

# Unit -6

# Enzymes

Unit -6

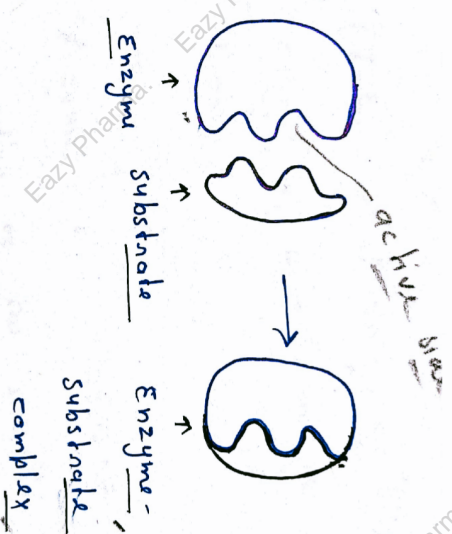
Enzymes

\* Definition →

- Enzymes Nature of protein etc



- Enzymes are study of enzymology and E1



# Biochemistry II D Pharm 2nd Year

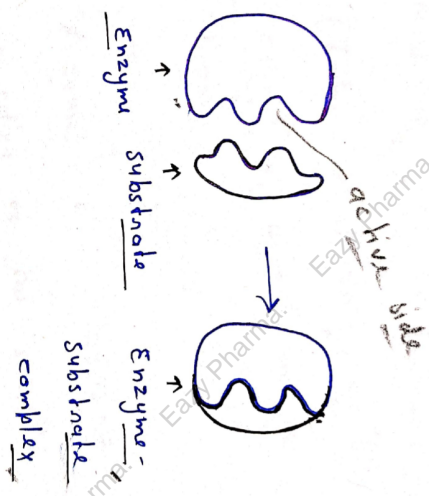
**Unit-6**

**Enzymes**

\* Definition →

- Enzymes Nature is protein in nature
- work as a biological catalyst
- work as a catalyst substance in chemical reaction and increase rate of reaction

- Enzymes are study of enzymology and it is



\* Properties →

- It calls as great chemical reaction and increases rate of reaction

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- $\checkmark$  reversible reaction  $\checkmark$  catalyze  $\checkmark$
- $\checkmark$  pH  $\checkmark$  affected  $\checkmark$
- $\checkmark$  temperature  $\checkmark$  affected  $\checkmark$
- $\checkmark$  nature of protein  $\checkmark$  except the group of catalytic RNA.
- Physically enzymes as a colloid act  $\checkmark$  on high molecular weight compounds.

\* IUB and MP classification  $\rightarrow$

(International Union of Bio-chemistry and molecular biology)

- Enzymes  $\checkmark$  according to classification  $\checkmark$
- 1) Oxidoreductases.
- 2) Transferases.
- 3) Hydrolases.
- 4) Lyases.

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5) Isomerases.

6) Ligases.

① Oxidoreductase

(ऑक्सीकरण एंड  
अपचयन)

- 2 types of enzymes oxidation and reduction  $H^+$  involved  $e^{-}$   $e^{-}$

• oxidation  $\rightarrow$  (Loss of electron)

• Reductase  $\rightarrow$  (Gain of electron)

\* Examples —

- Dehydrogenases
- oxidases

• Reductases.

② Transferases  $\rightarrow$

- 2 types of enzymes chemical group  $\rightarrow$  transferring  $H^+$  involved  $e^{-}$   $e^{-}$

like - ketone, amino, phosphate,

Alcohol, Aldehyde etc....

examples —

• Transaminases  $\rightarrow$  (Transfer amino group)

• kinases  $\rightarrow$  (Transfer phosphate group)

③ Hydrolases — (Hydrolysis)

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- 3 types of enzymes  
different bonds are breaking  
are involved in  
like - hydrogen bond.
- Examples -
- Lipases.
  - Esterases.
  - Amylases.
  - Peptidases.
- ④ Lyases (cutters) -
- 3 types of enzymes elements  
are addition and removal

- are involved in  
like -  $H_2O$ ,  $NH_3$ ,  $CO_2$ , at  
double bonds.
- Example -
- Decarboxylases - remove carbon  
dioxide ( $CO_2$ ) from amino acids.
  - Dehydrogenases.
  - Aldoses.
  - Deaminases.
  - Synthases.
- ⑤ Isomerases - (arrangers)

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• सर प्रकार के एन्जिम रिएक्शन

के इन्वोल्वमेंट में शामिल

इन्क्लूडिंग -

- एपिमेरिजेशन
- सिस-ट्रान्स इन्वोल्वमेंट

उदाहरण -

- इन्वोल्वमेंट
- एपिमेरिजेशन

⑥ Ligases (संश्लेषण)

- सर प्रकार के एन्जिम दो प्रकार के मॉलिक्यूल को जोड़ने में शामिल हैं

इन्वोल्वमेंट में शामिल

उदाहरण -

- कार्बन, ऑक्सीजन बंध
- कार्बन-स बंध
- कार्बन-नाइट्रोजन बंध
- सिन्थेज
- कार्बोक्सीलेज

इत्यादि.....

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## \* Factors Affecting Enzymes

activity →

- following factors effect to enzyme activity are -
  - 1) Temperature.
  - 2) PH.
  - 3) concentration (enzymes)
  - 4) substrate concentration
  - 5) effect of inhibitors.
  - 6) effect of activators.

7) effect of time.

8) effect of radiation.

### ① Temperature (dhwani) -

- Enzymes are not at optimum temperature effect to increase or fastest work are done.

• Temperature matter in effect enzyme work or affect enzyme.

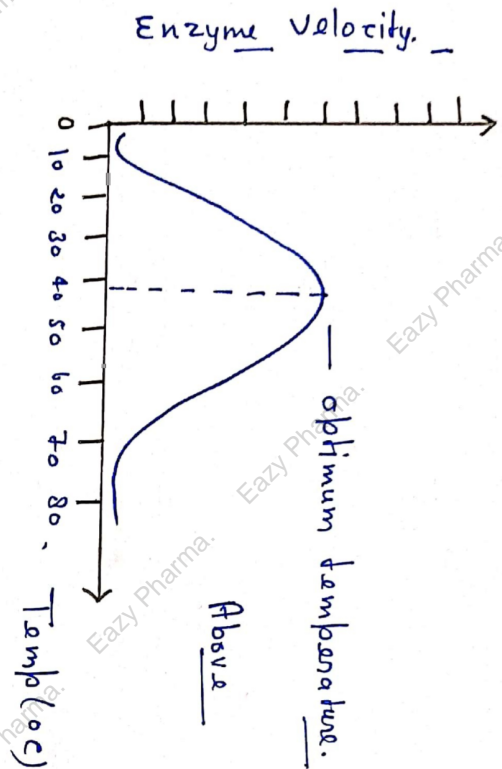
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② pH  $\rightarrow$

- Enzymes are most optimum pH एनजाइम का गतिमानता का तापमान
- Mostly enzymes are pH 7-8 एनजाइम का pH

(Human body pH - 7.35 to 7.45)

Enzymes

pH (optimum)

• Amylase  $\rightarrow$

6 to 7.

• Lipase  $\rightarrow$

7.

• Trypsin  $\rightarrow$

6 to 8.5

• Pepsin  $\rightarrow$

5.5

etc...

③ Enzyme concentration  $\rightarrow$

- enzymes are concentration increase एनजाइम की सांद्रता बढ़ने पर reaction rate linearly increase एनजाइम की सांद्रता बढ़ने पर प्रतिक्रिया दर रैखिक रूप से बढ़ती है

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⑥ Effect of Activators →

- Activators on action  
can increase rate of  
reaction and rate  
increase of rate etc.

\* Mechanism of Action

of Enzymes -

- Two model are explained of enzyme action and explained are:
  - 1) Lock and key model.
  - 2) Induced fit model.
- ① Lock and key model →
  - This model is Emil Fischer of proposed first.

- **lock model** के अनुसार

जब एन्जाइम - substrate complex

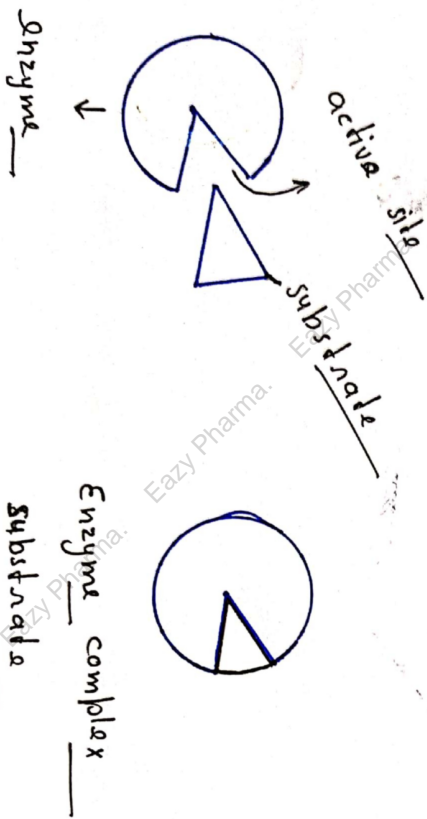
की formation होती है तो

enzyme की active site substrate

की exactly fit होने से lock

allow करता है।

यही lock की fit होने है।



**② Induced fit model →**

- D. Koshland ने induced fit

model in 1958 में proposed

किया था।

- lock model के अनुसार

enzyme की active site

flexible होती है ताकि rigid.

- जब enzyme and substrate

काar में bind होने से

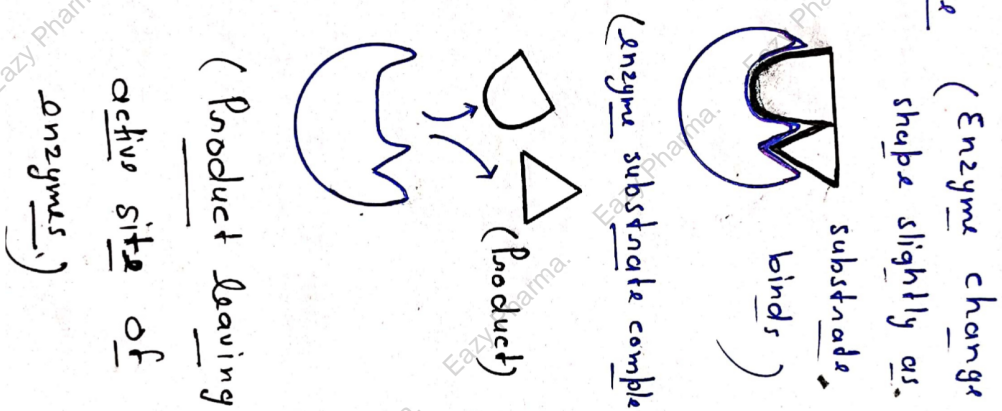
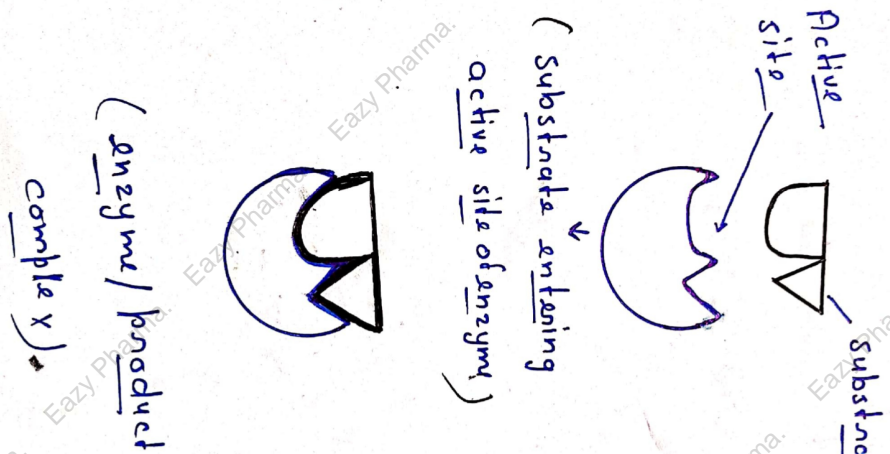
की enzyme molecule की

shape बदलने से और

में change होने है।

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\* Enzyme Inhibitors →

• Enzyme inhibitors are agent

that decrease the

action of enzymes or

prevent and/or

\* Types →

① Competitive inhibitors →

• competitive inhibitors enzyme

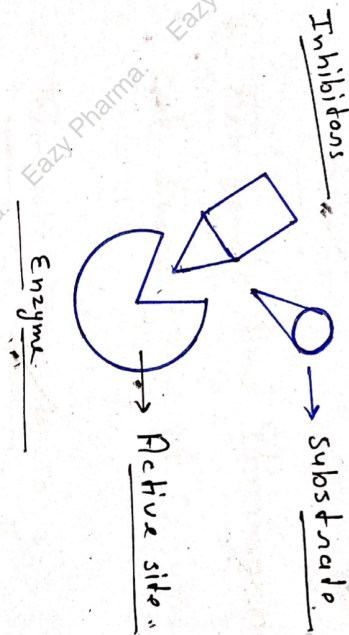
are bind at enzyme

and interrupt ability of

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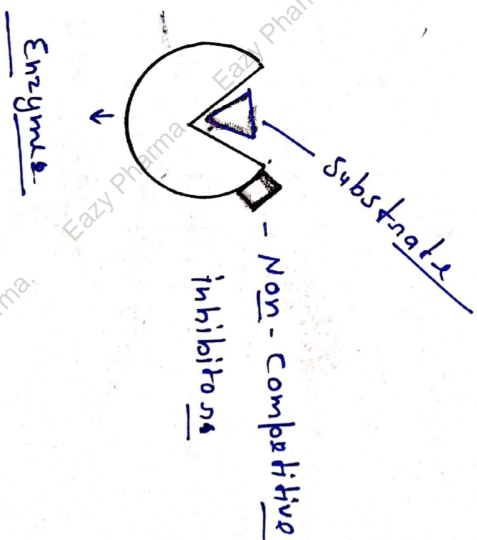
- If substrate and inhibitor bind to the active site of enzyme, the enzyme will not be able to form the substrate-enzyme complex.



③ Non-Competitive Inhibitors →

- Non-competitive inhibitors bind to a site other than the active site of the enzyme.

- If the inhibitor binds to a site other than the active site, the active site of the enzyme is not affected and the enzyme continues to function normally.



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## \* Therapeutic and Pharmacological

Importance of Enzymes -

### \* Therapeutic Importance →

- Skin Ulcer of treatment of

eg - Collagenase

- Thrombosis of treatment of

eg - Streptokinase.

- Next of treatment of

eg - Uricase.

- Anti-biotics of our of

eg - Lysozyme.

- Assist Metabolism.

eg - Hyaluronidase

- Surface disinfectant of

our of

eg - Trypsin.

### \* Pharmacological Importance →

- 1) High fructose syrup of production.

of

eg - Inulase isomerase.

2)

Penicillin of production of

3)

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eg - Penicillin

acylase.

3) Anti-microbials of synthesis of

at.....

Thank you 😊

Unit → 6 (complete)

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**THANK YOU.**

**By Dr Firoz khan**

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