**Biology 101: Cellular Respiration**

**Key Concepts**: Mitochondria, ATP, Glycolysis, Krebs Cycle, Electron Transport Chain

**1. Overview**

Cellular respiration is the process by which cells convert glucose and oxygen into **ATP (adenosine triphosphate)**, the cell’s energy currency.  
**Equation**:  
C6H12O6+6O2→6CO2+6H2O+ATP*C*6​*H*12​*O*6​+6*O*2​→6*CO*2​+6*H*2​*O*+*ATP*

**2. Stages of Cellular Respiration**

**a. Glycolysis**

* Occurs in the **cytoplasm**.
* Breaks 1 glucose molecule into 2 pyruvate molecules.
* Produces **2 ATP** and **2 NADH**.

**b. Krebs Cycle (Citric Acid Cycle)**

* Takes place in the **mitochondrial matrix**.
* Generates **2 ATP**, **6 NADH**, and **2 FADH₂** per glucose.

**c. Electron Transport Chain (ETC)**

* Located in the **inner mitochondrial membrane**.
* Uses NADH/FADH₂ to produce **~34 ATP** via oxidative phosphorylation.

**3. Mitochondria Structure**

Labeled diagram (imagine an image here):

1. Outer membrane
2. Inner membrane (cristae)
3. Matrix

**Function**: The "powerhouse of the cell" where the Krebs Cycle and ETC occur.

**4. Key Terms**

* **ATP Synthase**: Enzyme that produces ATP in the ETC.
* **Anaerobic Respiration**: Occurs without oxygen (e.g., fermentation).
* **Chemiosmosis**: Movement of protons to drive ATP synthesis