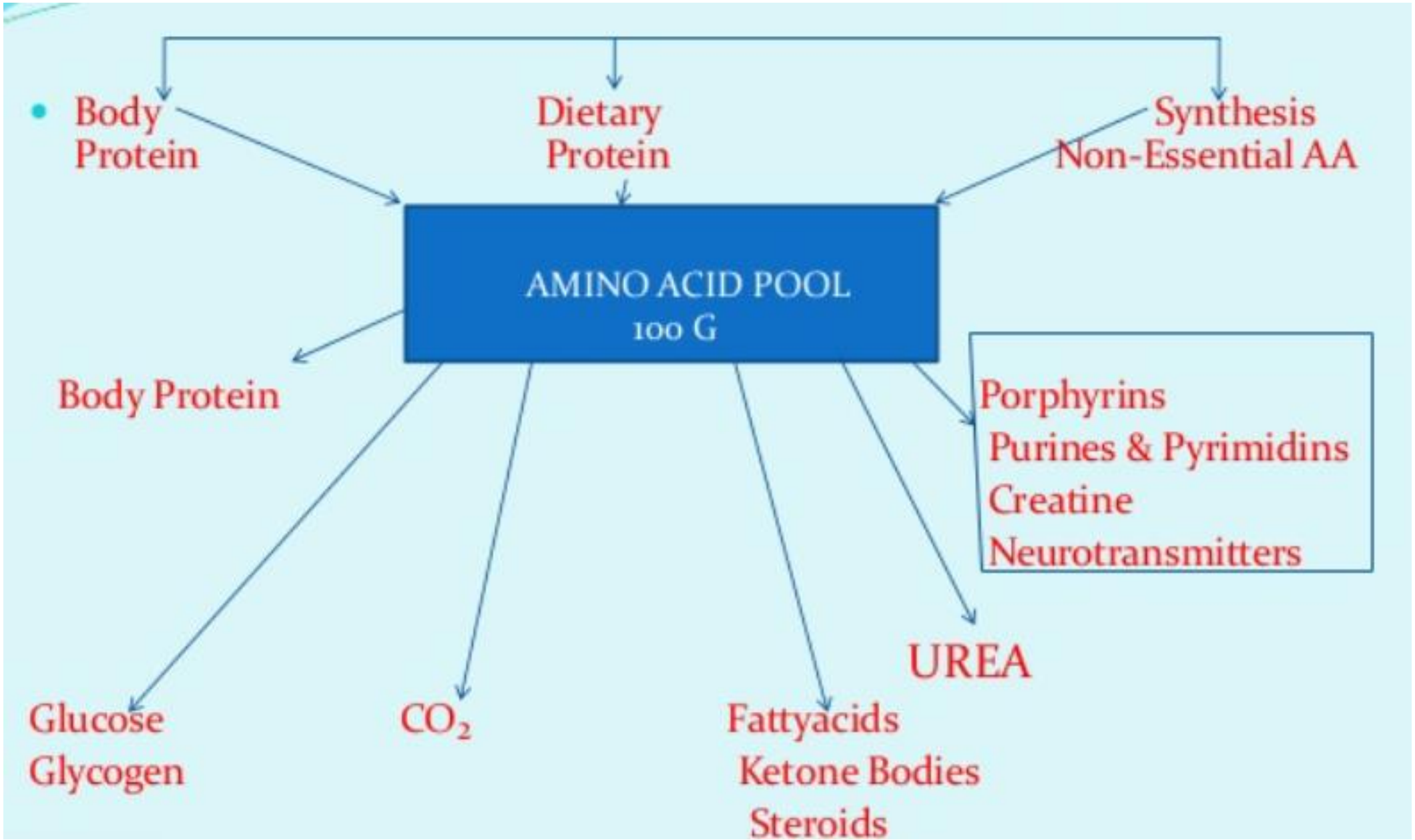
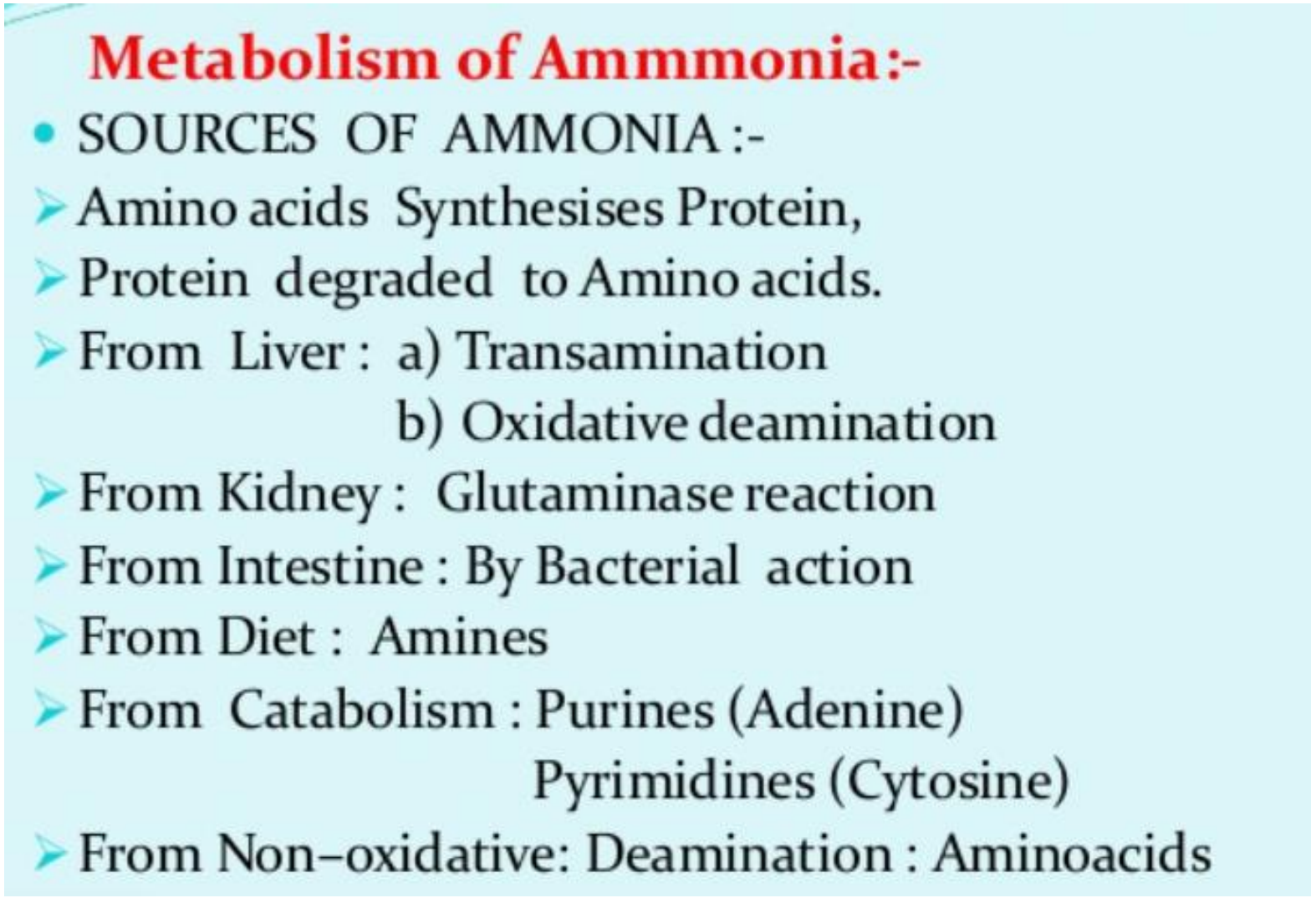
Metabolism of proteins


Body Protein
Dietary Protein
Synthesis Non-Essential AA
AMINO ACID POOL
100 G
Body Protein
Porphyrins
Purines & Pyrimidins
Creatine
Neurotransmitters
UREA
Glucose
Glycogen
CO_2
Fattyacids
Ketone Bodies
Steroids

Deamination

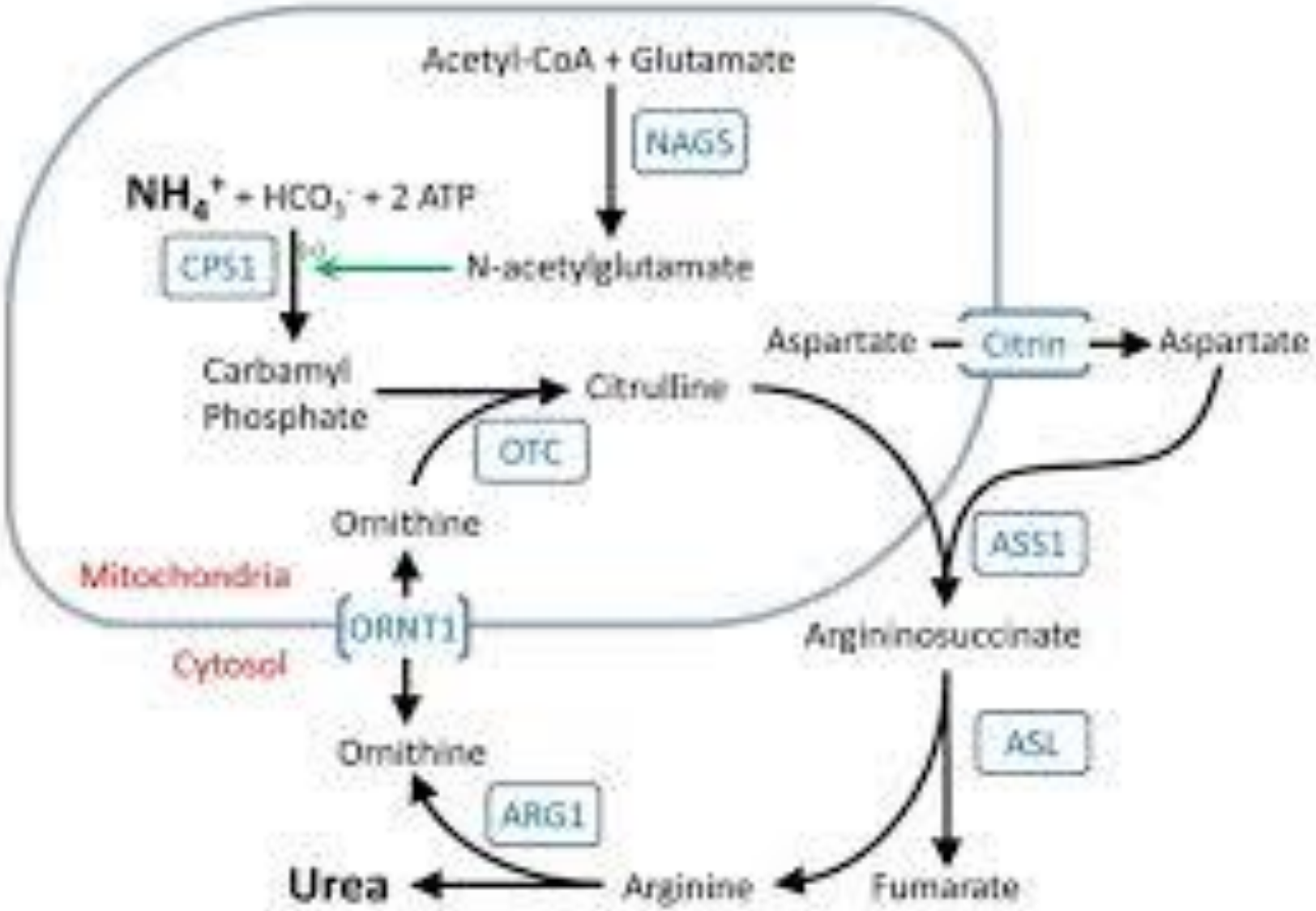
- Removal of amino group in the form of ammonia from amino acid



UTILIZATION OF AMMONIA:-

- Glutamate+ Ammonia $\longrightarrow$ Glutamine.
- Glutamine synthetase- Liver, Brain and Kidney.
- Brain :- Major mechanism for removal of Ammonia is Glutamate formation.
- $\alpha KG + NH_3 + NADPH + H^+ \longrightarrow$ Glutamate+$NADP^+$
- Glutamate may be considered as a major transport form of NH_3 from tissue to liver.Concentration of Glutamate in blood is 10 times more than other amino acids.

Removal of ammonia = Urea cycle



Two nitrogen atoms of urea are derived from ammonia and alpha amino group of aspartic acid.

One mol of *urea* synthesis requires 4 mol of ATP.

Step 1 in Mitochondria:-

CO_2 + Ammonia + 2 ATP → Carbamoyl Phosphate+2ADP+PPi

Carbamoyl phosphate synthase 1(CPS-1)

It is a Mitochondrial enzyme,

Allosteric activator is N-Acetyl Glutamate.

- Step 2. Formation of Citrulline

Carbamoyal phosphate +Ornithine

Ornithine Transcarbamoylase

Citrulline + Pi

- Ornithine trans carbmoylase is also a Mitochondrial enzyme

This step onwards the reactions occurred in CYTOPLASM

- Step3- Formation of Argininosuccinate.
- Citrulline + Aspartate + ATP

Argininosuccinate Synthase

Argininosuccinate + AMP + PPi

- **Step 4. Formation of Arginine.**

Argininosuccinate

Argininosuccinase

Arginine + Fumarate

- **Step 5. Formation of Urea.**

Arginine + H_2O —Arginase→ Ornithine + Urea.