

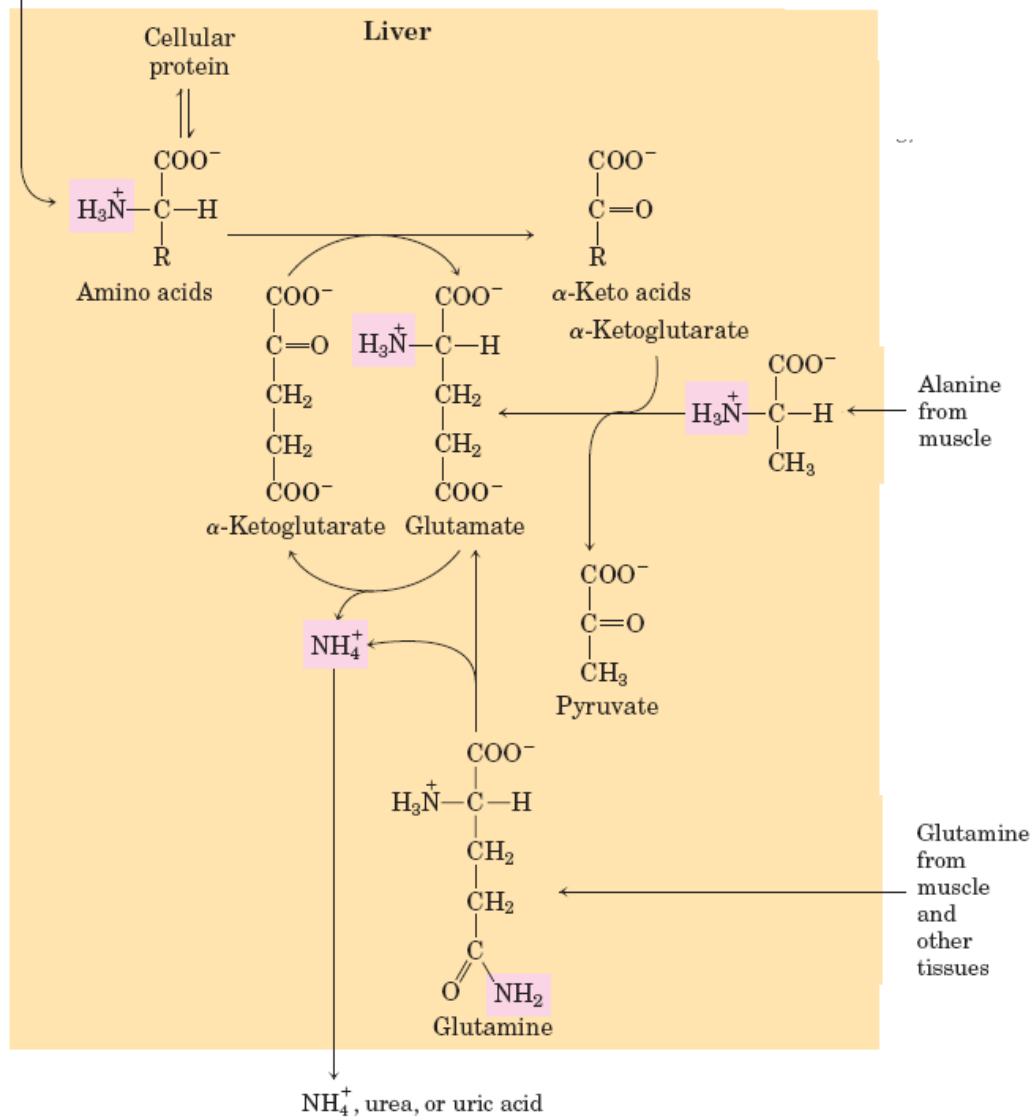
UREA CYCLE

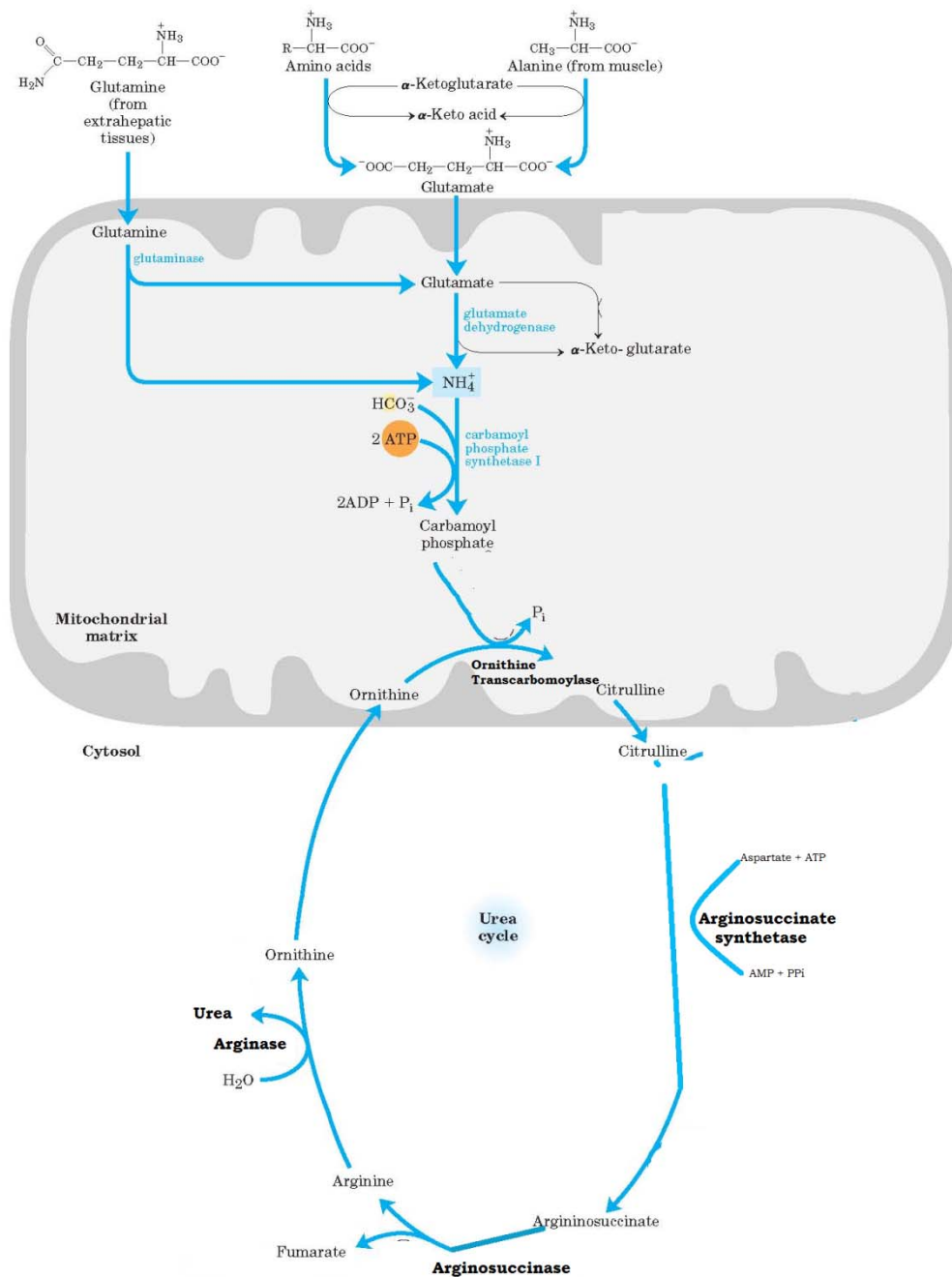
The ammonia released for the catabolism of amino acid is transported to liver as amide nitrogen of glutamic acid. Alternatively, the ammonia is also transported to skeletal muscle as amino group of Alanine.

If the amino acids are not reused for synthesis of proteins amino groups are channelled into excretory end product. Fishes excrete ammonia directly into the environment where it gets diluted in surrounding. The terrestrial animals that excrete ammonia nitrogen as urea (Ureotelic organisms). The birds and reptiles excrete ammonia in the form of uric acid (Uricotelic organisms).

The ammonia produced from other tissues is deposited in mitochondria of hepatocytes where it is converted to urea through urea cycle. The urea produced by the urea cycle is excreted through urine.

Amino acids from
ingested protein

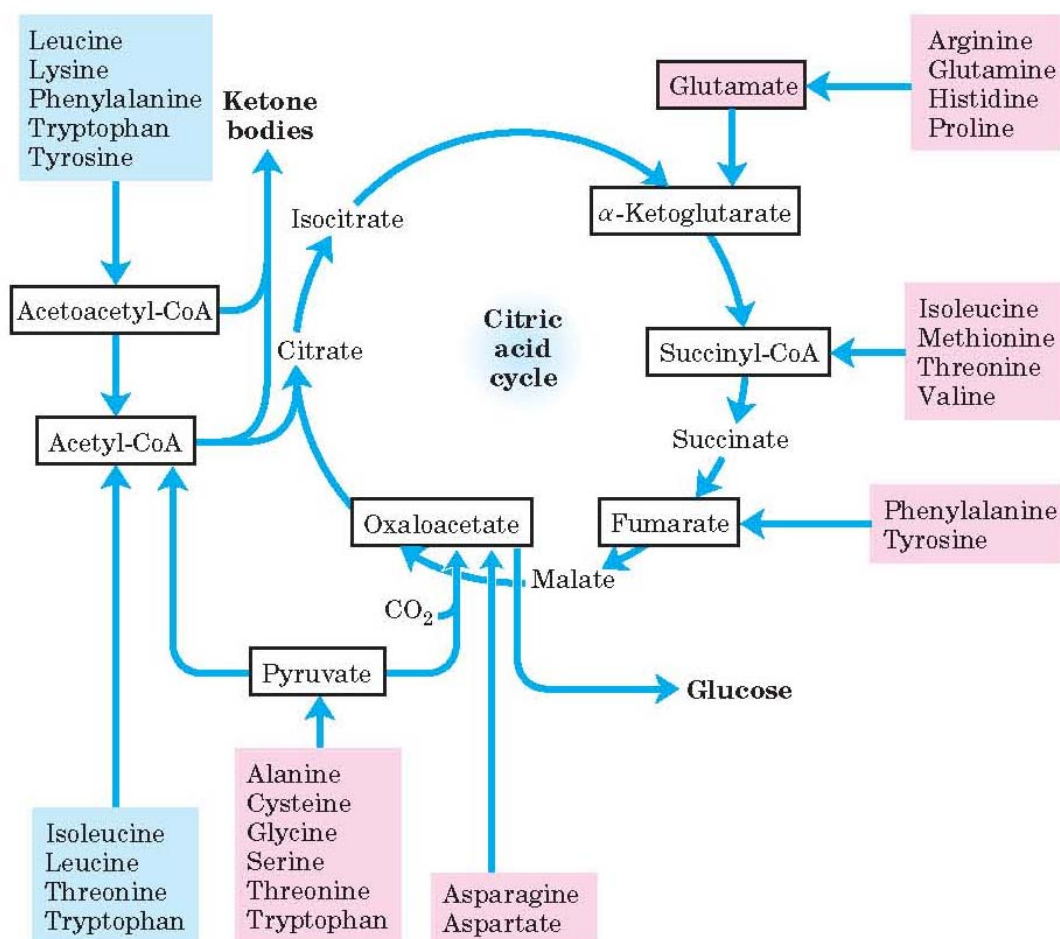




REGULATION OF UREA CYCLE

Animals fed on heavy protein diet or in the emaciated animals the amino acids are catabolised producing ammonia that enters the urea cycle. In this condition all four enzymes are synthesized at high rate producing large amount of urea.

PATHWAYS OF AMINO ACID OXIDATION:



The oxidation of amino acids account for 10-15% of total energy production in mammals. However, the efficiency of the pathways of amino acids oxidation is less as compared to that of glycolysis or fatty acids beta oxidation. This percentage of total energy production increases in the condition when other source of energy production is exhausted. As the main source of energy is glucose. In case of lack of glucose in body, the preference for energy production goes to fatty acids. Lastly, upon exhaustion of fatty acids in body, the last preference goes to amino acids. The amino acids are oxidized through various pathways to generate energy.

The amino acids that lead to production of glucose are called glucogenic amino acids and those that lead to production of ketone bodies upon oxidation are called ketogenic amino

acids. For example, as shown in the flow chart above, the leucine is ketogenic amino acid and Alanine is glucogenic amino acid.