FATE OF C-SKELETON OF GLUCOGENIC AND KETOGENIC AMINO ACIDS

Q.Define glucogenic and keto genic amino acids and give suitable examples.

Glucogenic amino acid

i)A glucogenic amino acid is an amino acid that can be converted into glucose through gluconeogenesis. The production of glucose from glucogenic amino acids involves these amino acids being converted to alpha keto acids and then to glucose, with both processes occurring in the liver.

ii)These amino acids are degraded to ***pyruvate, α-ketoglutarate, succinyl CoA, fumarate or oxaloacetate***.

ii)This mechanism predominates during catabolysis, rising as fasting and starvation increase in severity.

iii)Example— Alanine, Arginine, Asparagine, Aspartic acid, Cysteine, Glutamic acid, Glutamine, Glycine, Histidine, Methionine, Proline, Serine, Valine etc.

Ketogenic amino acid

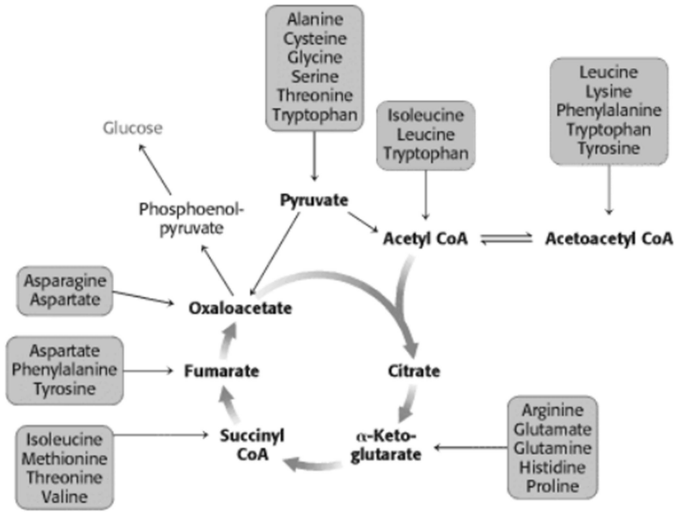
i)A **ketogenic amino acid** is an amino acid that can be degraded directly into ***acetyl-CoA or acetoacetyl CoA***, which is the precursor of ketone bodies and "myelin, especially during early development, when brain myelin synthesis is extremely high" according to the National institute of Health.

ii)This is in contrast to the glucogenic amino acids, which are converted into glucose. Ketogenic amino acids are unable to be converted to glucose as both carbon atoms in the ketone body are ultimately degraded to carbon dioxide in the citric acid cycle.

iii)Example— Leucine, Lysine.

Q.Give examples of some amino acids those are both gucogenic and ketogenic.

Phenylalanine, Isoleucine, Tryptophan, Tyrosine.



Q.State functional significance of ketogenic amino acids.

i)Ketogenic amino acids serve important roles in the human body, leading to the study of ketogenic amino acid rich (KAAR) diets as possible treatment for non-alcoholic fatty liver disease (NAFLD) and diabetes.

ii)Decreasing the intake of ketogenic amino acids lysine and threonine may induce hepatic steatosis, a major cause of non-alcoholic fatty liver disease.