

Aim: How do special proteins called Enzymes function?

Do Now: What is lactose intolerance?
How do these people change their diet?

Homework
Rd pp65-67

Vocab: Activation energy, enzyme, reactants, products, active site, synthesis

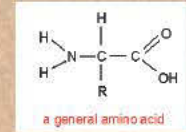
Apr 9-6:23 AM

Proteins have many different Functions

- most important biological compounds needed for life & are used for many purposes in the human body
- act as the structural materials in humans and animals as cellulose does in plants
- **Enzymes** are proteins that catalyze the body's chemical reactions.
- Proteins make up muscles that aid in movement.
- **Example:** The curl from a perm involves the resetting of attractive forces in the protein of hair.

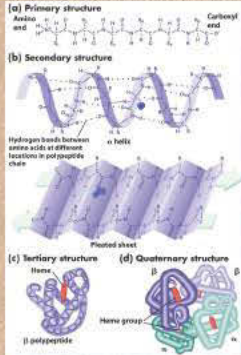
Structure

- Proteins are made up of chains of amino acids
- Proteins have specific shapes
- Shape is determined by 4 levels of structure: Primary, secondary, tertiary & quaternary
- There are about 20 amino acids that naturally form in nature.
- Amino acids are classified into four major groups, each characterized by its type of side chain: non-polar, polar but neutral, acidic, and basic.
- Amino acids can bond together forming a peptide bond.



Apr 9-6:32 AM

4 Levels of Structure of Proteins



Apr 9-6:58 AM

Different Proteins in Humans

Protein	Function	Number of amino acids	Molar Mass (g/mole)
Insulin	enzyme for sugar metabolism	51	6000
Cytochrome c	enzyme for cell respiration	104	16000
Growth Hormone	used in anti-aging treatment	191	49000
Hemoglobin	oxygen transport in blood	574	65000
Hexokinase	enzyme for glycolysis	730	96000
Gamma Globulin	part of immune system in blood	1320	176000
Myosin	muscle action	6100	800000

Apr 9-6:51 AM

Enzymes help maintain Homeostasis

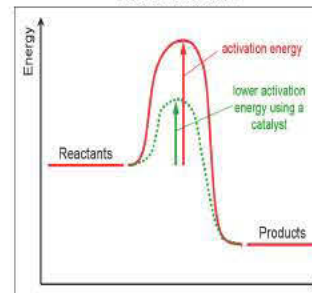
Biological Reactions- take place in living things to maintain a stable internal environment (Homeostasis!)

- chemical reactions
- like using a lighted match to get a fire going, these reactions require a large **Activation Energy**
- **Enzymes REDUCE the Activation Energy Level, making the reaction more efficient for the organism**

Enzymes- molecules (usually proteins) that increase the speed of chemical reactions
- hold molecules close together and in the correct position so they can react **EASILY!**

Oct 12-6:54 AM

Energy of Activation



Oct 12-7:29 AM

Enzyme Activity: Lock & Key Model

Lock & Key

- each enzyme has an **active site**- where reaction takes place
- shape of active site determines which **reactants or substrates** will bind to it
- Each enzyme only acts only on specific substances
- One "Key (Enzyme)" for One "Lock (Substrate)"

substrate @ L.A. Dallas 2005

active site bonds in substrate are weakened products

enzyme enzyme-substrate enzyme

Oct 12-7:10 AM

Enzyme action can be a Building up (Synthesis) or a breaking down

BEFORE REACTION DURING REACTION AFTER REACTION

SYNTHESIS (building) REACTION

BEFORE REACTION DURING REACTION AFTER REACTION

BREAKDOWN REACTION

Oct 12-7:16 AM

Oct 12-7:19 AM

Proteins function in a Lock and Key Way:
Proteins are specifically shaped to the substrate they are meant to act on

Apr 9-6:56 AM

Here is an example of phenylalanine and lysine combining together.

amino acid 1 amino acid 2

Looking at the structure of combination of the two, what is lost when the two amino acids bond together?
Peptide bonds are formed by loosing an _____ and a _____
What do you call two amino acids bonded together?

Apr 9-6:48 AM

Here is an example of phenylalanine and lysine combining together.

amino acid 1 amino acid 2

Looking at the structure of combination of the two, what is lost when the two amino acids bond together?
Peptide bonds are formed by loosing an _____ and a _____
What do you call two amino acids bonded together?

Apr 9-6:48 AM

Aim: Lab : Say Cheese!
Understanding the chemistry of
proteins

Do Now: Read page 1 & 2 of Lab

Apr 9-11:06 AM

Materials
100-200 ml
5-10 ml vinegar
pH (Hydriom paper)
Litmus paper

Apr 9-9:51 AM