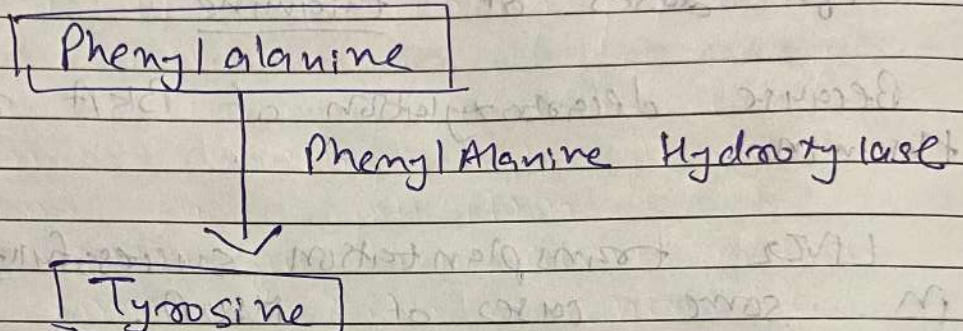


Que 60

Biochemical Basis of etiology, Clinical feature, diagnosis and treatment of various hyperphenylalaninemia.

- Phenylketonuria

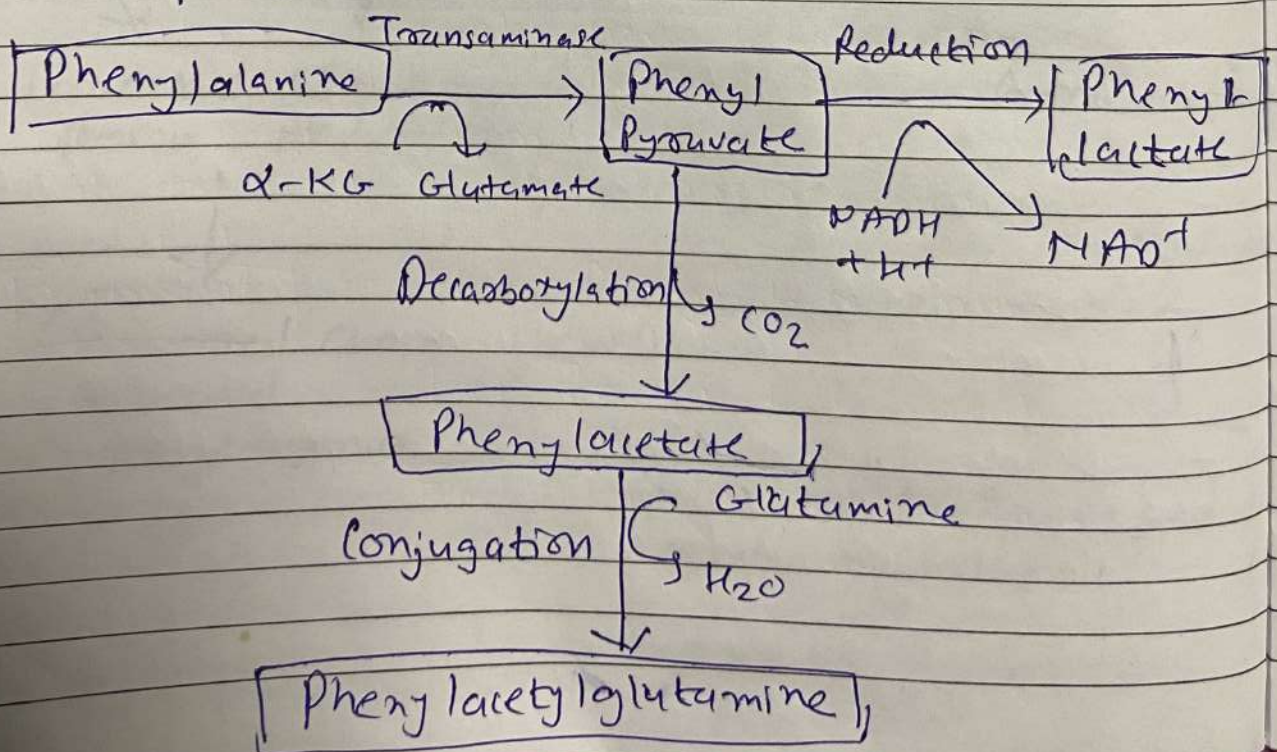
-> Biochemical Abnormalities In PKU



- Deficiency of Phenylalanine Hydroxylase is the cause for this disease.

- So phenylalanine could not be converted to tyrosine, so phenylalanine accumulates and level elevated in blood.

-> Alternate Minor Pathway of Phenylalanine opened



→ 5 Types of PKU

- Type I is Classical One described above
phenylalanine hydroxylase deficiency
- Type II & III - Deficiency of
Dihydrobiopterin Reductase
- Type IV & V are due to deficiency of
enzyme synthesizing biopterin
- Tetrahydrobiopterin is the coenzyme
required for serotonin and dopamine,
the decreased level of these neurotransmitters
may also result in the neurological symptoms.

(*) CF

- Mental Retardation IQ - 50 v.
- Agitation, hyperactivity, tremors and convulsions
because phenylalanine interferes with neuro-
transmitter synthesis
- Hypopigmentation → Due to decreased tyrosine
- Incidence is 1 in 10,000 births
in India lesser than western countries
; only 1 in 25,000 births.
- It is recessive condition

Laboratory finding

- Blood Phenylalanine - Normal level is 1 mg/dl
In PKU, the level $> 20 \text{ mg/dl}$
demonstrated by chromatography

- Tandem mass spectroscopy

→ Guthrie test rapid screening test

- Spot of blood on a filter paper disc is placed on the surface of an agar plate, which contain a substance that inhibits bacterial growth, high phenylalanine can overcome this inhibition.

- after overnight incubation bacterial growth is compared with a control disc by measuring the diameter of growth zone.

- The amount of phenylalanine in blood of the patient can be estimated.

→ DNA Probes are now available to diagnose the defect in phenylalanine hydroxylase and dihydrobiopterin deficiency.

→ Ferric Chloride Test - Urine of patient contain phenylketones about $500-3000 \text{ mg/day}$, this could be detected by adding drop of ferric chloride to the urine.
A transient blue-green color is a positive test

Treatment - Low phenylalanine containing diet
- Low protein diet grains, sprouts,
- Food based on tapioca (cassava) +

Phenylketonuria's carrier state

- Disease is manifested only in Homozygous state
- In heterozygous state, phenylalanine hydroxylase enzyme is sufficient to metabolize normal level of phenylalanine.
- But when phenylalanine (Lys) is injected intravenously, the carriers will show increased level in the blood.