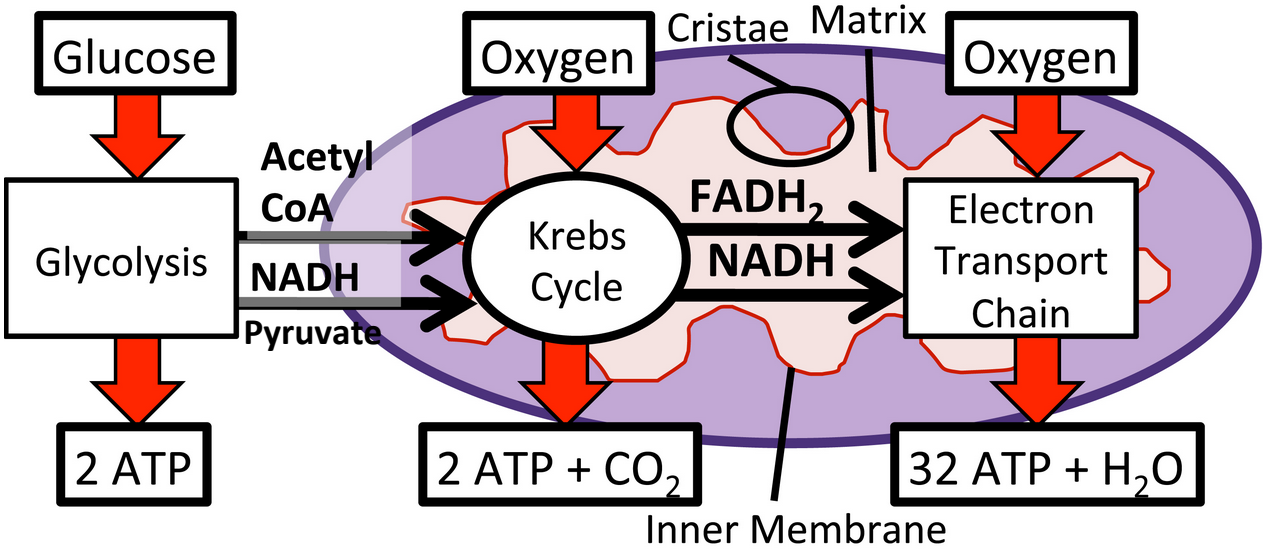
ATP Producers: Cellular Respiration & Photosynthesis

Cellular Respiration

$$O_2 + C_6H_{12}0_6 \rightarrow CO_2 + H_2O + Energy$$

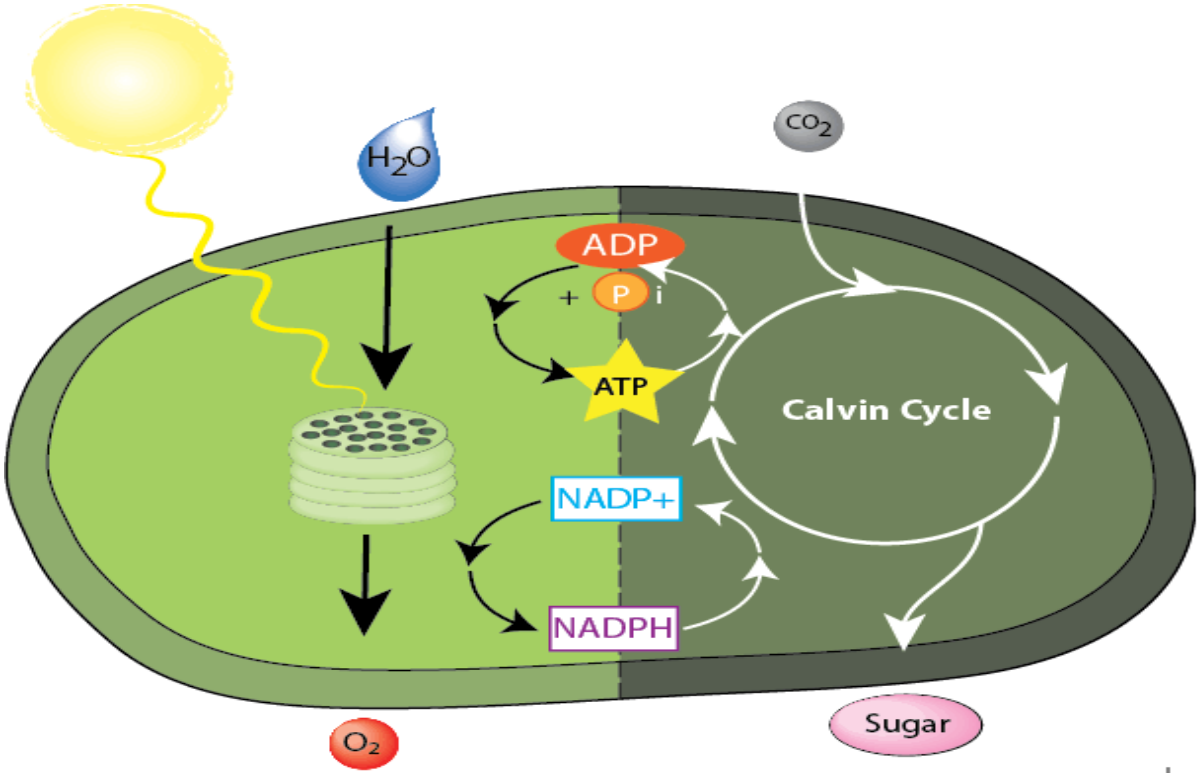


Stage, Site, Mechanism	Inputs	Outputs
Stage: *Glycolysis*	1) 2 ATP	2 ADP
Site: *Cytoplasm*	2) 4 ADP	4 ATP
Mechanism: *Substrate-level Phosphorylation*	3) 2 NAD^+	2 NADH
	4) 1 Glucose	2 pyruvate
Stage: *Oxidation of Pyruvate to Acetyl-CoA*	1) 2 pyruvate	1) CO_2
Site: *Mitochondrial Matrix*	2) 2 NAD^+	2) 2 NADH
Mechanism: *Oxidation*	3) CoA	3) 2 Acetyl CoA
Stage: *Citric Acid Cycle*	1) 2 Acetyl CoA	1) 4 CO_2
Site: *Mitochondrial Matrix*	2) 2 ADP	2) 2 ATP
Mechanism: *Substrate-level Phosphorylation*	3) 6 NAD^+	3) 6 NADH
	4) 2 FAD	4) 2 $FADH_2$
Stage: *Oxidative Phosphorylation/ATP Synthesis*	1) 10 NADH	1) 10 NAD^+
Site: *Mitochondrial Matrix*	2) 2 $FADH_2$	2) 2 FAD
Mechanism: *Electron Transport, Chemiosmosis*	3) 32 ADP	3) 32 ATP
	4) 6 O_2	4) 6 H_2O

ATP Producers: Cellular Respiration & Photosynthesis

Photosynthesis

$$6\ CO_2 + 6\ H_2O + \text{Energy (light)} \rightarrow C_6H_{12}O_6 + 6\ O_2$$



Stage, Site, Mechanism	Inputs	Outputs
Stage: *Light-Dependent Reactions* **Site:** *Membrane of Thylakoids in Chloroplasts* **Mechanism:** *Light-induced Oxidation-Reduction, Electron Transport, Chemiosmosis*	1) 2 H_2O 2) 3 ADP 3) 3 P_i 4) 2 $NADP^+$	1) O_2 2) 2 NADPH 3) ATP
Stage: *Calvin Cycle* **Site:** *Stroma of the Chloroplast* **Mechanism:** *Oxidation-Reduction, Carbon Fixation*	1) 3 CO_2 2) 6 NADPH 3) 5 H_2O 4) 9 ATP	1) 1 G3P 2) 2 H^+ 3) 6 $NADP^+$ 4) 9 ADP 5) 8 P_i