



Denaturing

- Alteration of the protein's shape and thus functions through the use of
 - Heat
 - Acids
 - Bases
 - Salts
 - Mechanical agitation
- Primary structure is unchanged by denaturing

Protein Digestion: Part 4



Proteins



Mouth and salivary glands

Mechanical digestion of protein begins with chewing, tearing, and mixing food with salivary juices to form a bolus.



Bolus



Stomach

Hydrochloric acid denatures protein and activates pepsinogen to form pepsin. Pepsin breaks the polypeptide chain into smaller polypeptides.



Denatured protein

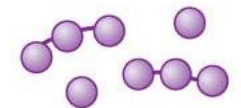


Polypeptide chain



Small intestine and pancreas

Enzymes from the pancreas enter the small intestine and continue to cleave peptide bonds, resulting in dipeptides, tripeptides, and single amino acids.

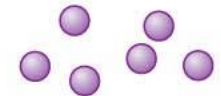


Tripeptides and single amino acids



Small intestine lining

Tripeptidases and dipeptidases on the surface of the small intestinal cells finish the digestion to yield single amino acids, which can then be absorbed.



Single amino acids

© 2010 Pearson Education, Inc.



Amino Acid Metabolism

- Liver metabolizes amino acids depending on bodily needs
- Most amino acids are sent into the blood to be picked up and used by the cells
 - Amino acid pool is limited but has many uses
- Protein turnover – the continual degradation and synthesizing of protein



Deamination

- When the amino acid pool reaches capacity the amino acids are broken down to their component parts for other uses
- First deamination must occur
- Carbon-containing remnants are
 - Converted to glucose, if they are glucogenic amino acids, through gluconeogenesis
 - Converted to fatty acids and stored as triglycerides in adipose tissue
- Surplus amino acids are
 - Deaminated
 - Used for glucose or energy
 - Stored as fat
 - Nitrogen is converted to urea and excreted in urine



Putting It All Together

- Best plan for a healthful diet
 - Eat an abundance of
 - Grains (at least 1/2 whole grains)
 - Vegetables
 - Fruits
 - Eat modest amounts of
 - Commercially made bakery and snack items
 - Vegetables with creamy sauces or added butter
 - Sweets
 - Choose low-fat dairy products, lean meat, poultry, and fish to minimize the intake of heart-unhealthy saturated fats