CATABOLISM OF AMINO ACID

Catabolism means break down complex molecules into simple ones. catabolism of amino acids involves the removal of the amino group, ~~fdfs~~ followed by the breakdown of the resulting carbon skeleton.

The first step in the breakdown of amino Acid is the removal of the amino group, usually through a reaction known as transamination. The carbon skeleton of the amino acid ~~td~~ undergo further reactions to form compounds that can either be used for the synthesis of glucose or the ~~th~~ synthesis of ketone bodies.

Among the several ~~degrading~~ processes for amino acids are Deamination (removal of an amino group), transamination (transfer of amino ~~acid~~ group), decarboxylation (removal of carboxyl group) and dehydrogenases (removal of hydrogen).

Transamination: The transfer of an amino (NH_2) group from an amino acid to a keto acid is known as transamination. This process involves the inner conversion of a pair of amino acid a pair of keto acid, catalysed by a group of enzymes called transaminases, (amino-transferases, Transamination, as such is the inciting point for amino acid metabolism.

Salient features of Transamination

① All transaminases require pyridoxal phosphate (PLP), a coenzyme derived from vitamin ~~of~~ B_6.

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2. Specific Transaminases exist for each pair of amino and keto acids. However only two - namely - aspartate transaminase and alanine transaminase - make a significant contribution for transamination.

3. There is no free NH_3 liberated, only the transfer of amino group occurs.

4. Transamination is reversible rxn. B.

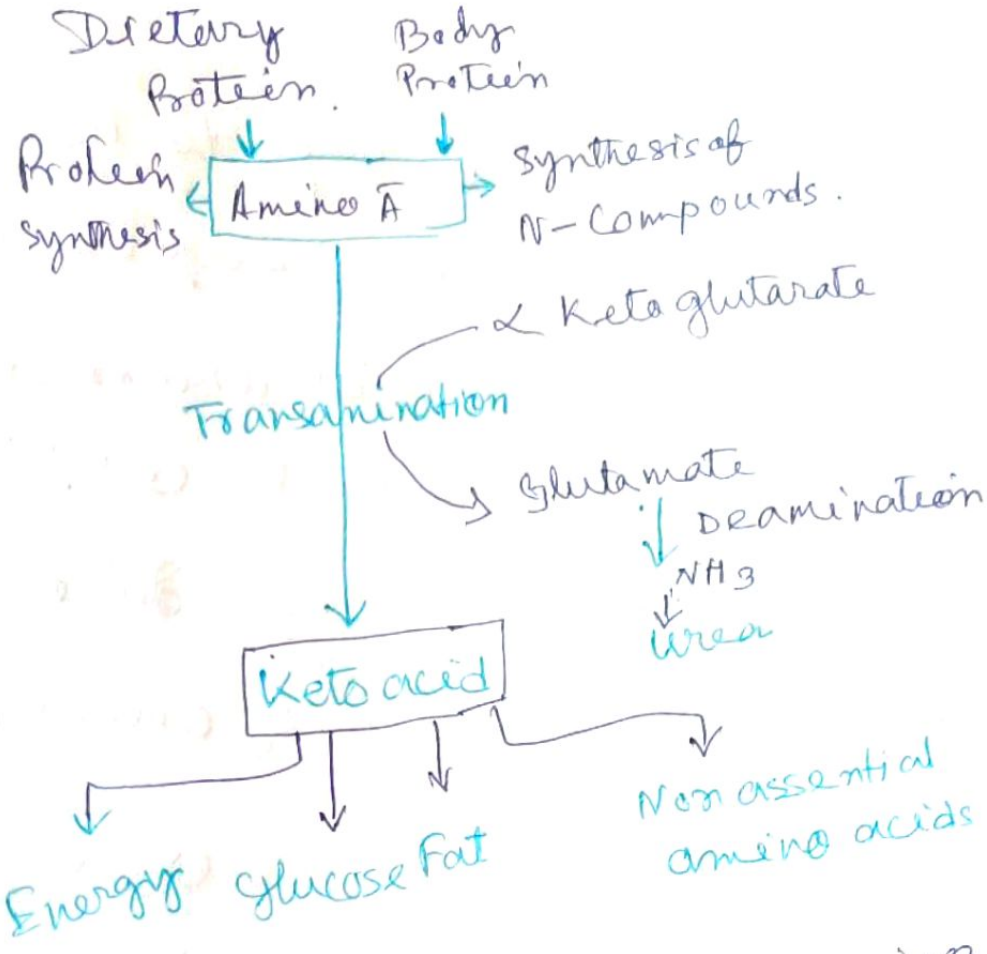

Fig-A An overview of amino acid metabolism

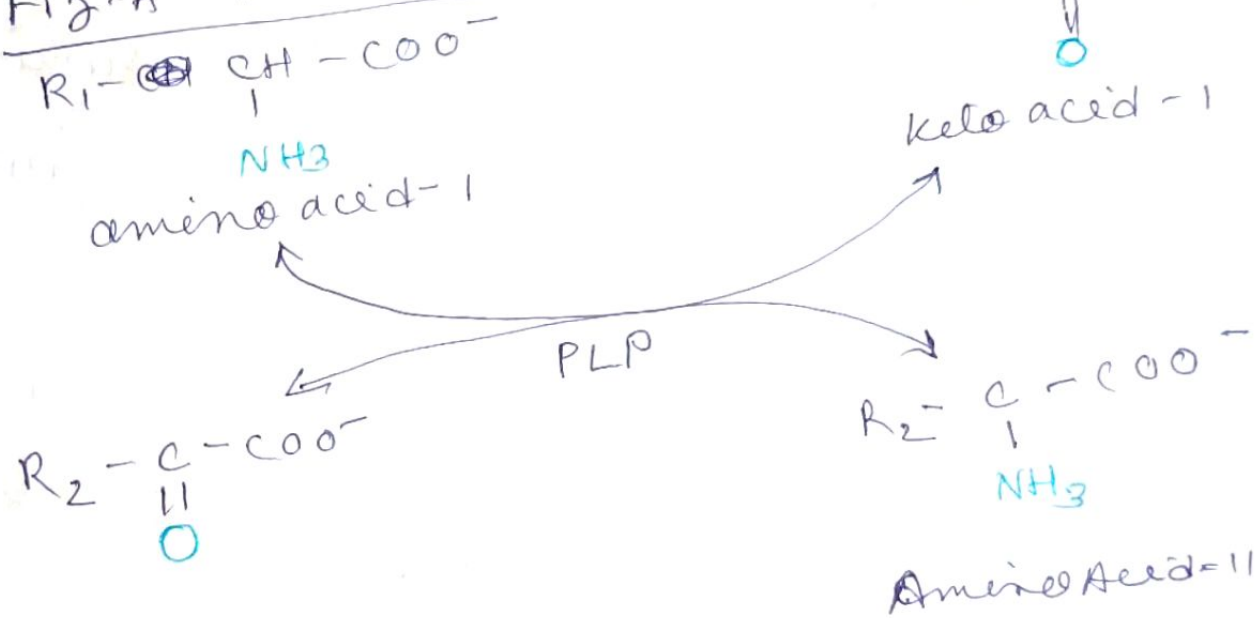

Fig-B. Transamination reaction

5. Transamination is very supt to the redistribution of amino groups and Production of non-essential amino acids as per the requirement of the cell. It involves both catabolism (degradation) and anabolism (synthesis) of amino A.

6. Trans amination diverts the excess amino A towards energy generation.

7. The amino acid undergo transamination to finally concentrate nitrogen in glutamate. Glutamate is the only amino A that undergoes oxidative deamination to a significant to liberate free NH for urea synthesis.

(8) All amino A except lysine, Threonine Proline and hydroxyproline participate transamination.

9. Transamination is not restricted to α-amino groups only. For instance, δ-amino ~~acid~~ group of ornithine is transaminated.

10. Serum transaminases are important for diagnostic and prognostic purposes.

Mechanism of Transamination

Transamination is the process by which amino groups are removed from amino acid to generate the amino acid version of the keto-acid and the keto-acid version of the original amino acid.

It is a chemical reaction that transfers an amino group a keto acid to form new amino acid.

Transamination occurs in two stages.

① Transfer of the amino group to the co-enzyme Pyridoxal phosphate (bound to the (coenzyme) to form pyridoxamine phosphate.

2. The amino group of pyridoxamine phosphate is then transferred to a keto acid to produce a new ~~keto~~ amino acid and the enzyme with PLP is regenerated.

Importance / significance

Transamination is of central importance in amino acid metabolism; providing pathway for catabolism of most amino acid as well as the synthesis of these amino acid for which there is a source of the the oxo-acid other than from the amino acid itself the non-essential amino acid.

Aspartate transaminase (AST) and Alanine transaminase (ALT) are very important as diagnostic

enzyme. Serum AST is mostly elevated in cardiac disorders (myocardial infarction) while ALT is increased in liver diseases (viral hepatitis).