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Assignment

M.Sc. Zoology
Semester-II

Title of Assignment:

ENZYME AND ENZYME KINETICS

Student Name: ASTHA YADAV

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ENZYME AND ENZYME KINETICS

CONTENT:-

Examples are missing
→ detail of Enzyme kinetics required.
→ Points need to be elaborate

1 Introduction.
1.1 Enzymes
2. Mechanism of enzyme Reaction

2.1 How do enzymes work
2.1.1 Enzymes & ester
2.2 How do enzyme binds to substrate.
2.2.1 Enzyme substrate & Complex.
2.2.2 Lock and key model
2.2.3 Induced-fit model

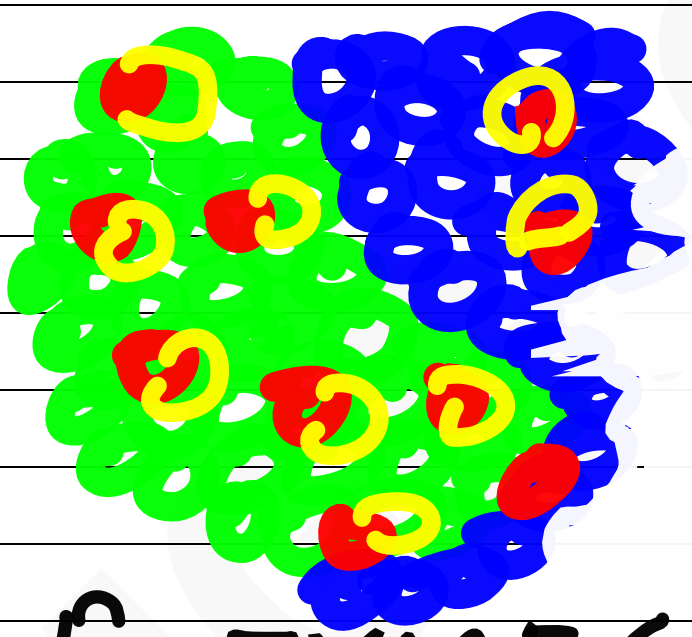
3. Enzyme Kinetics.

3.1 Michaelis-Menton eqn.

4. Factors affecting enzymes activity
4.1 environmental condition.
4.2 Cofactor & Coenzymes.
4.3 Enzyme Inhibitors.

INTRODUCTION:-

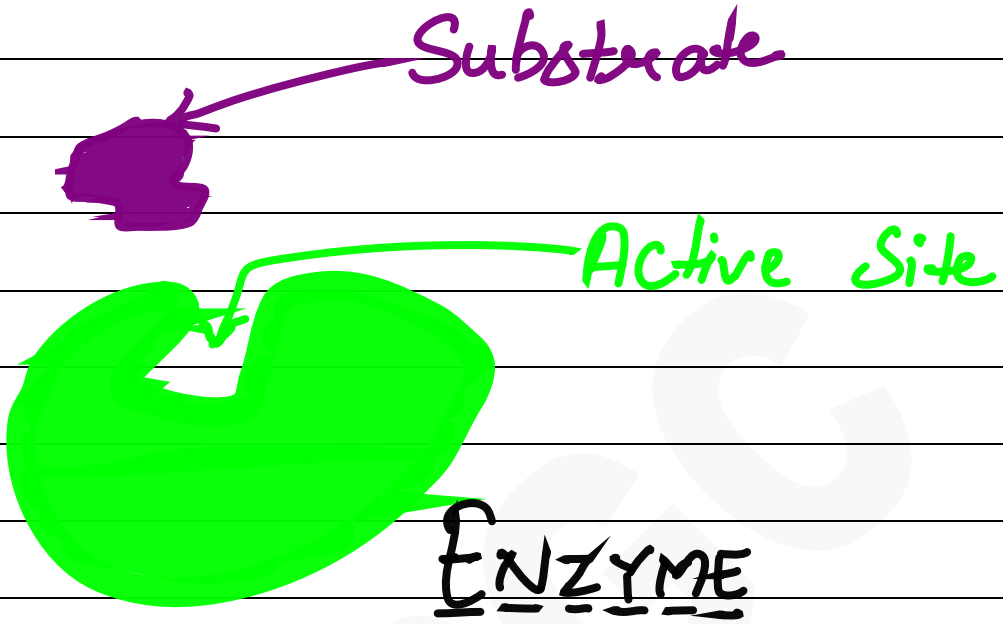
→ Most enzymes are proteins.
→ Acts as catalyst to accelerates a rexn.
→ No permanently changed in the process.



Enzyme are protein

o ENZYMES:-

→ Enzymes are specefic for what they ~~are~~ will Catalyse
→ Enzymes are reusable
→ End in — ase
— Sucrase
— Lactase
— Maltase



* MECHANISM OF ENZYMATIC REACTION :-

- How do enzyme work ?

→ Enzymes work by weakening bonds which lowers activation energy.

ENZYMES & REACTIONS :-

- Hydrogen peroxide (Substrate)

- Enzymes without substrate ⟶ No rex".
- Enzyme + Substrate ⟶ $H_2O + O_2$ (bubbles)
- Liver Homogenate.

Q→ How do enzymes binds to substrate.

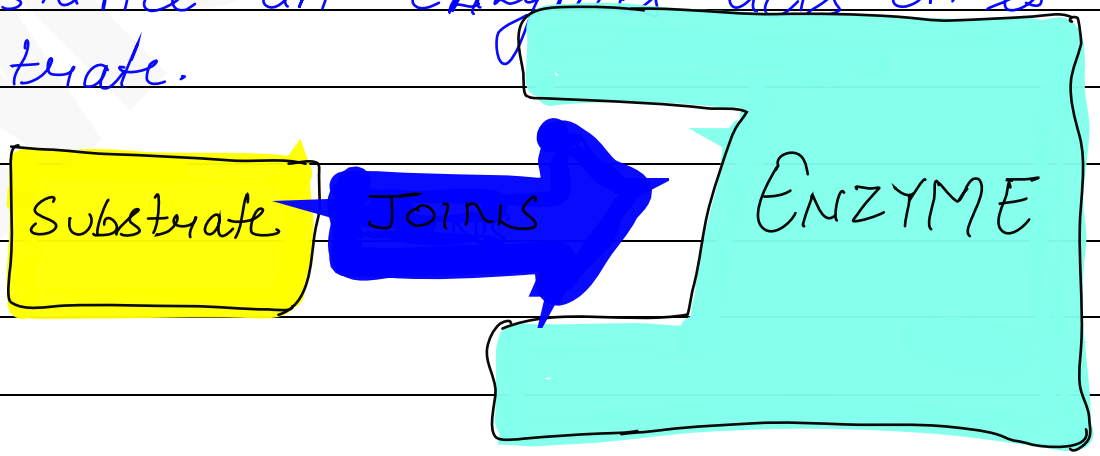
→ There are two proposed methods by which enzymes binds to substrate:-

① Lock and key model.

② Induced - fit model.

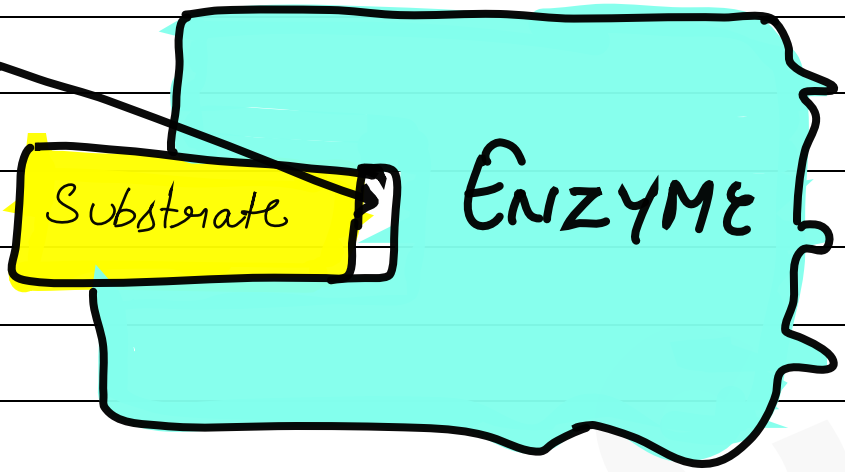
* ENZYMES SUBSTRATE COMPLEX:-

⇒ The substance an enzymes acts on is the substrate.

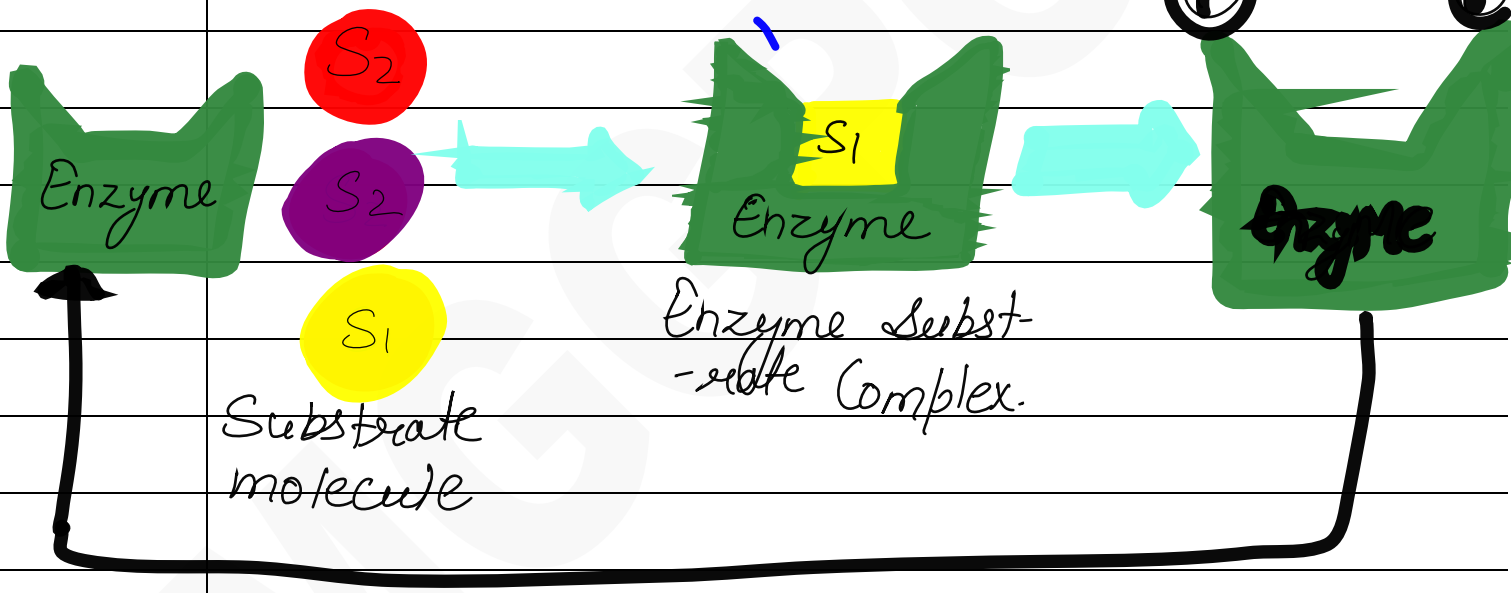


○ ACTIVE SITE:-

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



1) LOCK AND KEY MODEL:-

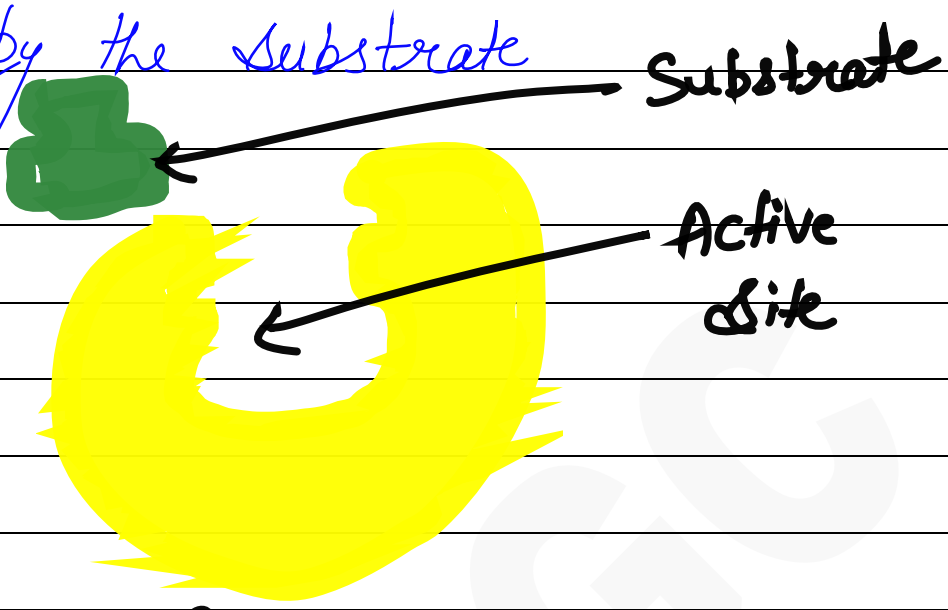


⇒ Enzymes returns from the rexn unchanged and can now react with more substrate.

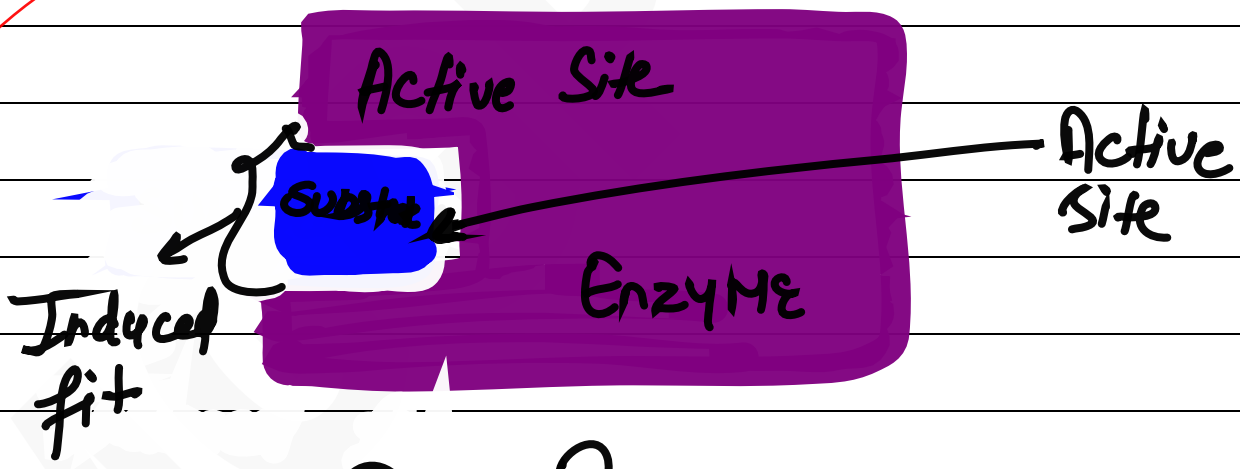
2) INDUCED FIT

→ enzyme ~~fit size~~ ∘ A change in the shape of active site.

→ Induced by the substrate



INDUCED FIT:-



* KINETIC OF ENZYME ACTIVITY:-

→ Expression for enzyme catalysed reactions.

$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \overset{k_2}{\rightleftharpoons} E + P$$

Explain k_1, k_{-1} & k_2

* Michaelis-Menten Eq^{n}:-

$$V_0 = V_{max}[S] / K_M + [S]$$

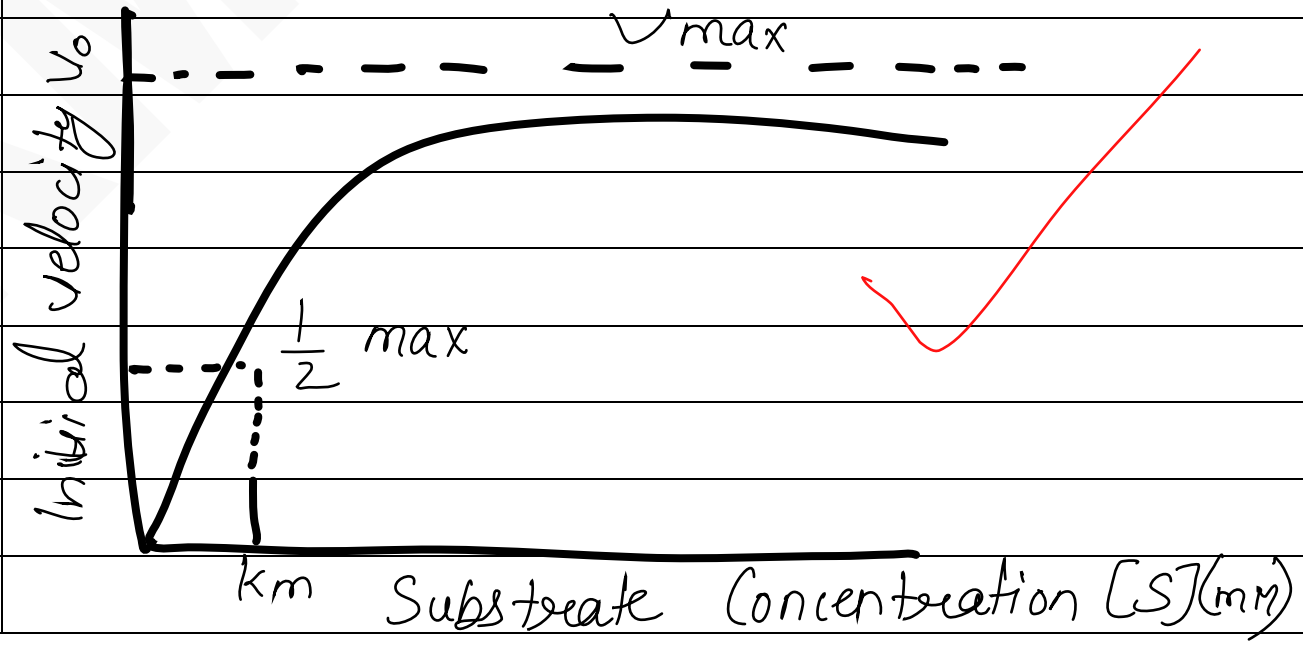
→ Rate increases with [S] rate levels off as approach Vmax.

More S than active sites in E

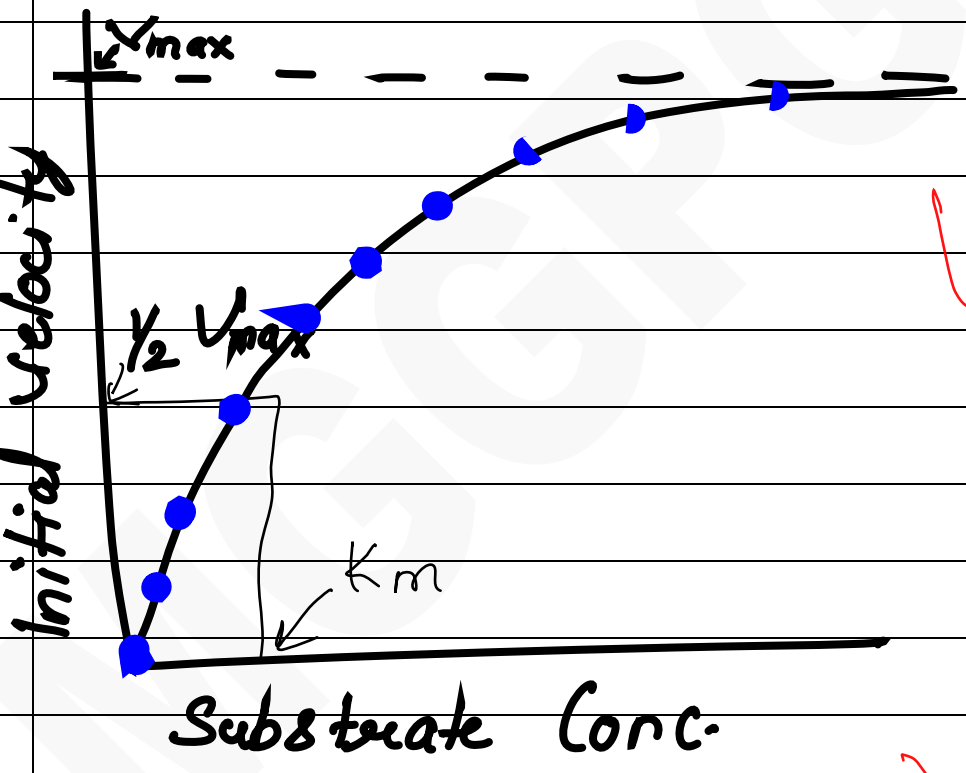
Adding S has no effect At

$V_0 = \frac{1}{2} V_{max}$

$[S] = K_M$



→ Vmax Occurs when enzyme active sites are saturated with substrate.
→ Kmax reflects affinity of enzyme of its substrate.
→ Smaller the Km, the greater than affinity an enzyme has for its substrate.



* FACTORS AFFECTING ENZYME ACTIVITY :-

* What affects enzyme activity :-

→ There are three factors :-

- 1) Enviromental Conditions
- 2) Cofactors and Coenzymes
- 3) Enzyme Inhibitors.

1) Enviromental Conditions :-

→ Temperature
→ pH
→ Ionic Concentrations

2) Cofactors and Coenzymes :-

→ Inorganic substance (Zinc, Iron)
→ Vitamin

3) Enzyme Inhibitors :-

→ Competitive Inhibitors
→ Non- Competitive Inhibitors.

Thank You.