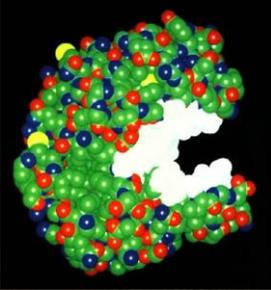


Enzymes

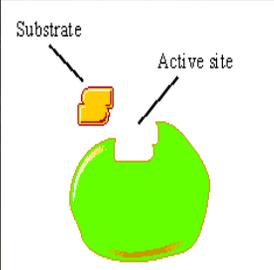
What Are Enzymes?

- Most enzymes are **Proteins** (tertiary and quaternary structures)
- Act as **Catalyst** to accelerates a reaction
- **Not permanently** changed in the process



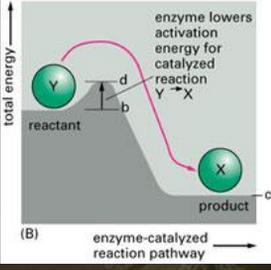
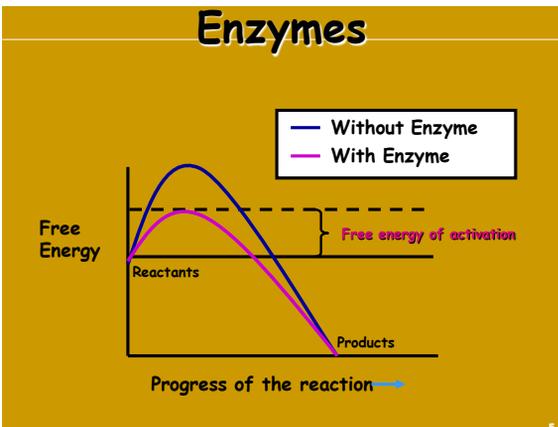
Enzymes

- Are specific for what they will **catalyze**
- Are **Reusable**
- End in **-ase**
 - Sucrase*
 - Lactase*
 - Maltase*

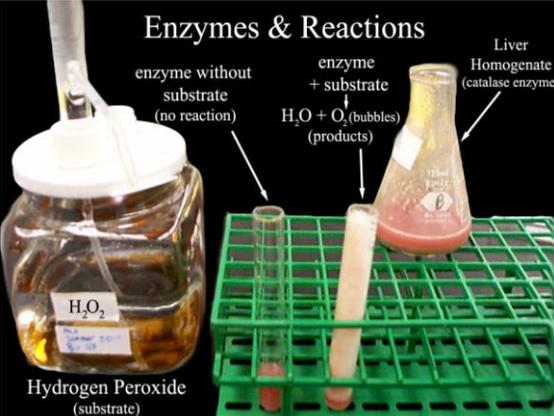


How do enzymes Work?

Enzymes work by **weakening bonds** which **lowers activation energy**

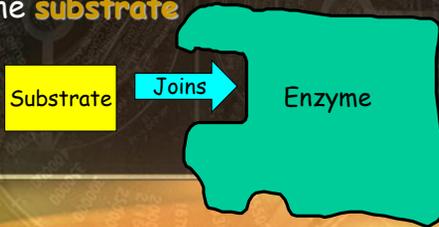



Enzymes & Reactions



Enzyme-Substrate Complex

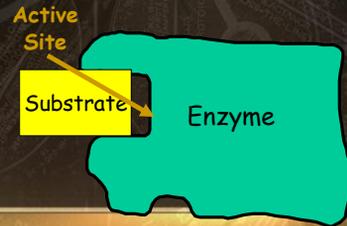
The substance (reactant) an enzyme acts on is the **substrate**



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Active Site

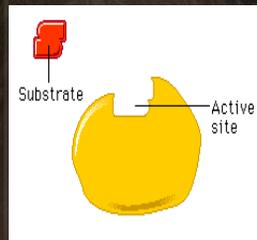
- A **restricted region** of an enzyme molecule which **binds** to the **substrate**.



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Induced Fit

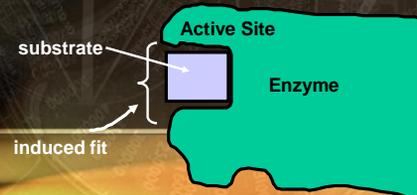
- A change in the **shape** of an enzyme's active site
- **Induced** by the substrate



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Induced Fit

- A change in the **configuration** of an enzyme's active site (H⁺ and ionic bonds are involved).
- Induced by the **substrate**.



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What Affects Enzyme Activity?

- Three factors:
 1. Environmental Conditions
 2. Cofactors and Coenzymes
 3. Enzyme Inhibitors

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1. Environmental Conditions

1. Extreme **Temperature** are the most dangerous
 - **high temps** may denature (unfold) the enzyme.
2. **pH** (most like 6 - 8 pH near neutral)
3. **Concentration** (salt ions)

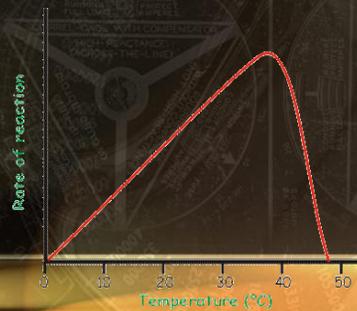
12

Rate of an Enzyme Controlled Reaction



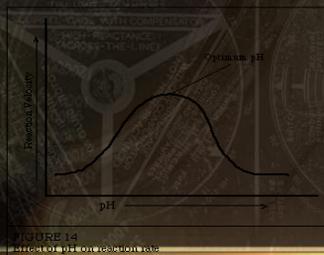
As there are more substrates, enzyme work faster. They can only work so fast

How temperature affects enzymes

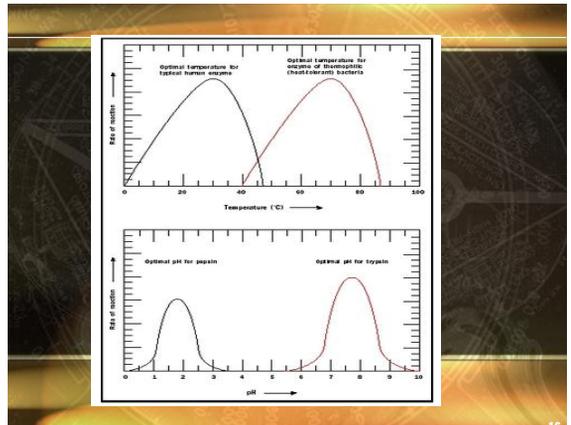


As temperature increases, enzyme work faster. If it gets too hot, enzymes DENATURE

How pH affects enzymes



Enzymes work best at optimum pH. Outside these areas, they don't work



2. Cofactors and Coenzymes

- Inorganic substances (**zinc, iron**) and **vitamins** (respectively) are sometimes need for proper enzymatic activity.
- Example:
Iron must be present in the quaternary structure - **hemoglobin** in order for it to pick up oxygen.

Two examples of Enzyme Inhibitors

- **Competitive inhibitors**: are chemicals that resemble an enzyme's normal substrate and compete with it for the active site.



Inhibitors

b. Noncompetitive inhibitors:
 Inhibitors that do not enter the active site, but bind to another part of the enzyme causing the enzyme to change its shape, which in turn alters the active site.



“Lock and Key”

• Example of hydrolysis

