

Topic: Enzyme(Nomenclature & Classification)

Class: B.Sc Part –III (Hons.)

Paper- V

Group – A

Faculty Name : Dr. Kumari Sushma Saroj

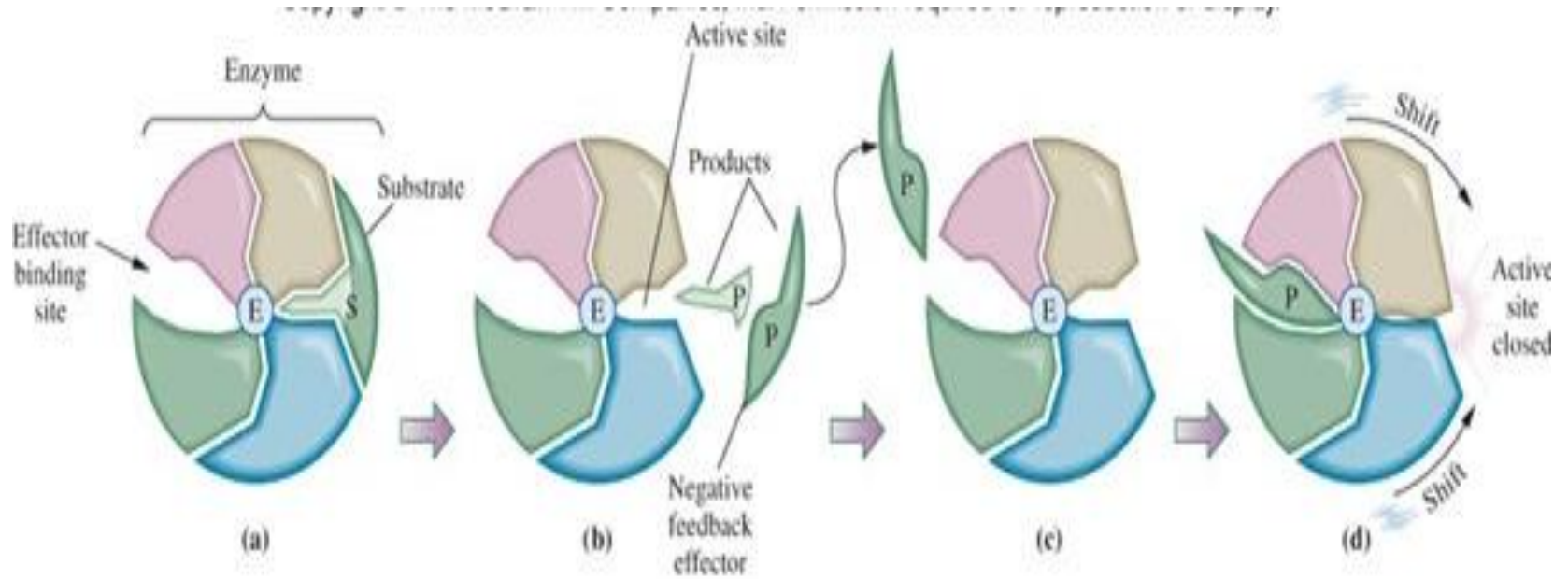
Department: Zoology

College: Dr. L. K. V. D College, Tajpur, Samastipur

Allosteric Enzymes

- Effector molecules change the activity of an enzyme by binding at a second site
- Some effectors speed up enzyme action (positive allosterism)
- Some effectors slow enzyme action (negative allosterism)

Allosteric Enzymes



(a), (b) The allosteric enzyme has a quaternary structure with two different sites of attachment—the active site and the effector binding site. The enzyme complex normally attaches to the substrate at the active site and releases products (P).

(c) One product can function as a negative-feedback effector by fitting into the effector binding site.

(d) Binding of the effector in the effector binding site causes a conformational shift of the enzyme that closes the active site and inactivates the enzyme.

Feedback Inhibition

- Allosteric enzymes are the basis for feedback inhibition
- With feedback inhibition, a product late in a series of enzyme-catalyzed reactions serves as an inhibitor for a previous allosteric enzyme earlier in the series
- In this example, product F serves to inhibit the activity of enzyme E1
- Product F acts as a negative allosteric effector on one of the early enzymes in the pathway

Inhibition of Enzyme Activity

- Chemicals can bind to enzymes and eliminate or drastically reduce catalytic activity
- Classify enzyme inhibitors on the basis of reversibility and competition
 - Irreversible inhibitors bind tightly to the enzyme and thereby prevent formation of the E-S complex
 - Reversible competitive inhibitors often structurally resemble the substrate and bind at the normal active site
 - Reversible noncompetitive inhibitors usually bind at someplace other than the active site
- Binding is weak and thus, inhibition is reversible

Uses of Enzymes in Medicine

- Diagnostic – biomarker levels altered with disease
- Acute myocardial infarction:
 - Creatine kinase – MB
 - Myoglobin
 - Troponin I
- Pancreatitis:
 - Amylase
 - Lipase
- Analytical reagents – enzyme used to measure another substance
- Urea converted to NH_3 via urease
- Blood urea nitrogen (BUN) measured
- Replacement therapy