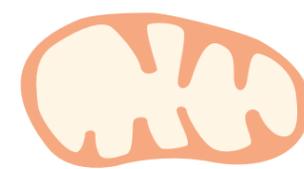
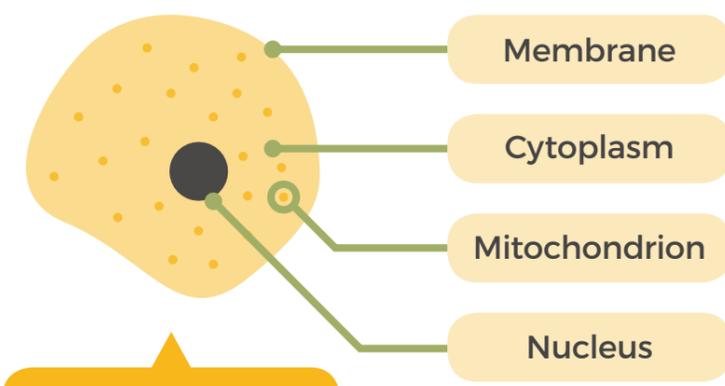


THE MIGHTY MITOCHONDRION & RESPIRATION



MITOCHONDRIA AND RESPIRATION

Mitochondria are found in almost all of the cells in our bodies. They play a key role in respiration, the chemical process which releases energy from food substances and traps it in the form of adenosine triphosphate (ATP). Aerobic respiration requires oxygen and occurs in several stages, generating carbon dioxide and water as waste products.

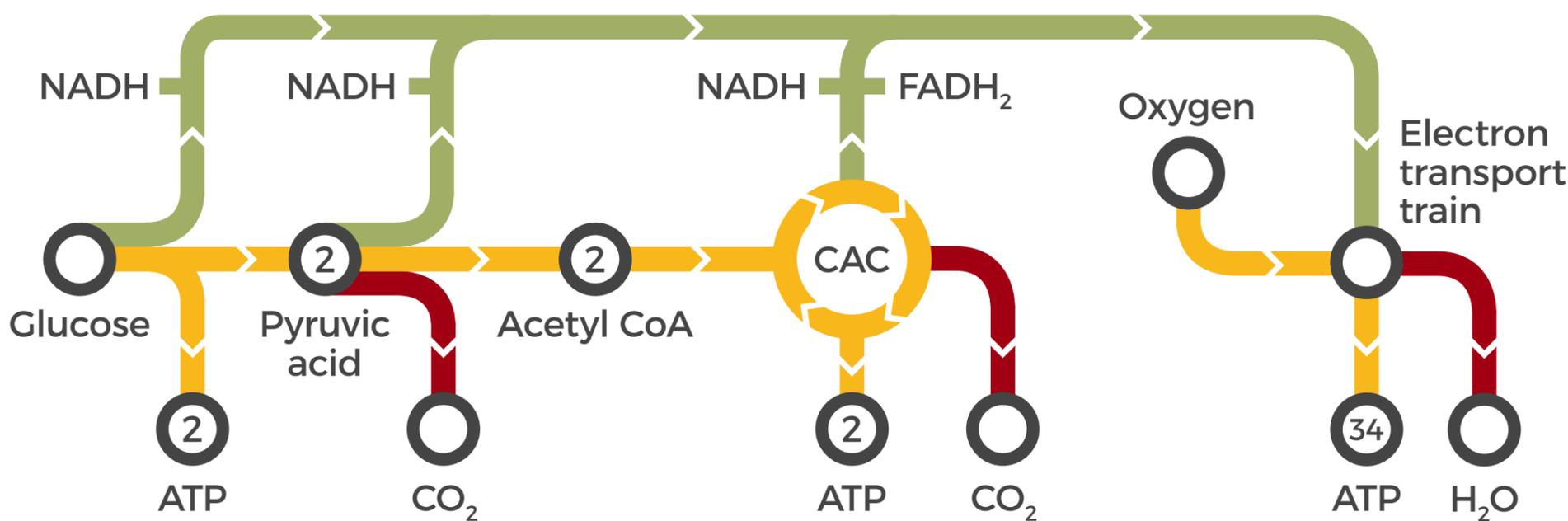


1-10,000 PER CELL
(varies depending on cell type)

MITOCHONDRION



HOW RESPIRATION GETS FROM GLUCOSE TO ATP – A SIMPLIFIED OVERVIEW



STAGE 1: GLYCOLYSIS

Glycolysis takes place in the cytoplasm. Glucose is broken down to pyruvic acid, generating ATP. Hydrogens are transferred to an hydrogen-carrying molecule, NAD, to form NADH.

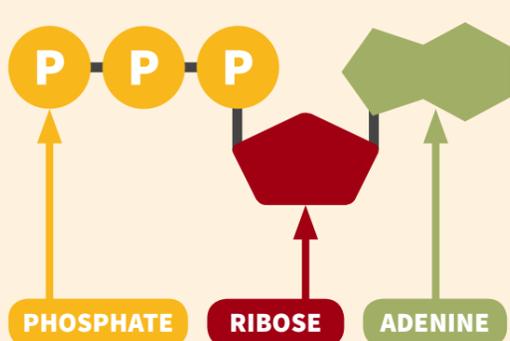
STAGE 2: CITRIC ACID CYCLE (CAC)

Mitochondria oxidise pyruvic acid, making carbon dioxide as a waste product. Then the citric acid cycle produces more ATP, carbon dioxide, and more hydrogen-carrying molecules.

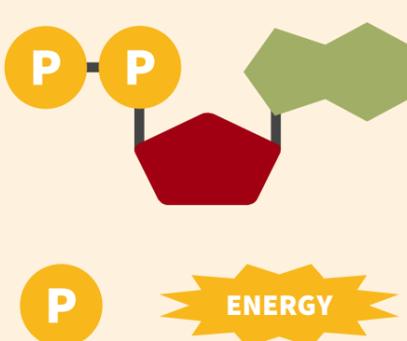
STAGE 3: CYTOCHROME SYSTEM

Hydrogen-carrying molecules made earlier generate a hydrogen ion concentration gradient in the mitochondrial membrane. This drives most of respiration's ATP production.

ADENOSINE TRIPHOSPHATE (ATP)



ADENOSINE DIPHOSPHATE (ADP)



GETTING ENERGY FROM ATP

ATP produced by respiration is used by your body's cells as a source of energy. ATP reacts with water to produce ADP and inorganic phosphate.

The energy needed to break the bonds in the reactants is less than is released when new bonds are formed in the products, so overall energy is released.

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