

MODE OF ENZYME ACTION.

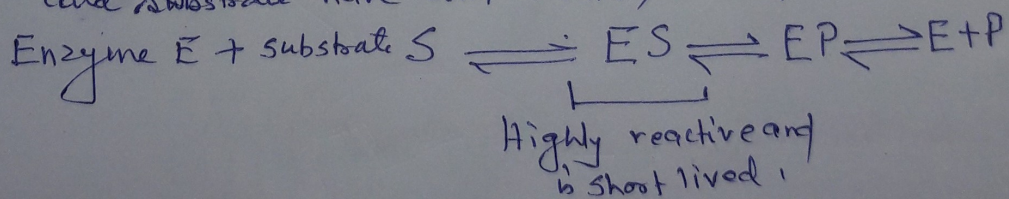
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An enzyme appears to act in the same way as an organic catalyst, except that it is usually much more specific. For metabolic process to occur, the substrate molecule must come in to intimate contact with a specific enzyme. It results in the formation of "enzyme-substrate complex". It is believed that enzymes have certain active sites with which a substrate molecule can form an intimate association.

The two models to explain the actions of enzymes with substrates are —

1) LOCK and KEY MODEL:-

This model was given by a German Chemist Fischer (1890). According to him enzyme has particular shape i.e. unique surface containing a precise spot where the substrate molecule is fixed exactly. Because of the unusual folded surface of the proteins, only very specifically shaped molecules can given access. The enzyme-substrate complex is often compared to a "Lock and Key" where the enzyme is the Lock and the substrate is the Key. According to this model active site of enzyme and substrate have complementary shapes.



→ P.T.O.

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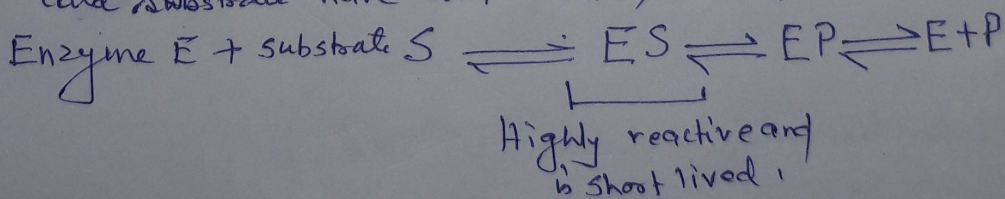
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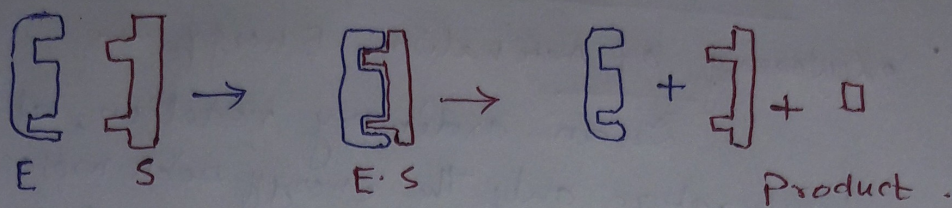
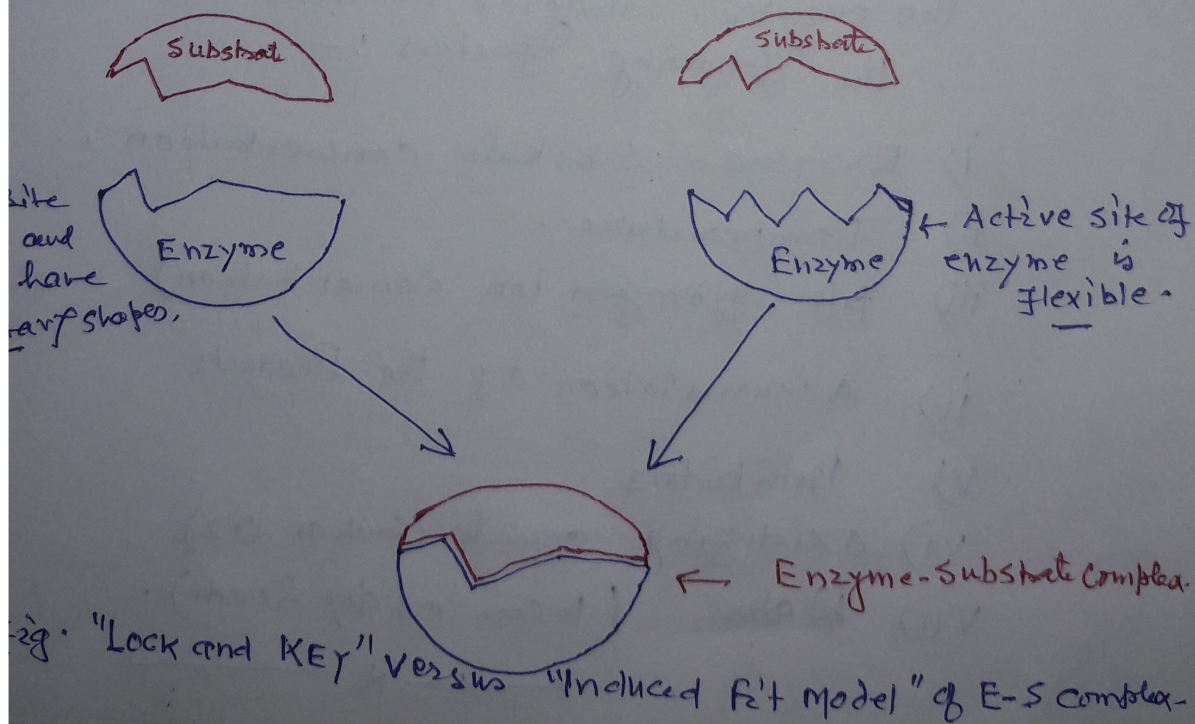


Fig - Showing 'Lock and Key' Arrangement.

After the formation of enzyme-substrate complex, distortion is produced at some linkage point in the substrate molecule. It becomes altered and loses affinity for the active site and hence is released.

(2) INDUCED FIT MODEL :-

This model was proposed by Koshland (1959). According to him the active site of enzyme is flexible. It is not very rigid and its three-dimensional structure changes according to the configuration of substrate. This model suggests a kind of "hand and glove" relation. Optical rotation measurements and X-ray diffraction analysis of several enzymic reactions have supported Koshland's view.



* MECHANISM OF ENZYME ACTION

Lowering of Activation Energy —

In an ordinary reaction, at normal temperature only the energy rich molecules will take part in reaction. The energy above average that is required for a reaction to take place is called the "activation energy". The main function

of an enzyme is to lower the activation energy barriers to a chemical reaction. Activation energy refers to the amount of energy required to bring a substrate to the reactive state. For example, the energy of activation required for the decomposition of H_2O_2 into water and oxygen is 18000 calories per mol. When the enzyme 'Catalase' is applied the energy of activation is lowered up to 5,500 calories.

* FACTORS AFFECTING ENZYME ACTIVITY.

The enzyme-catalysed reactions are affected by the following factors :-

- i) Enzyme-Substrate concentration.
- ii) Temperature.
- iii) pH (Hydrogen ion concentration)
- iv) Accumulation of the Products
- v) Inhibitors
- vi) Oxidizing agents (Such as O_2)
- vii) Water (In case of dry seeds).

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