

Tikrit University

College of Nursing

Basic Nursing Sciences



1st stage - 2023-2024

Biochemistry

(Lecture (9) Enzymes)

by:

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The difference between Co-enzymes and -Co factors

Co enzymes-

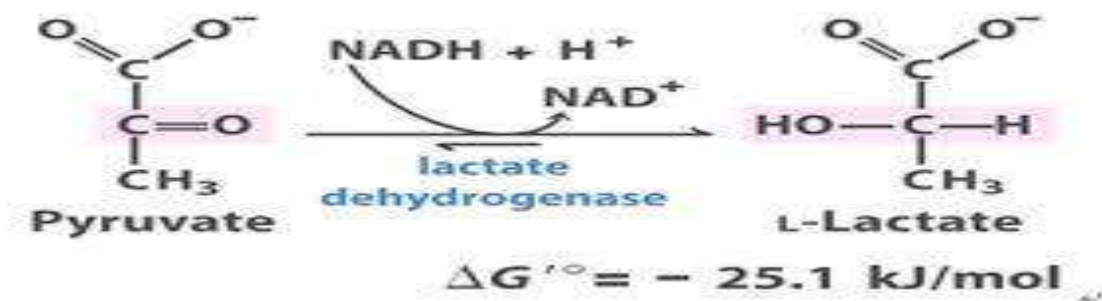
1. binds loosely and can easily separated from enzyme by dialysis.
2. organic compounds (ex: water soluble vitamins)
3. non protein.
4. heat resistance.
5. their function as co-substrate.

Co-factors

1. conjugated with protein(enzyme)
2. metallic ions (Fe, Mn, Cu,Mg) such as Vit C and B
3. has low molecular weight

Classification of enzymes:

1-Oxidoreductases. ,one compound oxidized, another reduced. Ex: lactate dehydrogenase, tyrosinase:



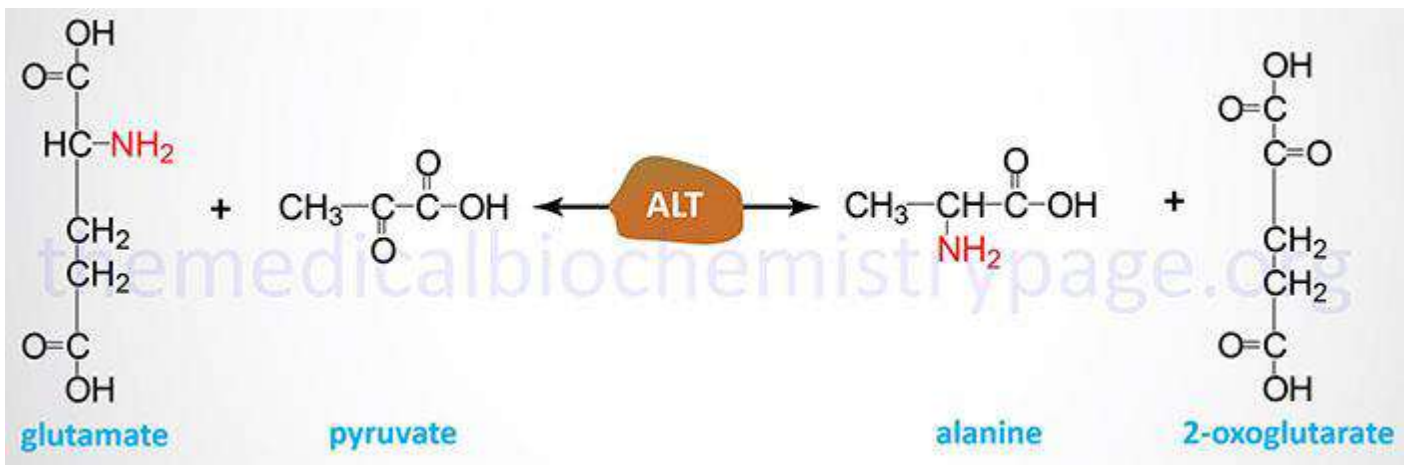
2-Transferase

Enzyme transfer group containing C, N or S, from one substrate to another substrate

Ex: **Transaminase** (glutamate oxaloacetate transaminase(**GOT**) or Aspartate transaminase (**AST**).

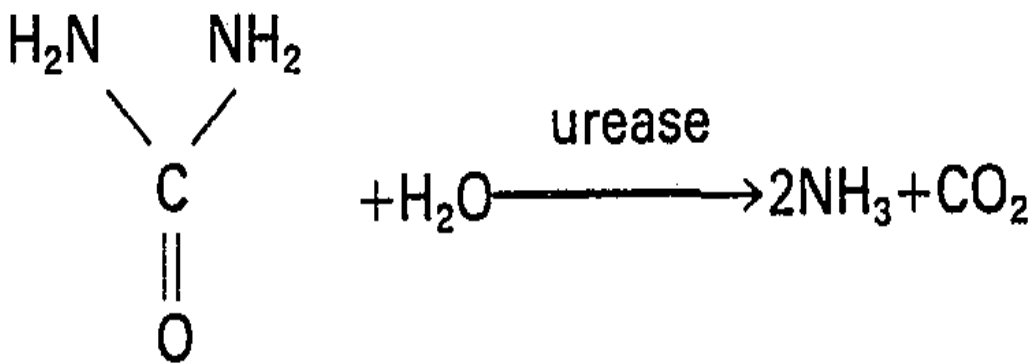
and glutamate pyruvate transaminase(**GPT**), alanine transaminase(**ALT**)

(transfer of amine group)



3-Hydrolyase.

Catalyse hydrolysis of ester, peptide or glycoside bound by addition of H₂O across the bond.

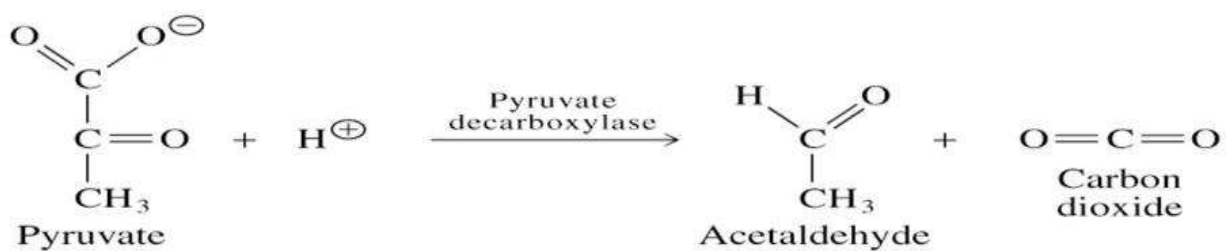


4-Lyasis.

Additional or removal of group without hydrolysis, oxidation, reduction producing double Bond.

4. Lyases

- Catalyze lysis of a substrate, generating a double bond in a nonhydrolytic, nonoxidative elimination



5-Isomerase.

.Produce optical, geometric or position isomer of substrates by intermolecular rearrangement

Ex: D- alanine \rightleftharpoons racemase \rightleftharpoons L – alanine



6-Ligases or synthetase.

link two substrate together usually by pyrophosphate bound.

6. Ligases (aka *synthetases*)

Example: L-glutamine synthetase
(EC 6.3.1.2)



Unnumbered figure pg 132c Principles of Biochemistry, 4/e
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- L-glutamate / NH_4^+ = substrates
- L-glutamine = product
- ATP = co-factor

SPECIFICITY OF ENZYMES



What is enzyme specificity?

- Ability of an enzyme to choose exact substrate
- It is a molecular recognition mechanism
- Recognition and specificity is based on structural complementarity

Conformational Complementarity of Enzyme and Substrate



Similar Conformational Symmetry of Enzyme and Substrate



Conformational Asymmetry of Enzyme and Substrate

