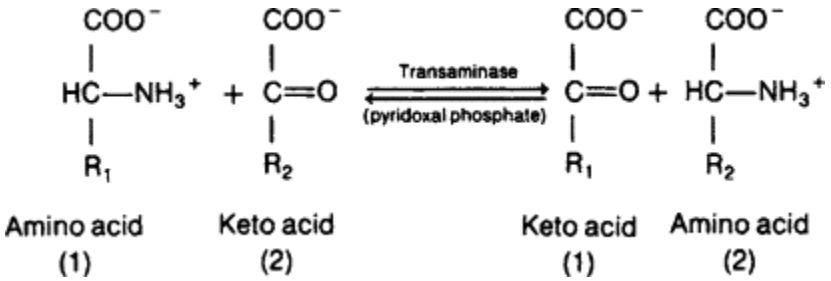
AMINO ACID METABOLISM

TRANSAMINATION

- Transamination is the process by which amino groups are removed from amino acids and transferred to acceptor keto acids to generate the amino acid version of the keto acid and the keto acid version of the original amino acid.
- The reactions are highly reversible, and the forward or reverse direction depends upon the concentrations of substrates or products.
- Transamination reactions are catalyzed by pyridoxal phosphate-dependent enzymes termed transaminases or, more properly, aminotransferases.



DEAMINATION

- The process of removing an amino group from a molecule is called deamination, when the amino group is changed into ammonia.
- The enzyme that stimulates this action is called deaminases.
- Deamination principally occurs in the liver; however, glutamate is also deaminated in the kidney.

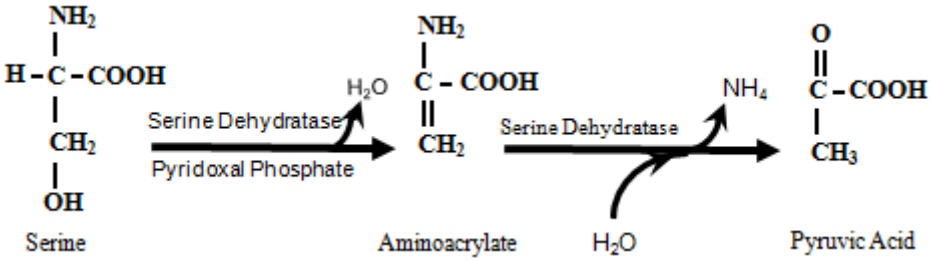
Types of Deamination

Non-oxidative Deamination

- In non-oxidative deamination, the amine group is removed without the oxidation process. A byproduct of non oxidative deamination is ammonia,

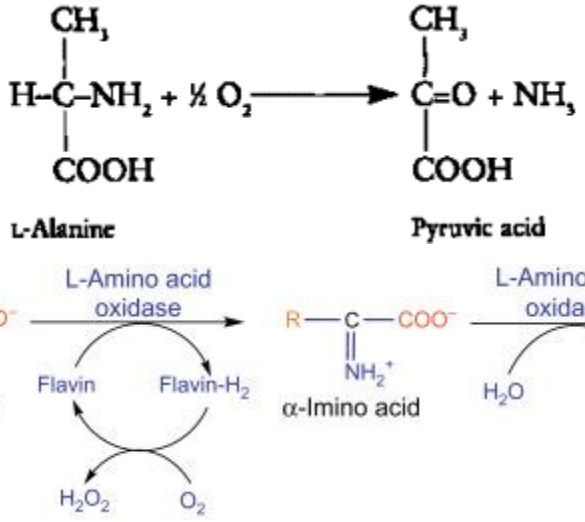
producing consequent a-keto acids. Hydroxyl acids with one or more hydroxyl groups undergo non oxidative deamination.

- The enzymes stimulating the non oxidative deamination are amino acid dehydratases. Pyridoxal phosphate acts as a coenzyme for non oxidative deamination reactions.



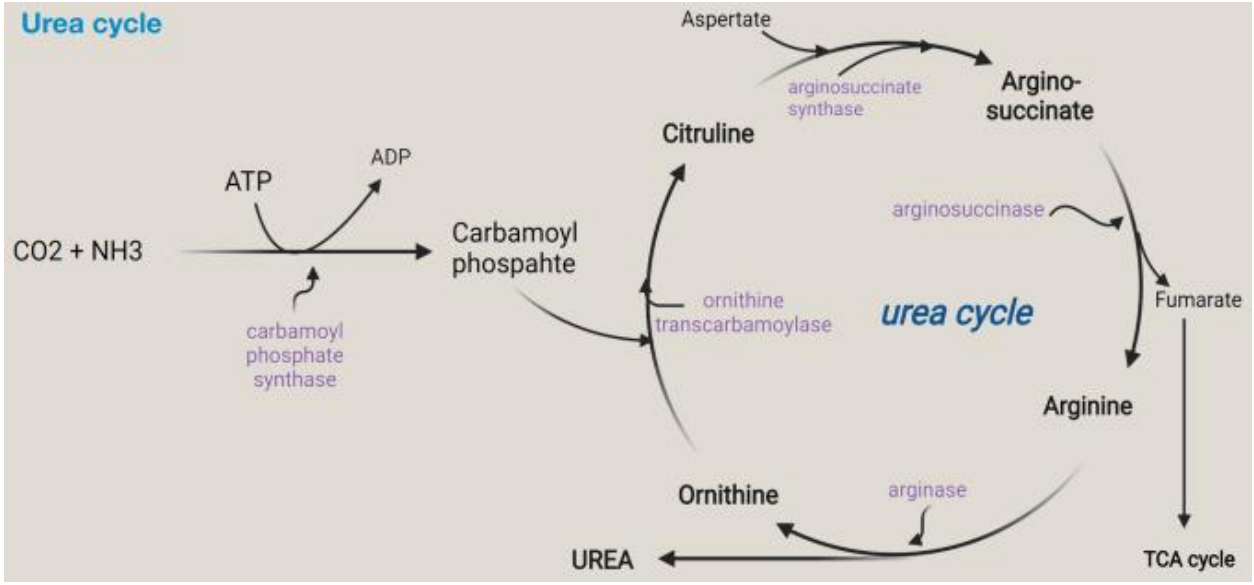
Oxidative Deamination

- This process breaks down the excess protein from the diet by removing the amino group from amino acids.
- Oxidative deamination mostly occurs in the liver and kidney, producing a-keto acids and other oxidized products from amine-enriched compounds.



UREA CYCLE

- The urea cycle is a series of six reactions necessary to rid the body of the nitrogen generated by the metabolism, primarily of amino acids, from the diet or released as the result of endogenous protein catabolism.
- The conversion of ammonia into urea through a series of biochemical reactions is known as the urea cycle or ornithine cycle. It takes place in the liver with the help of mitochondrial and cytosolic enzymes.
- The ammonia produced by amino acid degradation is detoxified by conversion to urea in the liver.
- The urea cycle begins in the mitochondria of hepatocytes and ends in the cytoplasm.
- The final product formed is then transported to the kidney, where it is excreted out of the body.



DECARBOXYLATION

- Decarboxylation is the reaction by which CO2 is removed from the COOH group of an amino acid as a result an amine is formed.
- The reaction is catalysed by the enzyme decarboxylase, which requires pyridoxal-P (B6-PO4) as coenzyme.
- Tissues like liver, kidney, brain possess the enzyme decarboxylase and also by microorganisms of intestinal tract.
- The enzyme removes CO2 from COOH and converts the amino acid to corresponding amine.