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Paper Biochemistry II

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Bs Radiology 2nd Sem

"Section"

Q1: Define Starvation and what are the metabolic changes take places during Starvation?

* **Starvation:-** (weight loss)

A Starvation is a Severe deficiency in caloric energy intake, below the level of needed to maintain an organism's life.

⇒ Starvation can cause permanent organs damage and eventially, death.

⇒ prolonged period not enough calories of any sort to keep up with the body energy needs in Starvation.

⇒ Result is Substantial weight loss, wasting away of the body tissues.

* Metabolic change in starvation:

⇒ Starvation usually implies complete deprivation of food & water only being supplied.

⇒ The cause of starvation can be Unavailability of food, poor diets, malabsorption, lesions of esophagus and stomach.

⇒ Total lack of food will result in death within about 2 months time in a previously well fed man.

⇒ The sum of these stores in a 70 kg man is only about 1,200 kcal which is not sufficient even for the basal metabolic rate of an adult for a single day.

* Carbohydrate metabolism:-

⇒ The liver glycogen fall very rapidly to a very low level.

⇒ The muscle glycogen also shows a fall but to a lesser extent than liver glycogen.

⇒ Blood glucose level remain normal normal for the first two days, but then falls to low level as some fuel to critical tissues like brain needs constant supply of glucose.

* **Fat metabolism:-**

After the stored carbohydrates reserved have been utilized the fatty acids are metabolized from the fat depots.

⇒ Excessive production.

⇒ Fatty liver results due to deposition of neutral fats in the liver.

⇒ The body phospholipids on the other hand are decreased.

⇒ The brain which normally utilize only glucose starts utilizing bodies.

* **Protein Metabolism:-**

A negative nitrogen balance occurs because the body continues to catabolize body proteins in the absence of protein intake.

⇒ Protein in starvation is shown by the study of uninary N in the fasting person.

⇒ Excretion of 1g of N in the urine represents the breakdown of 6.25gms of tissue protein.

* For the first day a very low urinary N is seen because the body derives most of the energy reserves.

* later the uriduy N rises reaching a maximum on the second and the third day due to utilization of reserves protein present mostly in the liver.

* After the stage: of an increased urinary N there occurs a progressive fall in urinary N may fall to about 6g/day.
During this stage the body is utilizing facts for deriving Calories. Thus sparing the tissues proteins from the breakdown.
⇒ Finally the renal failure sets in and the urinary N again fall. This is occur just before death.

* **Body weight:-**
Because the person does not ingest any calories but his caloric expenditure continues will be in a condition of a negative energy balance and will be in a caloric will gradually loose weight.
⇒ The adipose tissues may completely disappear while the liver, muscle and GI tract may loose about one third of their masses.

* **Cause of Starvation:-**

⇒ Poverty
⇒ Conflict and hunger itself.
⇒ unequal income distribution in the world.

Q(2) Write note on Metabolism of Carbohydrate?

* **Metabolism of Carbohydrate:-**

⇒ Carbohydrate metabolism is a the whole of the biochemical processes responsible for the metabolic formation, breakdown and interconversion of carbohydrates in living organism.

⇒ Carbohydrates are central to many essential metabolic pathways.

⇒ The most important carbohydrate in glucose, which can be break down via glycolysis enter into the Kreb's cycle and Oxidative phosphorylation to generate ATP.

⇒ Blood glucose level remain normal for the first two days; but they fall to low level as 50mg/dl.

⇒ The provision of adequate fuel to critical tissues like brain needs Constant supply of glucose. Certain tissues such as kidney, heart, and Skeletal muscles changes their primary fuel from glucose to fatty acids thus sparing glucose for the brain.

Q(3) Write Clinical Significance of Some of the enzymes.

(a) **Gamma-glutamyl transferase (GGT):-**

⇒ The gamma-glutamyl transferase (GGT) test may be used to determine the cause of elevated alkaline phosphatase (ALP).

⇒ Both ALP (Alkaline phosphate) and GGT are elevated in disease of the bile ducts and in some liver disease, but only ALP will be elevated in bone disease.

(b) Glucose 6-phosphate dehydrogenase (G-6-PD):-

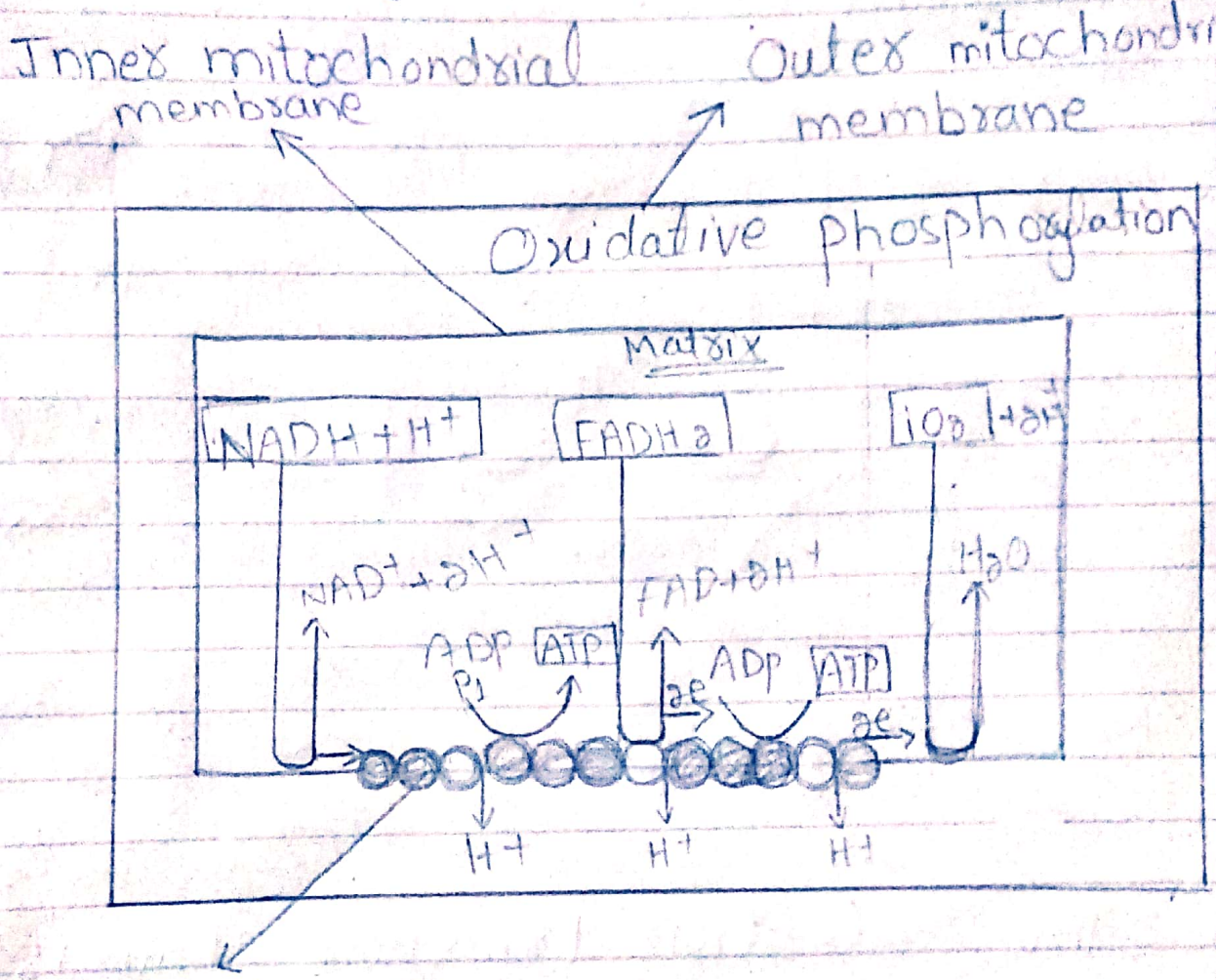
⇒ Glucose-6-phosphate dehydrogenase is a cytosolic enzyme that catalyzes the chemical reaction, D-glucose-6-phosphate + NADP+ + H_2O ⇌ 6-phospho-D-glucono-1,5-lactone + NADPH + H^+.

⇒ G6PD deficiency is a genetic abnormality that results in an inadequate amount of glucose-6-phosphate dehydrogenase (G6PD) in the Blood.

⇒ G6PD is also responsible for keeping red blood cells healthy so they can function properly and live a normal life span.

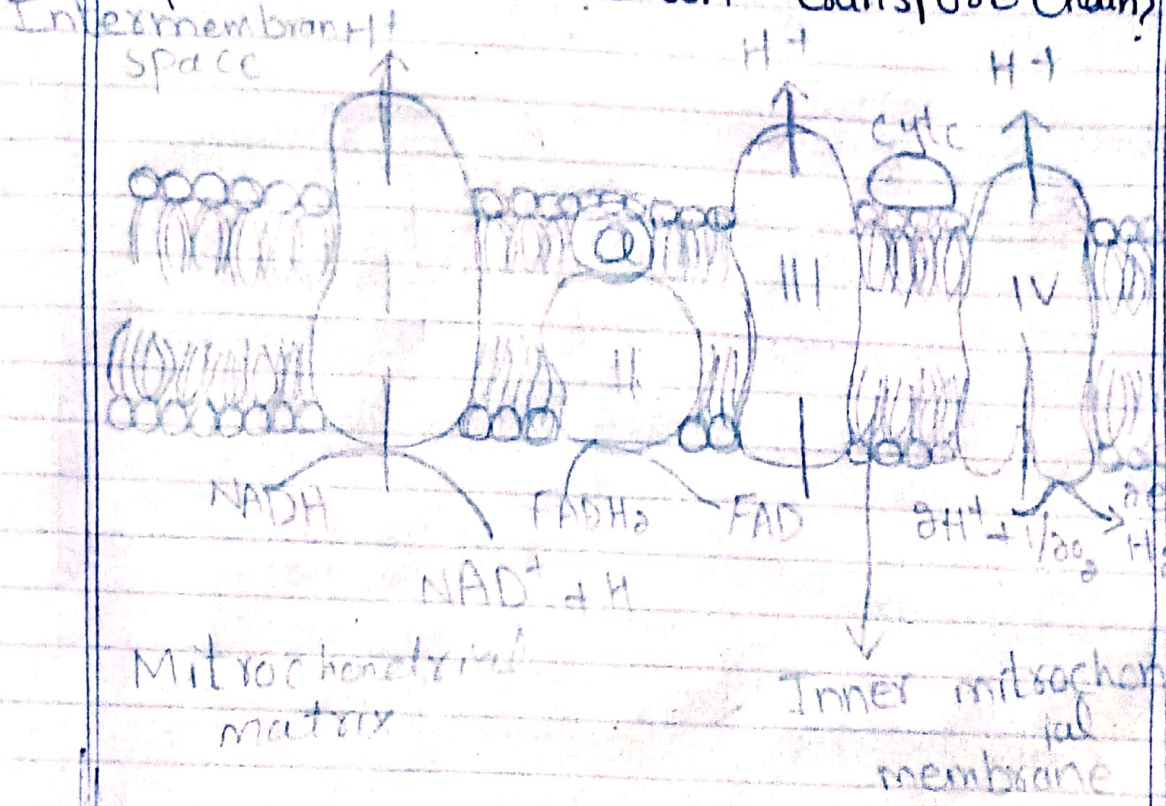
⇒ Hemolytic anemia develops when red blood cells are destroyed faster than the body can replace them, resulting in reduced oxygen flow to the organs and tissues. This can fatigue, yellowing and shortness of breath

Q4) Draw a diagram of oxidative phosphorylation?



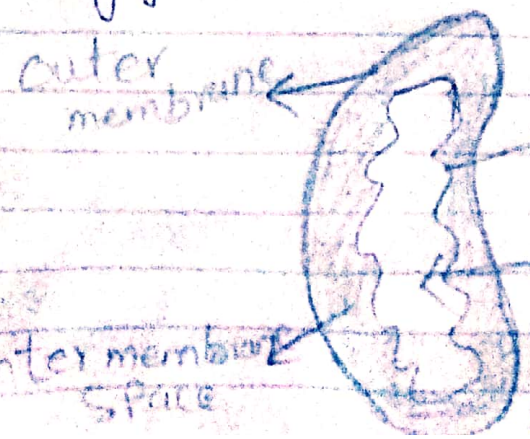
Oxidative phosphorylation

Q5 How electron trasfer take place in electron transport chain?



⇒ The electron transport chain is a Sexies of electron trasporters embedded in the inner mitochendrial membrane that shuttles electrons from NADH and FADH2 to molecular oxygen.

⇒ In the process, protons are pumped from the mitochondrial matrix to the intermembrane space, and oxygen is reduced to from water.



- Clusters of proteins present in mitochondrial inner membrane transfer electrons to form ATP's.
- Energy store in the form of hydrogen or electrons, NADH and FADH.
- The NADH and FADH are two electrons are present.
- In ETC various proteins are involved
- These 4 proteins are called complex proteins.
- Electrons move in complex 1 here FMN transfer 2e- electron to Fe-S to then these move to Q
- Then Q transfer these e- to complex 3, these then move to different proteins and pass to complex 4, last e- acceptor protein in cyto a 3.
- H^+ present in ~~cortex~~ matrix.
- water synthesis take place in ETC and in Krebs cycle CO_2 synthesis takes place.
- So at every step redox reaction is happening.