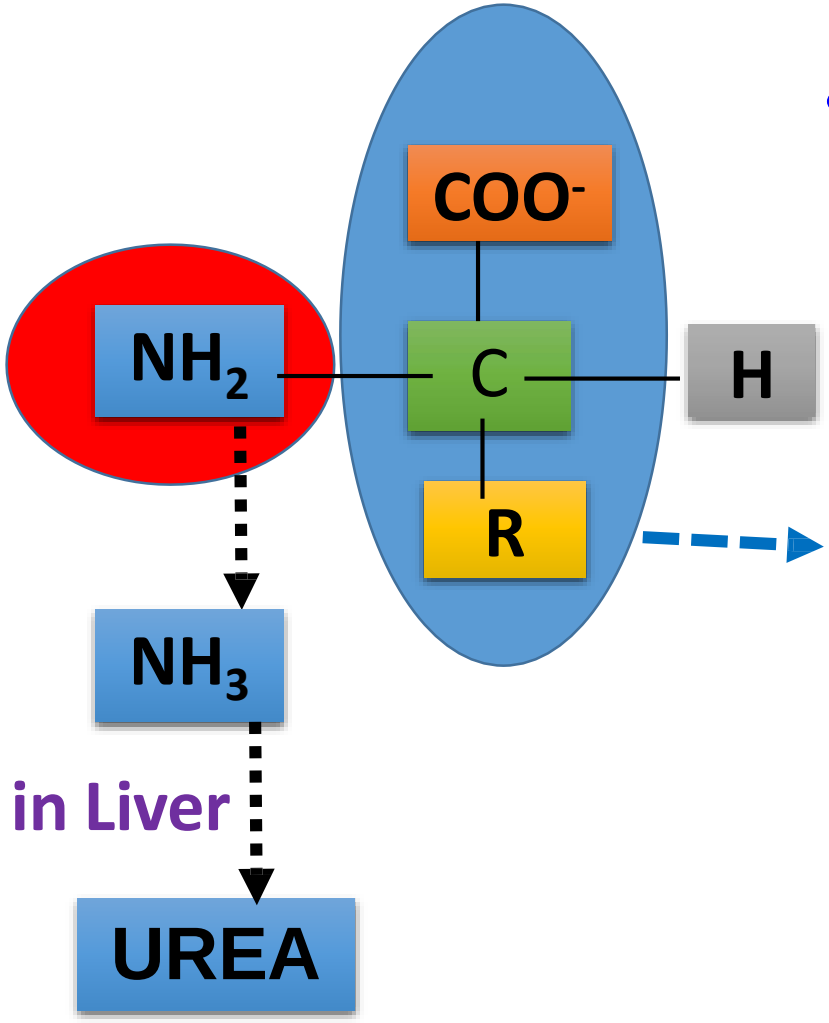
Protein metabolism

2nd stage

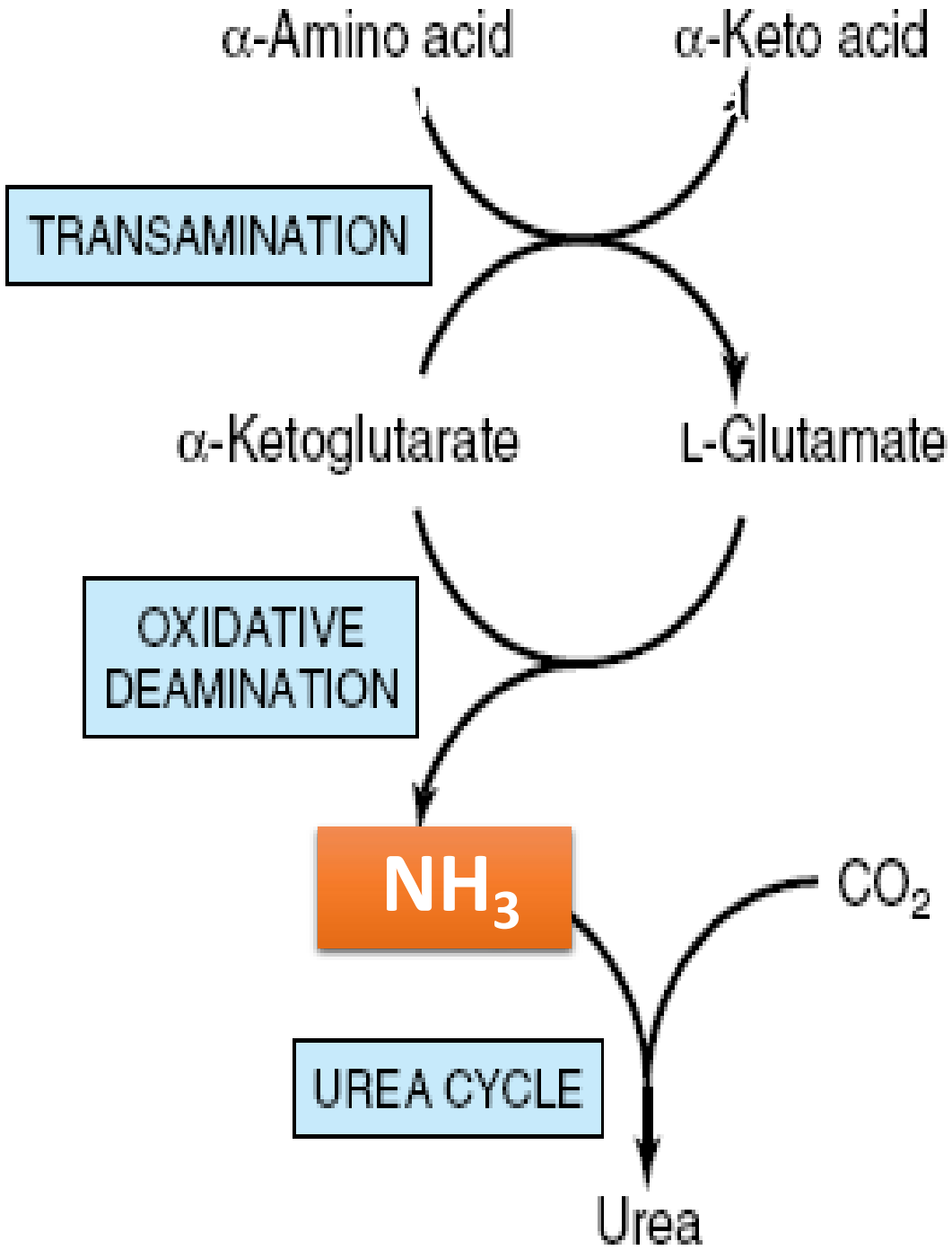
Lec 1

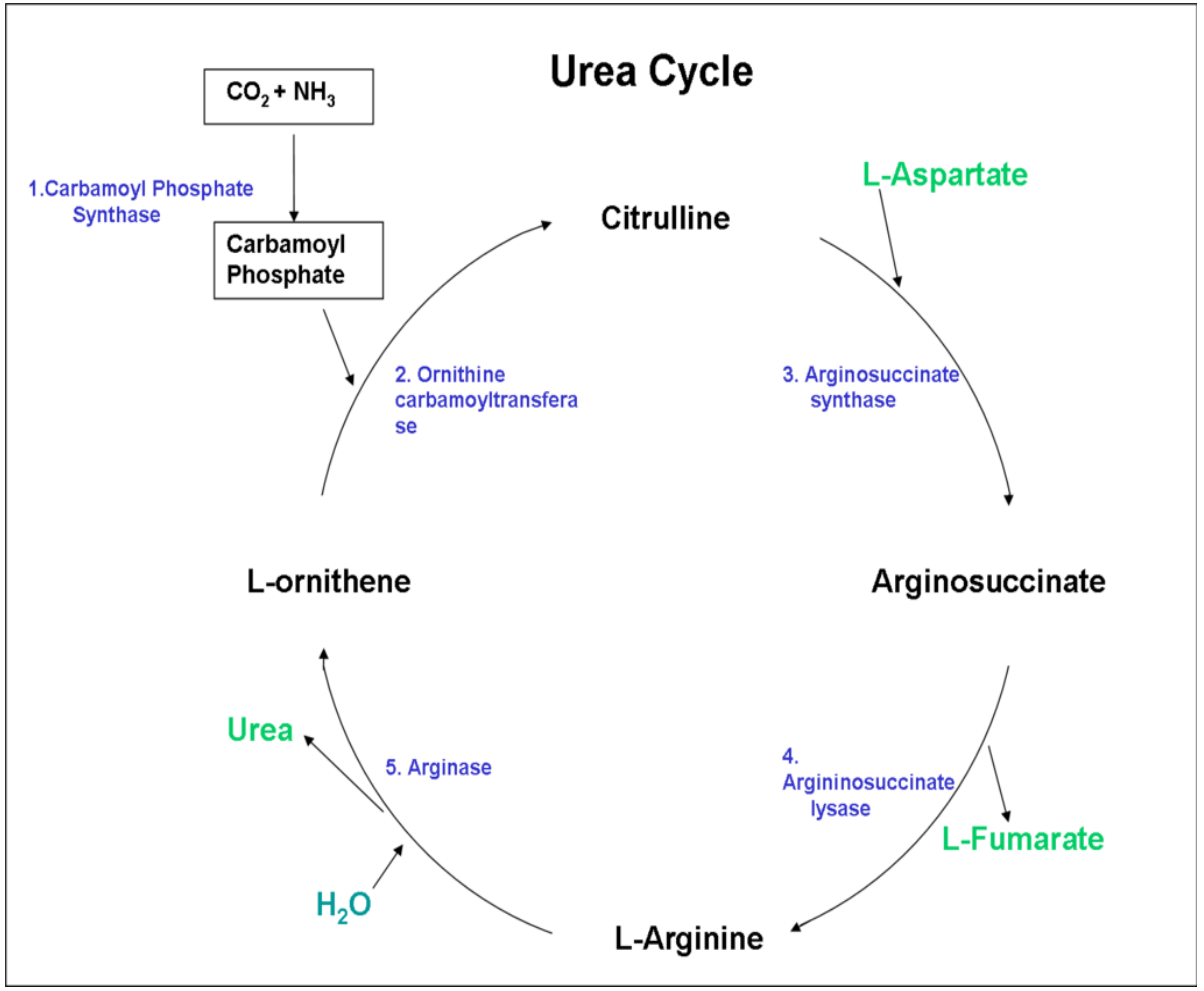
Dr. Rusul H. Hamza

Cataboliosm of Amino acids

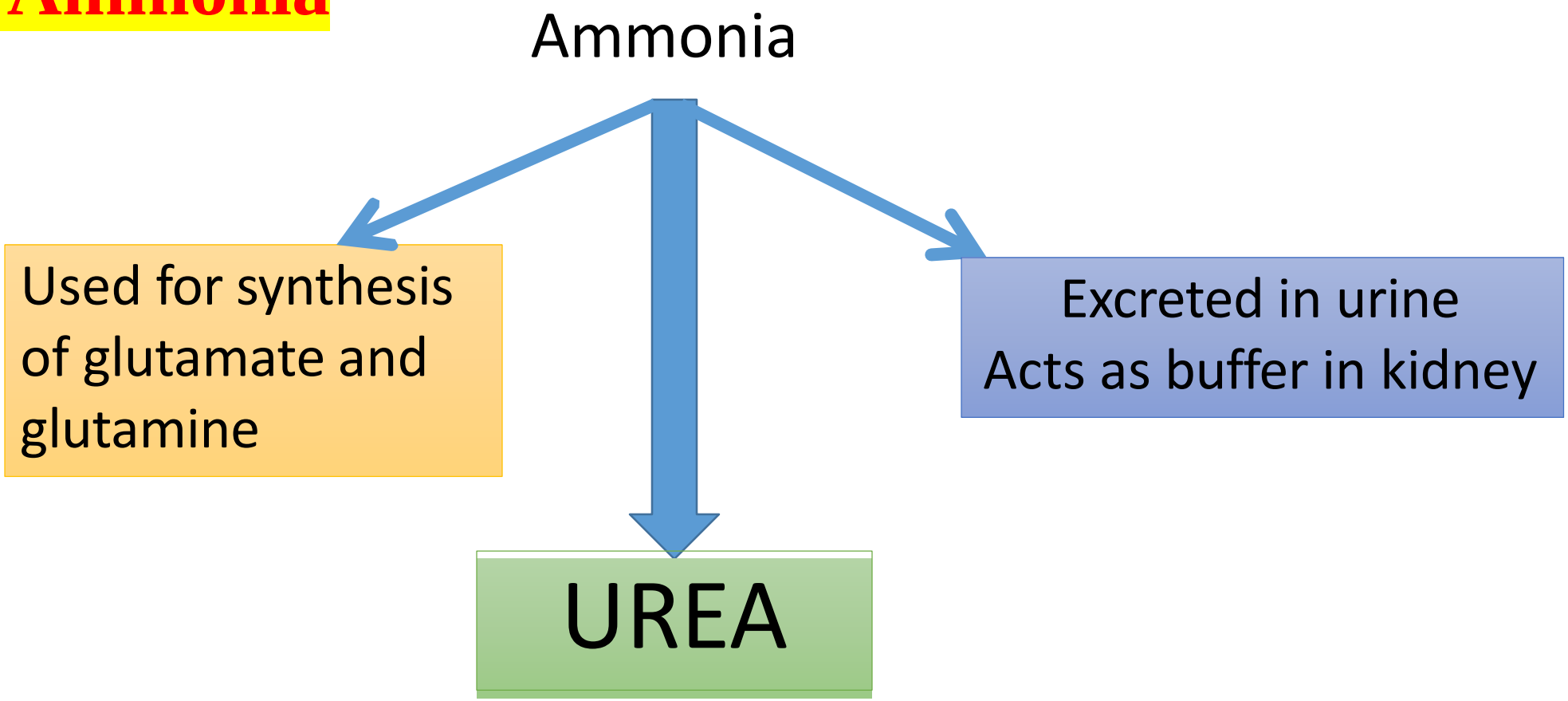


- The α amino group is removed as Ammonia
- Ammonia is converted to Urea (in Liver)
- The carbon skeleton of the amino acid is metabolized
  - Energy production
  - Glucose synthesis
  - Fat synthesis


α-Amino acid
α-Keto acid
TRANSAMINATION
α-Ketoglutarate
L-Glutamate
OXIDATIVE DEAMINATION
NH3
CO2
UREA CYCLE
Urea


Urea Cycle
CO2 + NH3
1.Carbamoyl Phosphate Synthase
Carbamoyl Phosphate
Citrulline
L-Aspartate
2. Ornithine carbamoyltransfera se
3. Arginosuccinate synthase
L-ornithene
Arginosuccinate
Urea
5. Arginase
H2O
4. Argininosuccinate lysase
L-Fumarate
L-Arginine

Fates of Ammonia



Uremia

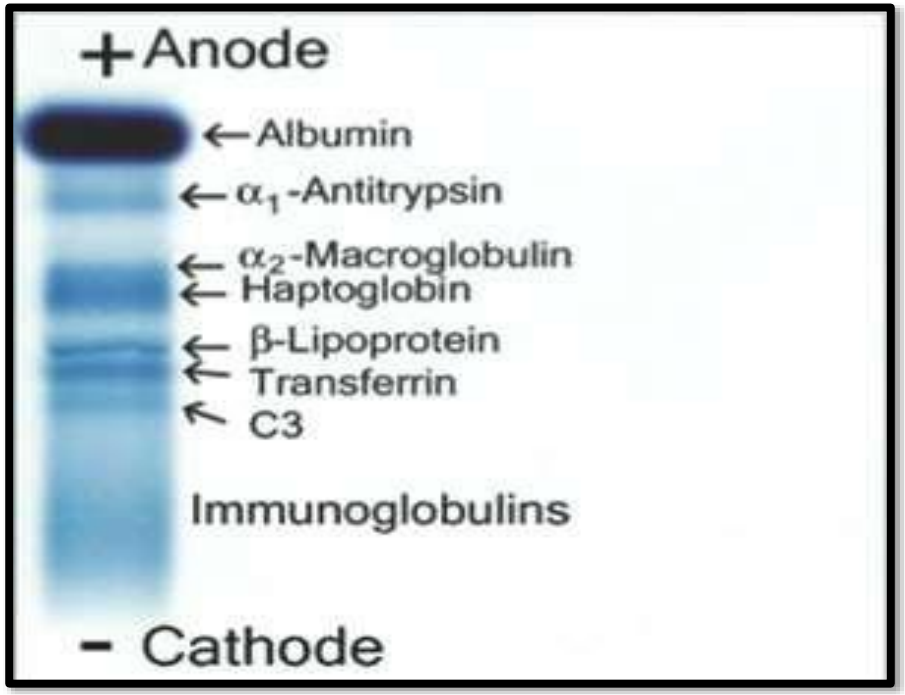
Uremia
high levels of urea in the blood

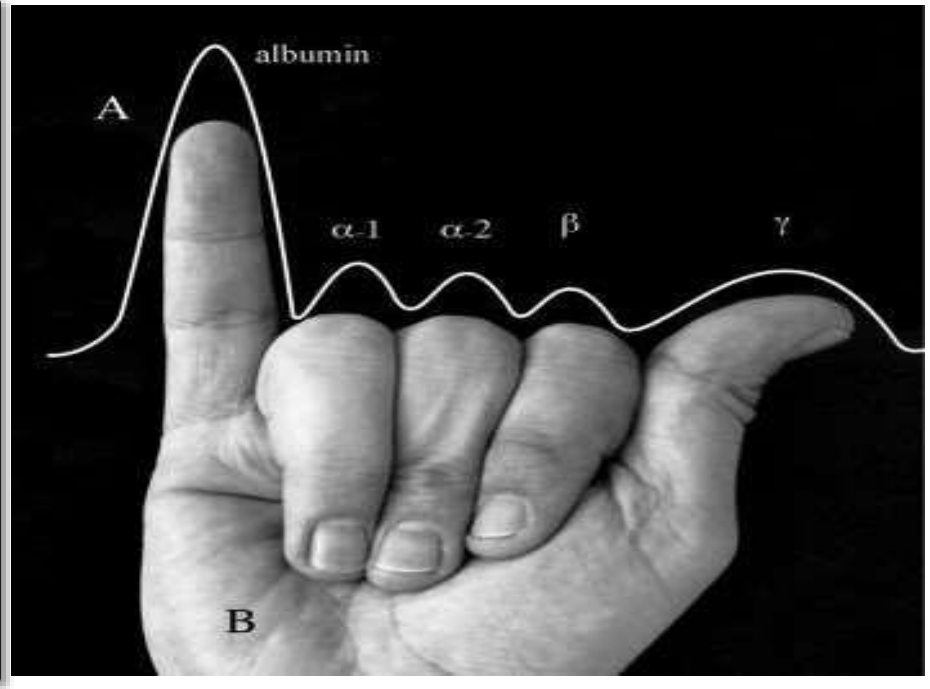
It can be defined as an excess of amino acid and protein metabolism end products, such as urea, in the blood that would be normally excreted in the urine.

Serum

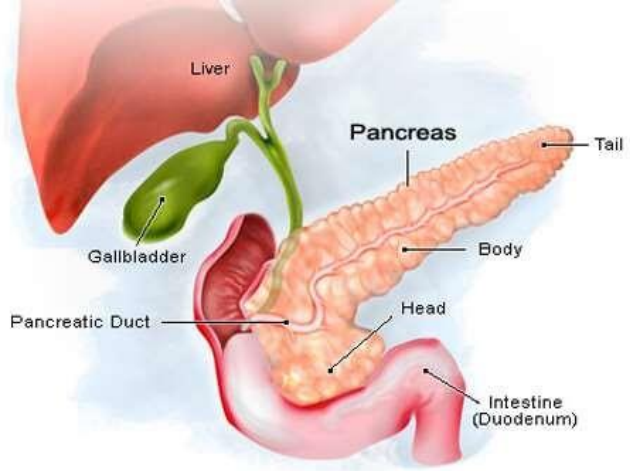
- Serum is the fluid component of blood after it is allowed to clot.
- Approximate 4% decrease in total protein content compared to plasma

Serum Protein components





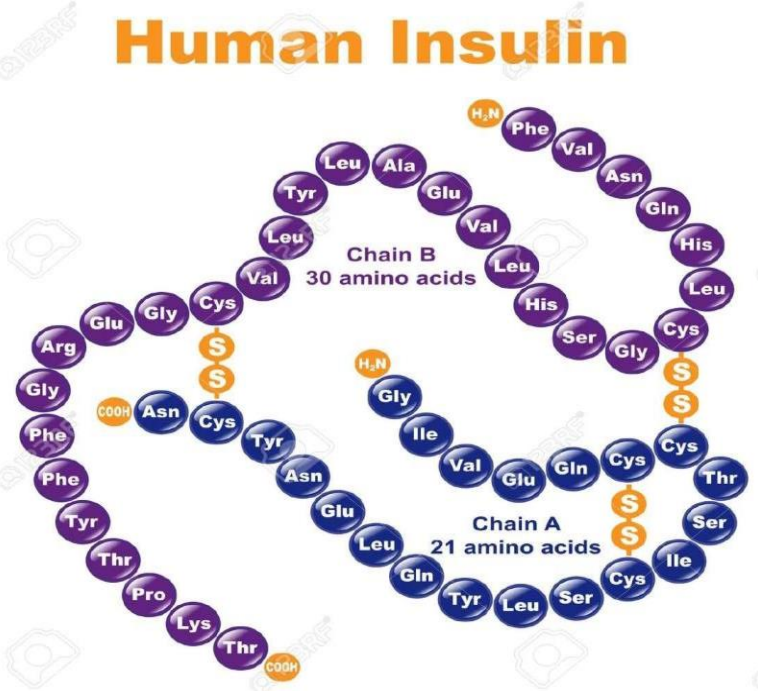
Insulin



- Is a polypeptide hormone produce by *β-cells of langerhans of pancreas.*
- It has profound influence on metabolism of Carbohydrates, fat & proteins.

Structure

- Human Insulin contain **51 aminoacids**, arranged in TWO Polypeptide chains.
- **Two Interchain Disulfide bridge**



Disorders of Amino acid metabolism

Phenylketonuria

- PKU is caused by a defect in the gene that helps create **phenylalanine hydroxylase**
- Unable to break down phenylalanine.

Alkaptonuria

- Mutation on your homogentisate1,2 dioxygenase (HGD) gene
- don't produce enough HGD,
- bones and cartilage to become brittle.

Maple syrup urine disease (MSUD)

is an autosomal recessive metabolic disorder affecting branched-chain amino acids.