

Biology Lecture Notes

Oxidative Phosphorylation

>> Key Concepts:

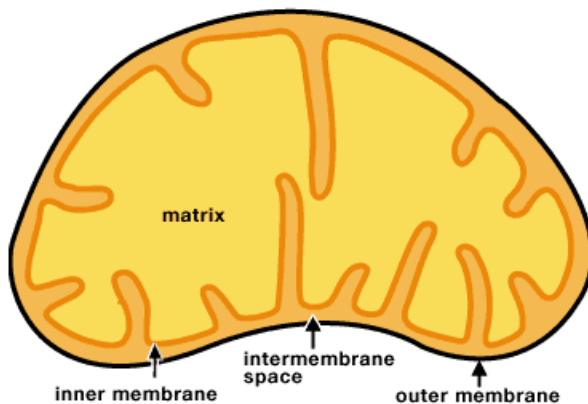
Review of Respiration:

- Glucose is broken down into pyruvate through the process of glycolysis.
- Pyruvate moves into the mitochondria and is converted to acetyl CoA.
- Still in the mitochondria, acetyl CoA enters the Krebs cycle, where it is further broken down and many coenzymes are reduced.
- Electrons and protons from reduced coenzymes enter the electron transport chain where they are used to create a proton gradient across the inner mitochondrial membrane. This gradient will be used to drive the synthesis of ATP.

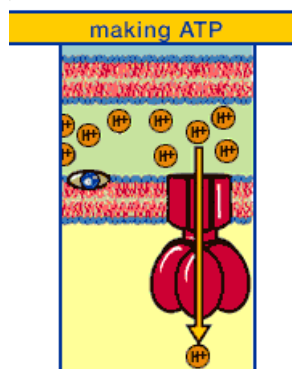
✎ **ATP synthase** is protein complex that can make ATP from the movement of H^+ down the concentration gradient set up by the electron transport chain.

✎ **Chemiosmosis** describes the movement of ions down a gradient. This movement of ions drives the production of ATP.

✎ **Oxidative phosphorylation** is the process of ATP production that is driven by the oxidation (and reduction) reactions that take place in the electron transport chain.



Mitochondria have a double membrane. The inner membrane is highly folded and encloses the mitochondrial **matrix**. The folds of the inner membrane are called **cristae**. The space between the inner and outer membrane is called the **intermembrane space**.



As the H^+ flows down a concentration gradient through ATP synthase, ATP is made.

Energy gained from the transfer of electrons is used to pump H^+ into the intermembrane space of the mitochondria. This concentration gradient causes one side of the membrane to have a charge while the other side has little to no charge. H^+ will diffuse across the membrane through **ATP synthase**. The downhill flow of H^+ through ATP synthase drives the production of ATP.