

**Higher Human Biology**

**Human Cells: Cellular Respiration (Key area 7& 8)**

By the end of this topic I will be able to:

**Key area 7 Cellular respiration**

1. State that ATP is used to transfer energy in metabolic pathways and cellular processes.
2. Describe phosphorylation.
3. Describe the process of glycolysis where glucose is broken down to form pyruvate in the cytoplasm.
4. Understand that respiration progresses via the aerobic pathway in the presence of oxygen, and anaerobically in its absence (fermentation).
5. Describe the breakdown of pyruvate to an acetyl group that binds with coenzyme A to enter the citric acid cycle as acetyl coA.
6. Describe the steps of the citric acid cycle ( in the matrix of the mitochondria) to generate ATP while releasing CO2 and regenerating oxaloacetate.
7. Give an account of the action of dehydrogenase enzymes in removing hydrogen ion and electrons from respiratory substrates.
8. State that the coenzyme NAD carries hydrogen ions and electrons and releases them to the electron transport chain.
9. Describe the electron transport chain (on the inner membrane of the mitochondria) and its bulk generation of ATP.
10. Give a detailed explanation of ATP synthesis including the action of ATP synthase.
11. State that oxygen is the final hydrogen & electron acceptor which combine together to form water.

**Key area 8 Energy systems in muscle cells**

1. Accurately describe the formation and accumulation of lactate in anaerobic conditions by the transfer of hydrogens ions to pyruvate from NADH to maintain the NAD needed to sustain glycolysis.
2. State that as lactate accumulates, muscles become fatigued and the oxygen debt which can be repaid when oxygen is available again and lactate can be converted back to pyruvate.
3. Differentiate between different muscle fibre types and the properties of each.