Let glycolysis passing through the two membranes of

Let me tell you about the electrons and hydrogen ions vacation during cellular respiration. First they enter the cytoplasm. This is where the first step of cellular respiration occurs, glycolysis. Glycolysis passes energy in a form of high energy electrons from glucose to other paths or molecules in the cell.

Luckily this is an anaerobic procedure, so there is no need to find any oxygen. During this process many chemical steps are followed to transform glucose. 2 ATP molecules are produced for each molecule of glucose broken down.

In glycolysis 1 molecule of glucose, a 6-carbon compound is turned into 2 molecules of pyruvic acid also known as a 3-carbon compound. High energy electrons are stuck in the reduction of 2 molecules NAD to NADH. The speed of glycolysis can be a big advantage when the energy requirements of a cell suddenly increases. After hearing about glycolysis you may ask, where do the pyruvic acid molecules go when oxygen is not available? When the oxygen is not available, pyruvic acid molecules go into the second stage of cellular respiration called the Krebs Cycle. During this process, pyruvic acid is broken down into carbon dioxide. The Krebs cycle starts with the pyruvic acid produced by glycolysis passing through the two membranes of the mitochondria and into the matrix. As the Krebs cycle begins, acetyl-CoA adds the 2-carbon acetyl group to a 4-carbon molecule already present in the cycle, producing a 6-carbon molecule called Citric Acid. Citric acid is the first compound formed in this series of reactions.

Also during this process electrons are removed from acetyl CoA and these electrons reduce more NAD+, along with FAD. As the Krebs cycle continues, Citric Acid is broken down into a 4-carbon molecule, more carbon dioxide is released, and electrons are transferred to energy carriers. Lastly the last step is Electron Transport. The electron transport chain uses the high-energy electrons from glycolysis and the Krebs cycle to convert ADP into ATP. NADH and FADH2 pass their high-energy electrons to the electron transport chain. At the end of this chain there is an enzyme that produces water by combining electrons with hydrogen ions and oxygen. The electron transport chain cannot function without oxygen. Oxygen is the final electron acceptor of the electron transport chain.

When 2 high-energy electrons pass down this chain, their energy is used to transport hydrogen ions across the membrane. These hydrogen ions build up in the intermembrane space so that they are positively charged compared to the matrix, the innermost compartment of the mitochondria. The cell uses potential energy of the charge differences from Electron Transport by going through chemiosmosis. The actual production of ATP in cellular respiration takes place through the process of chemiosmosis. This involves the pumping of protons through special channels in the membranes of mitochondria from the inner to the outer compartment. This creates a proton H+ gradient.

After the gradient is accepted, protons spread down the gradient through ATP synthase. The ATP synthases spins, and with each rotation the enzyme takes an ADP molecule and attaches a phosphate group which produces ATP. When a pair of high energy electrons move down the chain, the energy is used to move H+ ions through the membrane. Then the ions quickly go back through the membrane to spin the ATP synthase, this is what creates all the ATP. Each pair of high energy electrons that move down the electron transport chain, provides enough energy to create about 3 molecules of ATP. Is it your turn to take a trip through cellular respiration?