**Subject:**



**Submitted by:**

Suman Ullah KhanID:15327
(DPT4th semester)
**Submitted to: Ma’am kulsoom**
**Dated:3/6/2020**

**Department of Doctor of Physiotherapy
Iqra National University Peshawar**

**Q1). Write down the components of extra cellular matrix?**

Ans. Highly viscous proteoglycans (heparin sulfate, keratin sulfate, chondroitin sulfate), which cushions cells.

. insoluble collagen fibers, which provides strength and resilience.

. Soluble multiadhesive extracellular matrix proteins ( fibronectin, laminin) which bind proteoglycans and collagen fibers to receptors on the cell surface.

Q2**) How much collagen protein present in mammals and what is the function of collagen in body?**

Ans. As the main component of connective tissue it is the most abundant protein in mammals making up from 25% to 35% of the whole body protein content. Collagen consists of amino acids bound together to form a triple helix of elongated fibril known as a collagen helix.

**Functions of collagen in body:**

Collagen helps to give strength to the body and also protects structures like the skin by preventing absorption and spreading pathogens substances, environmental toxins, micro organisms and cancerous cells. Collagen protein is the cement that holds everything together.

Q3) **Write down the functions of proteoglycan?**

Ans. Proteoglycans are a major components of the animal extracellular matrix, the filter substance existing between cels in an organisms. Here they form large complexes both to other proteoglycans, to hyaluronan, and to fibrous matrix proteins such as collagen. Functions of herpam sulfate proteoglycans in cell signaling during development in particular HSPGs play crucial role in regulating key development signaling pathways such as the wnt, HEDGEHOG, transforming growth factors beta and fibroblast growth factor pathways.

**Q4) How many proteins involve in electron transport chain? Write down their names?**

Ans. There are 4 proteins complexes(labeled complex I-IV) in the electron transport chain which are involved in moving electrons from NADH and FADH2 molecular oxygen. Complex I establishes the hydrogen ion gradient by pumping four hydrogen ions across the membrane from the matrix into the intermembrane space.

**Names involved are as follow:**

1. Complex I. NADH-Q oxidoreductase
2. Complex II. Succinate- Q reductase
3. Complex III. Quinol—cytochrome –c reductase
4. Complex IV. Cytochrome c oxidase

**Q5)Name the four steps of glycogenesis?**

Ans. Step 1. Pyruvate gets converted into phosphoenolpyruvate. This is the step that requires a sub step in order for it to occur. When phosphoenolpyruvate is converted into pyruvate in glycolysis a lot of energy is released. So doing the reverse is not energy favourable. This is why two steps are needed. The sub step needs to be used. The first step adds a carbon dioxide into the puruvate forming ocaloacetate by then removing the carbon dioxide the energy is created to add the phosphate into the pyruvate and rearrange the double bond to form phosphoenolpyruvate. After phosphate is formed the steps are similar to glycolysis but in the reverse. Most of these steps are just rearranging the previous compound.

2) Phospohoenolpyruvate rearranged into 2-phosphoglycerate

3) 2-phosphoglycerate rearranges into 3-phosphoglycerate.

1. 4) 3-phosphoglycerate gets another phosphate added froming 1,3- bisphosphoglycerate.

**Q6)Write down the steps of glycolysis?**
 Ans. Step1. A phosphate group is traasnfered from ATP to glucose making glucose 6 phosphate is more reactive than glucose and the addition of the cell since glucose with a phosphate cant readily cross the membrane

step2. Glucose 6 phosphate is converted into its isomer fructose 6 phosphate.

step3. A phosphate group is transferred form ATP to fructose 6 phosphate producing fructose 1 6 biphosphate this step is catalyzed by the enzyme phosphofructokinase which can be regulated to speed up or slow down the glycolysis pathway

step4. Fructose 1 6 bisphosphate splits to form three carbon sugars dihydroxyacetone phosphate (DHAP) and glyceraldehyde-3- phosphate- can directly continue through the next steps of glycolysis

step5. DHAP is converted into glyceraldehyde-3-3phosphate. The two molecules exist in equilibrium but the equilibrium is pulled strongly downward in the scheme of the diagram above as glyceraldehyde-3-phosphate is used up. Thus all of the DHAP is eventually converted.

step6. Two half reactions occur simultaneously 1) Glyceraldehyde-3-phosphate (one of the three carbon sugars formed in the initial phase) is oxidized and 2) NAD+ is reduced to NADH and H+. The overall reaction is exergonic, releasing energy that is then used to phosphorylate the molecule formin 1,3-bisphosphoglycerate.

step7. 1,3-bisphosphglycerate donates one of its phosphate groups to ADP, making a molecule of ATP and turning into 3- PHOSPHOGLYCERATE in the process.

step8. 3-phosphoglycerate is converted into its isomer, 2-phosphoglycerate.

step9. 2-PHOSPHOGLYCERATE loses a molecule of water becoming phosphoenolpyruvate (PEP). PEP is an unstable molecule poised to lose its phosphate group in the final step of glycolysis.

step10. PEP readily donates its phosphate group to ADP making a second molecule of ATP as it loses its phosphate PEP is converted to pyruvate the end product of glycolysis.

 **Q7 How isocitrate is converted to succinyl CoA in krebs cycle? Write in one step reaction?**

Ans. Reaction 1: formation of citrte
The first reaction of the cycle is the condensation of acetyl-CoA with oxaloacetate to form citrate catalyzed by citrate synthase
Once oxaloacetate is joined with acetyl coA a water molecule attacks the acetyl leading to the release of coenzyme A from the complex

Reaction 2: The citrate is rearranged to form an isomeric form isocitrate by an enzyme in this reaction a water molecule is removed from the citric acid and then put back on in another location. The overall effect of this conversion is that the –OH group is moved from the 3 to the 4 position on the molecule. This transformation yields the molecule isocitrate.