

The electron transport chain in the mitochondrion is the site of oxidative phosphorylation in eukaryotes. The NADH and succinate generated in the citric acid cycle are oxidized, providing energy to power ATP synthase.

Photosynthetic electron transport chain of the thylakoid membrane.

An electron transport chain (ETC) is a series of complexes that transfer electrons from electron donors to electron acceptors via redox (both reduction and oxidation occurring simultaneously) reactions, and couples this electron transfer with the transfer of protons ( $H^+$  ions) across a membrane. This creates an electrochemical proton gradient that drives the synthesis of adenosine triphosphate (ATP), a molecule that stores energy chemically in the form of highly strained bonds. The molecules of the chain include peptides, enzymes (which are proteins or protein complexes), and others. The final acceptor of electrons in the electron transport chain during aerobic respiration is molecular oxygen although a variety of acceptors other than oxygen such as sulfate exist in anaerobic respiration.

Electron transport chains are used for extracting energy via redox reactions from sunlight in photosynthesis or, such as in the case of the oxidation of sugars, cellular respiration. In eukaryotes, an important electron transport chain is found in the inner mitochondrial membrane where it serves as the site of oxidative phosphorylation through the action of ATP synthase. It is also found in the thylakoid membrane of the chloroplast in photosynthetic eukaryotes. In bacteria, the electron transport chain is located in their cell membrane.

In chloroplasts, light drives the conversion of water to oxygen and  $NADP^+$  to NADPH with transfer of  $H^+$  ions across chloroplast membranes. In mitochondria, it is the conversion of oxygen to water, NADH to  $NAD^+$  and succinate to fumarate that are required to generate the proton gradient.

Electron transport chains are major sites of premature electron leakage to oxygen, generating superoxide and potentially resulting in increased oxidative stress.