 1 mL NaOH
- 1 g food sample

Positive for proteins/amino acids
Negative for proteins/amino acids
Lab Safety

- Chemicals
- Goggles
- Lab coat
- No food or drink allowed.
Lab Experiment: Identification of Proteins and Amino Acids in Foods

Objectives:
1. To demonstrate that you can detect the presence of proteins in food samples using a simple biuret test
2. To reinforce the concepts of lab safety taught in class

Materials:
- 10% NaOH Solution
- 5% CuSO₄ solution
- 10 test tubes
- Food samples to be tested
**NaOH solution is corrosive. Safety goggles and gloves must be worn at all times in the lab!!!**

Procedure:
1. Label each test tube with the name of one food sample
2. Weigh ~1.0g of each food sample into separate test tubes. For best results, crush the solid food samples before placing in the test tube.
3. Carefully add 1 mL of sodium hydroxide (NaOH) solution (Caution, NaOH solution is corrosive, gloves and goggles must be worn during this lab!!!)
4. Add 5 drops of copper sulfate (CuSO₄) solution to the test tube
5. Record the color change in the table below for each test tube
6. Present your data in a graph

<table>
<thead>
<tr>
<th>food sample</th>
<th>color</th>
<th>protein present (Yes/No/Not determined)</th>
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Observations: