



Cellular Respiration and Fermentation

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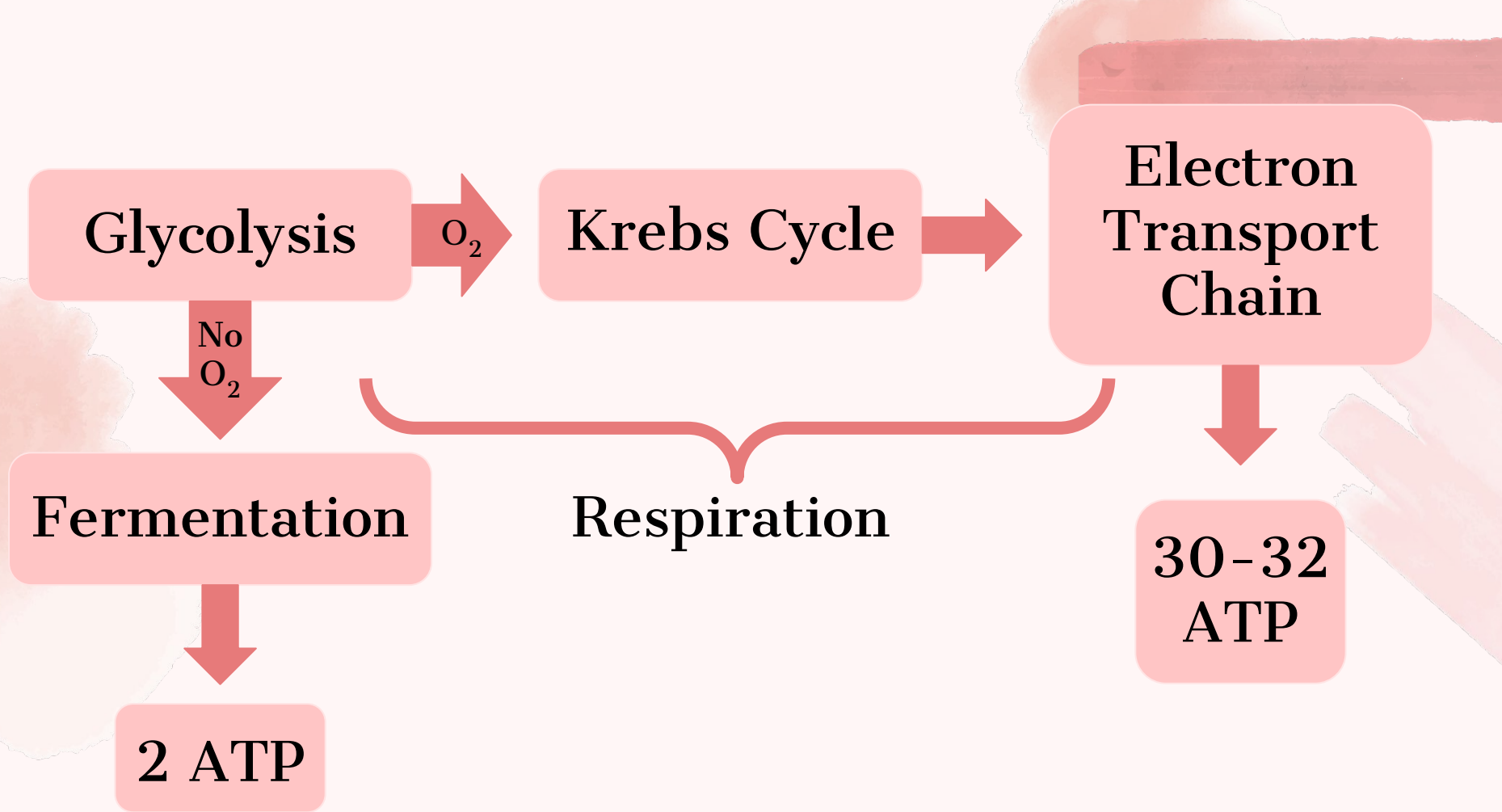
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Anaerobic
Respiration/
Fermentation



01

Overview



Energy Sources

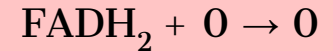
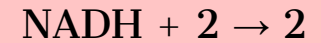
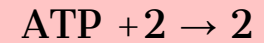
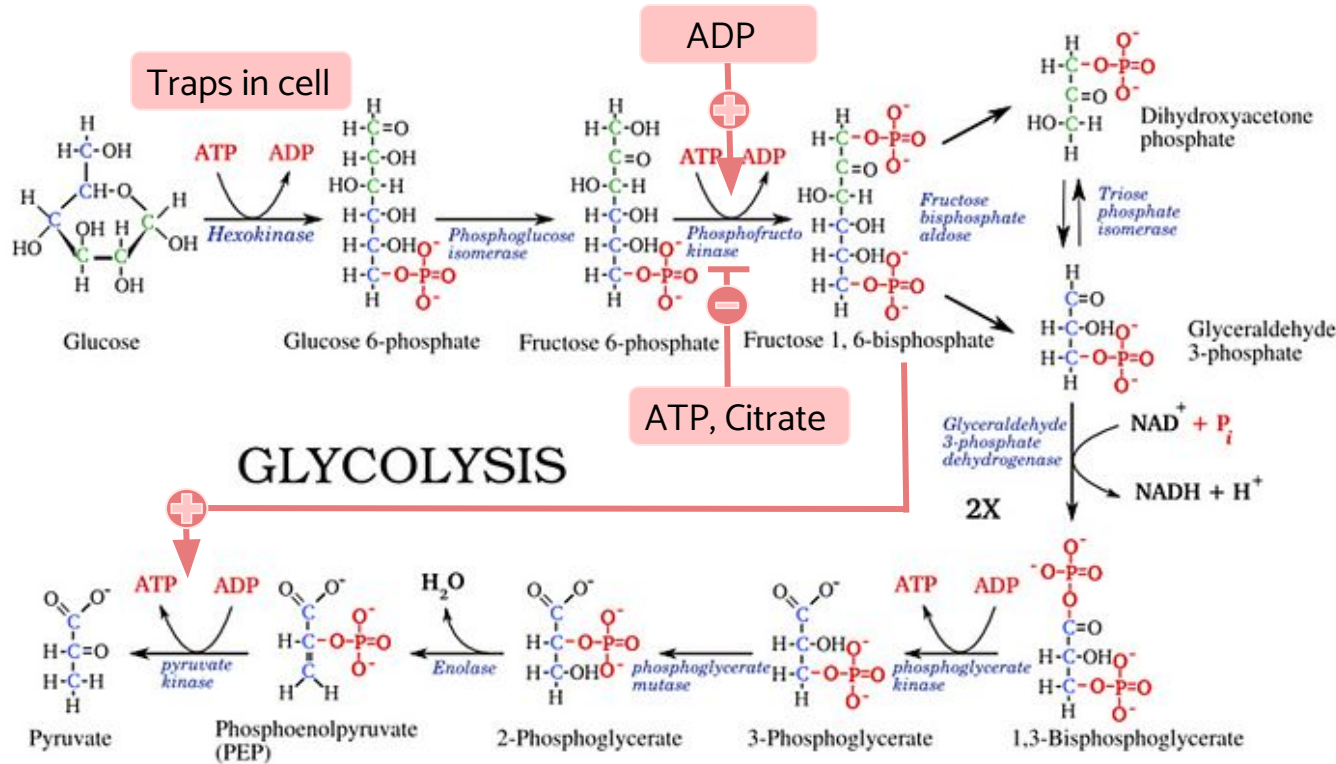
- **ATP** (Adenosine triphosphate)
 - Substrate-level phosphorylation: Gains ATP as a byproduct
 - Oxidative phosphorylation: Gains ATP from ETC
 - Activated/deactivated by kinases
- **NAD⁺/NADH** (Nicotinamide adenine dinucleotide)
 - ~2.5 ATP (3)
 - Niacin (B3)
 - Activated/deactivated by NADH dehydrogenase
- **FAD/FADH₂** (Flavin adenine dinucleotide)
 - ~1.5 ATP (2)
 - Riboflavin (B2)



02

Glycolysis

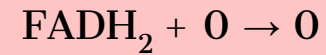
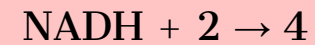
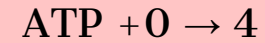
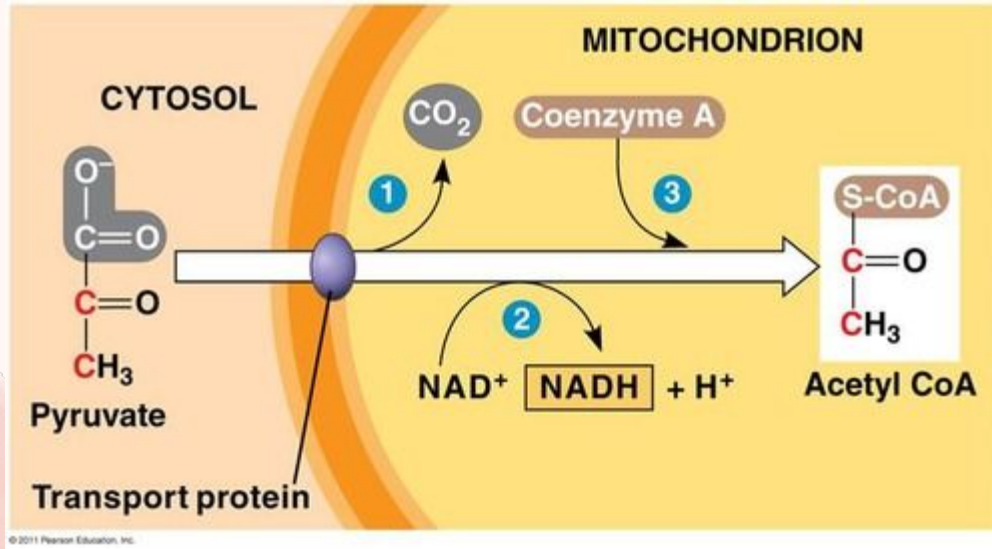
Glucose → 2 Pyruvate





03

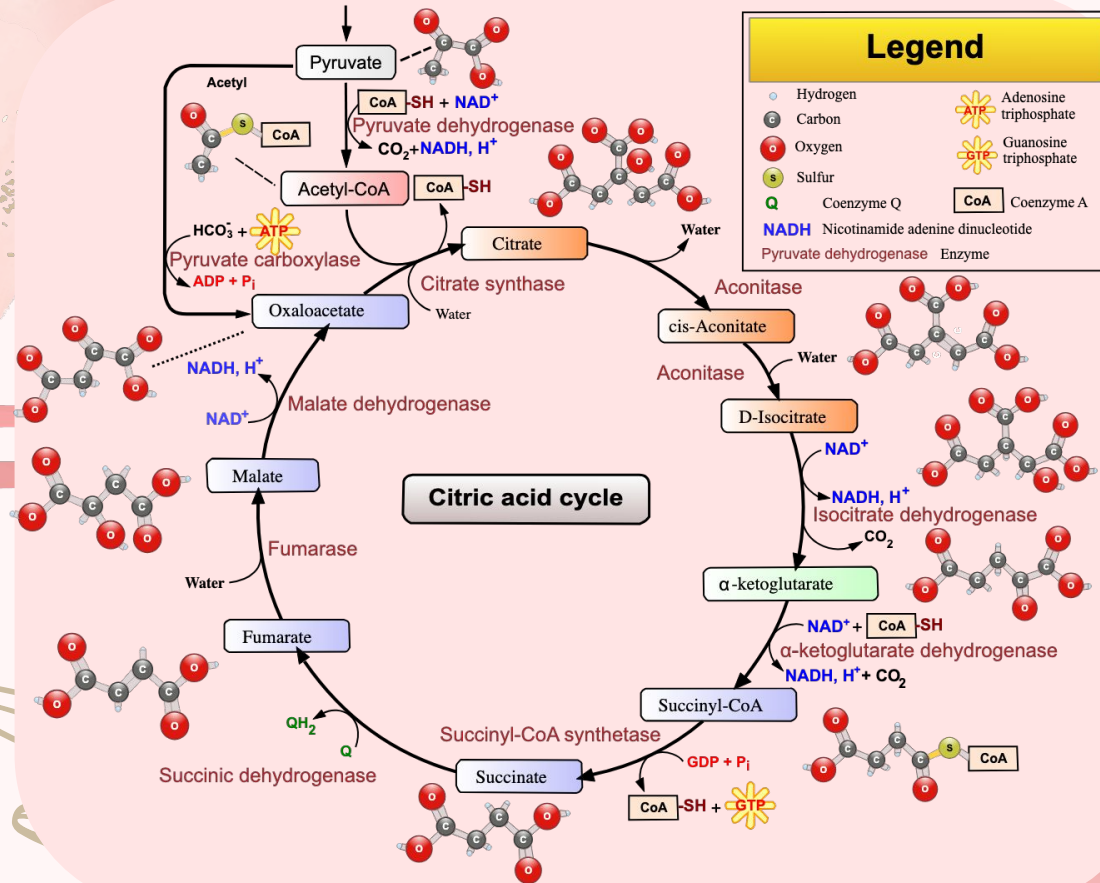
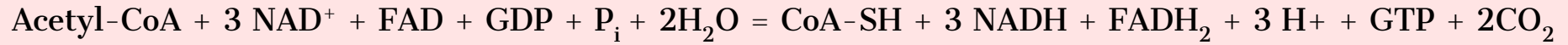
Intermediate Step



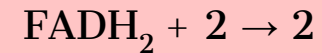
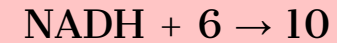
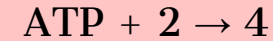


04

Krebs/Citric
Acid/Tricarboxylic Acid
Cycle



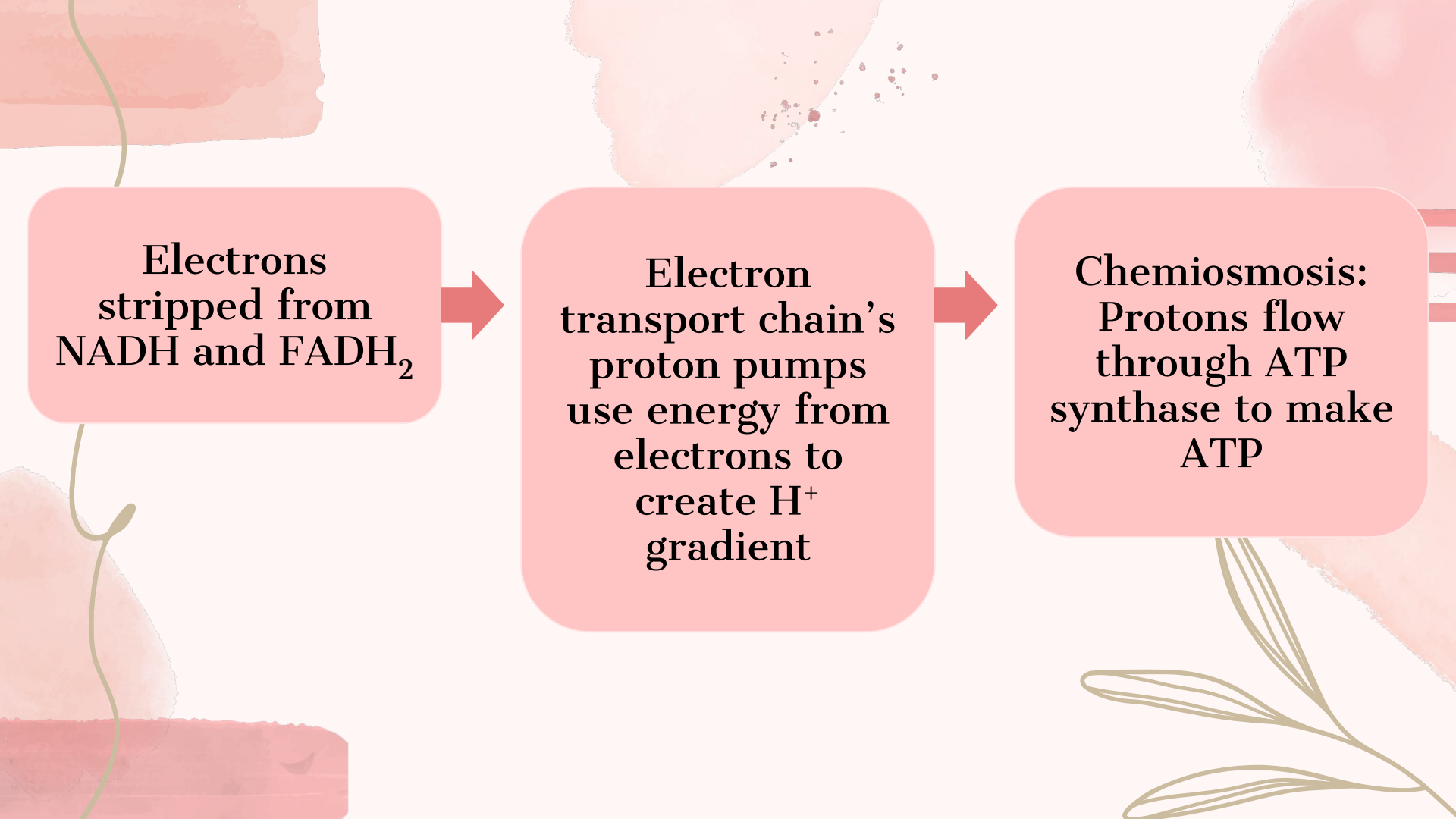
CAIKS SFMO





05

**Electron
Transport Chain**



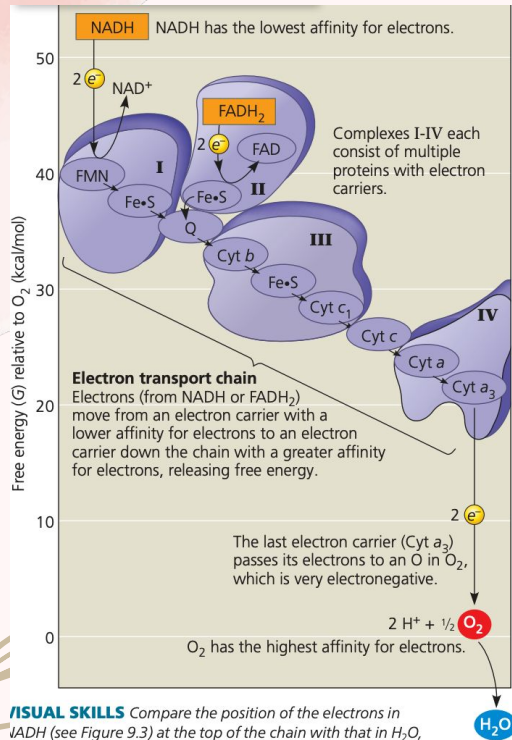
The diagram consists of three pink rounded rectangular boxes arranged horizontally, connected by red arrows. The background features abstract watercolor-style washes in shades of pink and red, with thin green line drawings of plant stems and leaves. The first box on the left contains the text 'Electrons stripped from NADH and FADH₂'. A red arrow points from this box to the middle box, which contains 'Electron transport chain's proton pumps use energy from electrons to create H⁺ gradient'. Another red arrow points from the middle box to the right box, which contains 'Chemiosmosis: Protons flow through ATP synthase to make ATP'.

**Electrons
stripped from
NADH and FADH₂**

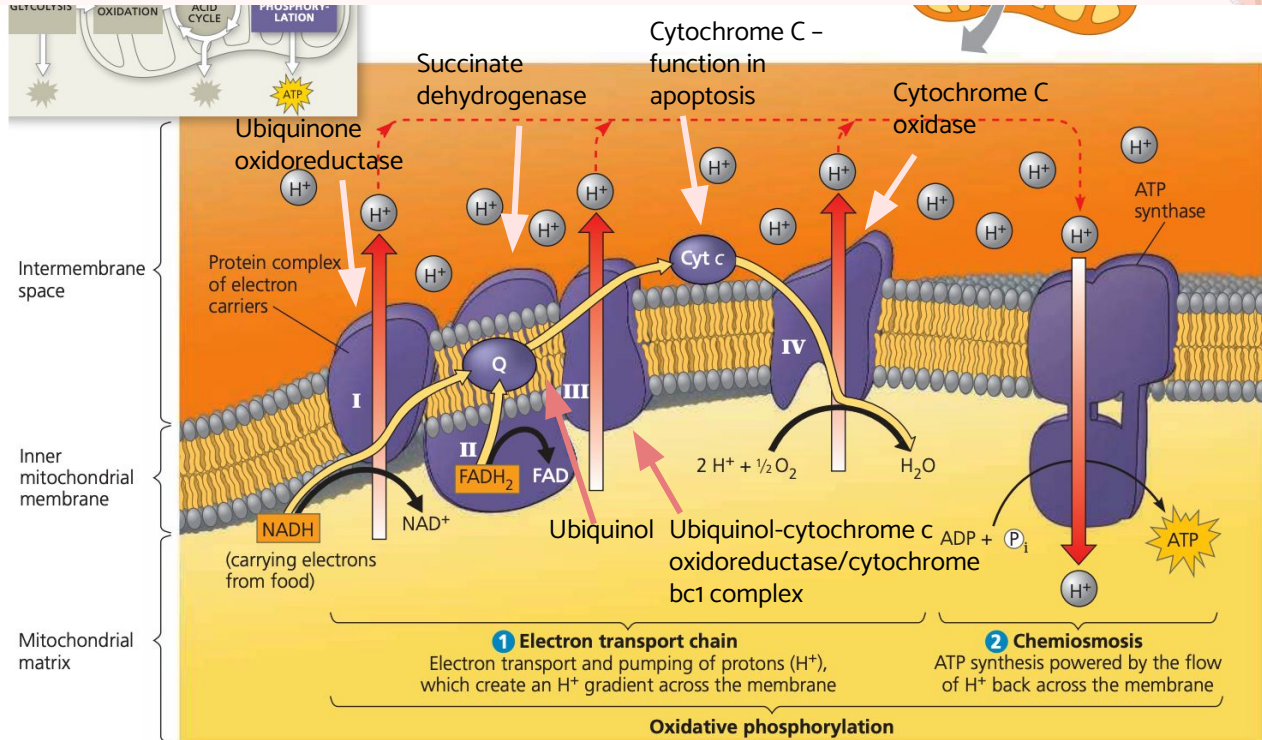
**Electron
transport chain's
proton pumps
use energy from
electrons to
create H⁺
gradient**

**Chemiosmosis:
Protons flow
through ATP
synthase to make
ATP**

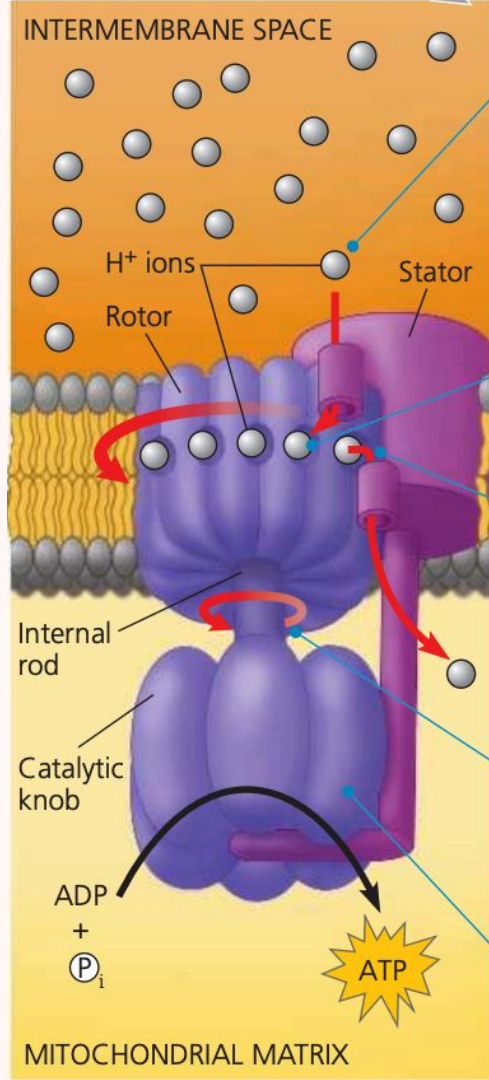
Electron Transport Chain



VISUAL SKILLS Compare the position of the electrons in IADH (see Figure 9.3) at the top of the chain with that in H_2O , at the bottom. Describe why the electrons in H_2O have less potential energy, using the term electronegativity.



ATP Synthase



ATP totals

Oxidative Phosphorylation

ATP +34 → 38

NADH -10 → 0

FADH₂ -2 → 0

Key	CO ₂	ATP	NADH	FADH ₂
Glycolysis	0	-2 +4	+2	0
Total	0	2	2	0
Intermediate	+2	0	+2	0
Total	2	2	4	0
Krebs	+4	+2	+6	+2
Total	6	4	10	2
ETC	0	+34	-10	-2
Total	6	38	0	0
Net Total w/ transport	6	38 - 2 36	0	0



06

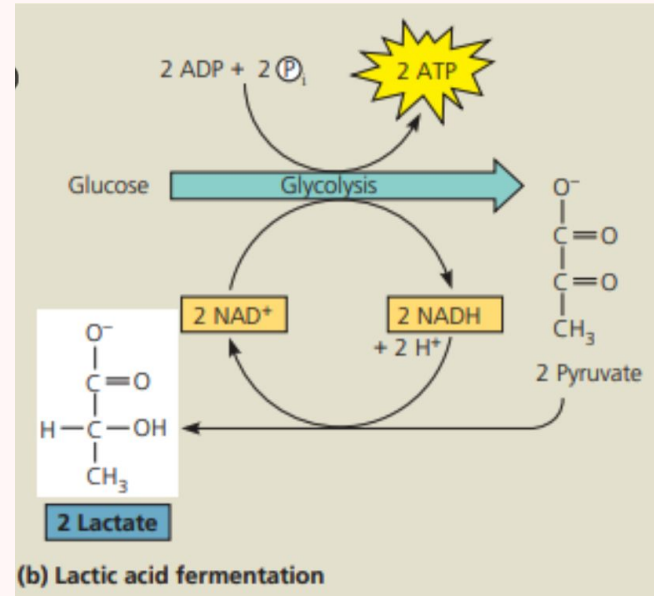
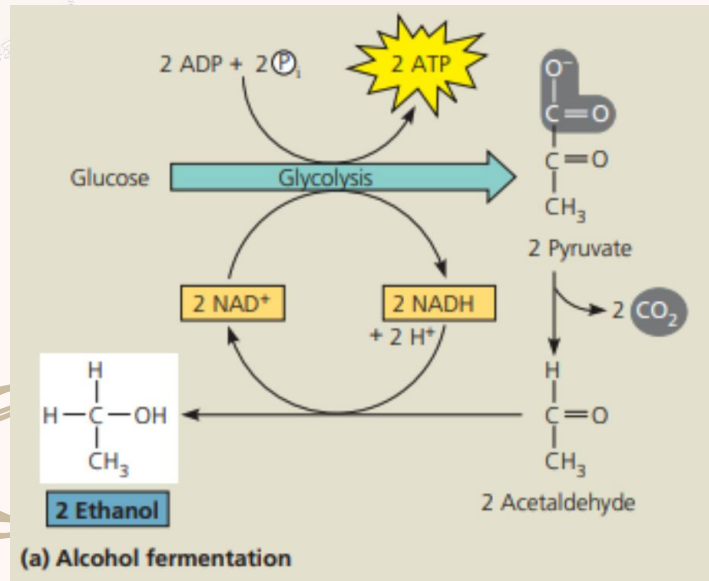
**Anaerobic
Respiration/
Fermentation**

Anaerobic Respiration

- The same as aerobic respiration, but using a different electron acceptor instead of oxygen
 - Sulfate (SO_4^{2-}) \rightarrow Hydrogen sulfide (H_2S)
 - $\text{CO}_2 \rightarrow \text{CH}_4$ (methanogens)

Fermentation

Recycles NAD^+





Thanks!

CRÉDITS: Ce modèle de présentation a été créé par **Slidesgo**, comprenant des icônes de **Flaticon**, des infographies et des images de **Freepik** et des illustrations de **Storyset**

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