Proteins are composed of amino acids, which are necessary for cell growth, maintenance, and repair. After consumption, proteins are broken down by enzymes in the small intestine and absorbed into circulation, where they can be converted into a number of functional molecules.

**Mnemonic: FITTT**

Amino acids that are glucogenic and ketogenic

F: Phenylalanine  
I: Isoleucine  
T: Tryptophan  
T: Tyrosine  
T: Threonine

**Deamination** in the liver separates the nitrogen group from the carbon backbone of amino acids. This process yields ammonium, which is toxic at high levels. The **urea cycle** converts the ammonia into urea to be safely excreted.

<table>
<thead>
<tr>
<th>Amino Acids</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketogenic</td>
<td>Leucine, lysine, isoleucine, phenylalanine, threonine, tryptophan, tyrosine</td>
</tr>
<tr>
<td>Glucogenic</td>
<td>All amino acids except for leucine and lysine</td>
</tr>
</tbody>
</table>

**Essential vs. Nonessential Amino Acids**

Nonessential amino acids can be synthesized by the cell, while the 9 essential amino acids must be obtained in the diet.  

*Essential amino acids:* Histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine.