

Electron Transport Chain

by Sophia



WHAT'S COVERED

In this lesson, you are going to learn the processes that occur in the electron transport chain phase of cellular respiration. Specifically, this lesson will cover:

1. Overview

Cellular respiration is the process in which cells make ATP, or adenosine triphosphate, which is energy for the cells. The **electron transport chain** is the third and final step of cellular respiration, and it occurs in the inner membrane of the mitochondria. The stages that come before it are glycolysis and the Krebs cycle.

You have some products from glycolysis being transferred into the electron transport chain and some products from the Krebs cycle also being transferred into the electron transport chain. The chains of reaction occur using the energy released by electrons to produce ATP.

The vast majority of ATP is being produced in this third step, and that energy is being produced by electrons. Each chain of reaction that occurs is called an electron transport system.



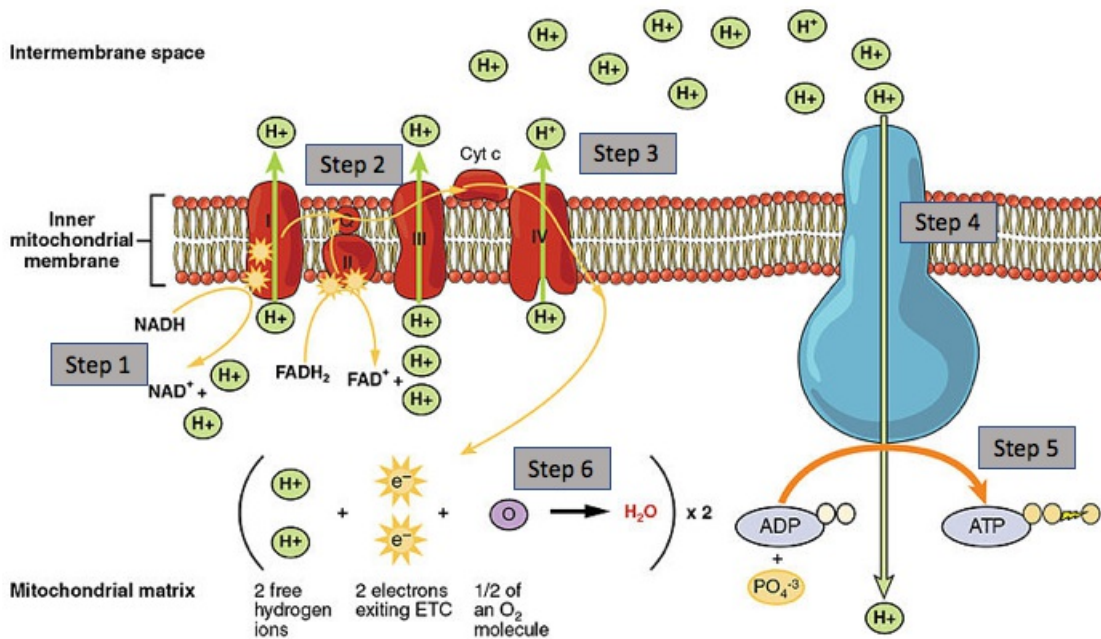
TERM TO KNOW

Electron Transport Chain

The third and final phase of cellular respiration in which electrons are used to produce 32 molecules of ATP.

2. Electron Transport Chain

As mentioned earlier, you have products from glycolysis and from the Krebs cycle that will enter into your electron transport chain.



STEP BY STEP

Step 1: Electrons Transferred

Electrons that were picked up (via NAD⁺ and FAD) during glycolysis or the Krebs cycle are transferred to the electron transport chain.

Step 2: Hydrogen Release

Hydrogen picked up by molecules in the inner membrane are released to the intermembrane space (the space between the mitochondria's inner and outer membranes) when they pick up and donate electrons.

Step 3: Hydrogen Gradient

Molecules, when they pick up an electron, will also pick up the hydrogen. That hydrogen will move from the inner membrane to the intermembrane space, while the electron will move on to somewhere else. This is going to produce the gradient of hydrogens in the outer membrane.

Step 4: Flow Through Enzymes

Once you have this gradient in the outer membrane, hydrogens are naturally going to start flowing back into the mitochondrial matrix (the space inside the inner membrane) to even out that concentration; they're going to flow through enzymes.

Step 5: ATP Formation

These enzymes will catalyze the formation of ATP from ADP and phosphate. We'll have ADP molecules which will then gain a phosphate and turn into ATP, which is energy, as the hydrogen moves through this enzyme.

Step 6: Form H₂O

Oxygen molecules outside of the mitochondria will fuse with hydrogen molecules to form H₂O. The electron is giving hydrogen and oxygen energy in order to be able to bond and form H₂O, which is water.



BIG IDEA

In this process, we are actually forming 32 molecules of ATP. If you remember back to glycolysis and the Krebs cycle, each of those is only forming two molecules of ATP. This stage of cellular respiration is forming the vast majority of ATP. If we add the ATP from glycolysis and the Krebs cycle, we would have a net total of 36 ATP produced by the end of cellular respiration.



SUMMARY

This lesson has been a brief **overview** of the **process** of the **electron transport chain**, which is the third and final step of cellular respiration.

Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND



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TERMS TO KNOW

Electron Transport Chain

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