



كلية : التربية للعلوم الصرفة

القسم او الفرع : علوم الحياة

المرحلة: الثانية

أستاذ المادة : د.أسراء عبد الكريم معروف العاني

اسم المادة باللغة العربية : كيمياء حيائية

اسم المادة باللغة الإنكليزية : **Biochemistry Chemistry**

اسم المحاضرة التاسعة باللغة العربية: الانزيمات ١

اسم المحاضرة التاسعة باللغة الإنكليزية : **Enzymes**

Enzymes

are proteins that act as **catalysts**, compounds that increase the rate of chemical reactions. Enzyme catalysts bind reactants (**substrates**), convert them to products and release the products. **Enzymes, in general, provide speed, specificity, and regulatory control to reactions in the body.**

Enzyme-catalyzed reactions have three basic steps:

- (1) binding of substrate:
- (2) conversion of bound substrate to bound product:
- (3) release of product :

Although enzymes may be modified during their participation in this reaction sequence, they return to their original form at the end. In addition to increasing the speed of reactions, enzymes provide a means for regulating the rate of metabolic pathways in the body.

Enzymes do not invent new reactions; they simply make reactions occur faster. The catalytic power of an enzyme is usually in the range of 10^1 to 10^7

Substrate is the substance upon which the enzyme act.

Enzyme binding sites.

An enzyme binds the **substrates** of the reaction and converts them to **products**. The substrates are bound to specific **substrate binding sites** on the enzyme through interactions with the amino acid residues of the enzyme.

The spatial geometry required for all the interactions between the substrate and the enzyme makes each enzyme **selective for its substrates** and ensures that only **specific products** are formed.

Active catalytic site. The substrate binding sites overlap in the **active catalytic site** of the enzyme, **the region of the enzyme where the reaction occurs**. Within the catalytic site, **functional groups** provided by **coenzymes, tightly bound metals (Cofactors)** and, of course, **amino acid residues** of the enzyme, participate in catalysis.

Cofactors are non protein compounds that participate in the catalytic process. enzyme without its cofactor is referred to as an apoenzyme; the complete, catalytically active enzyme is called a holoenzyme.