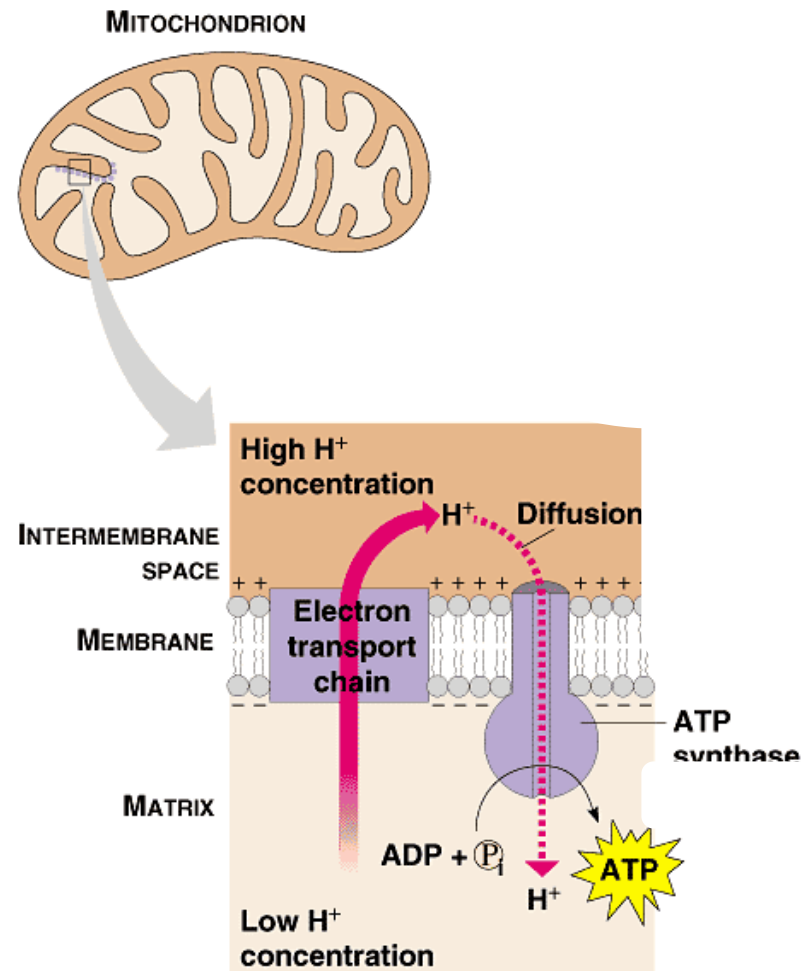


ELECTROCHEMICAL GRADIENT & CHEMIOSMOSIS



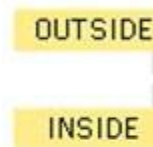
ELECTROCHEMICAL GRADIENT

Accumulation of protons in the intermembrane space creates **electrochemical potential energy**

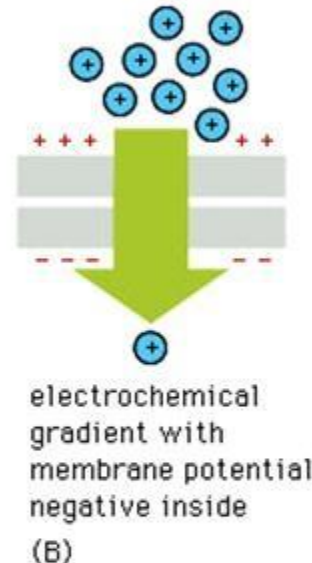


Electrochemical Gradient As A Driving Force For Ion Movement

high concentration
of + charged ion



low concentration
of + charged ion



As charged particles, movement of *ions* across a membrane is influenced by both their:

- concentration (chemical) gradient and
- the membrane potential (electrical gradient) across the membrane

These are combined in the term “**electrochemical gradient**”

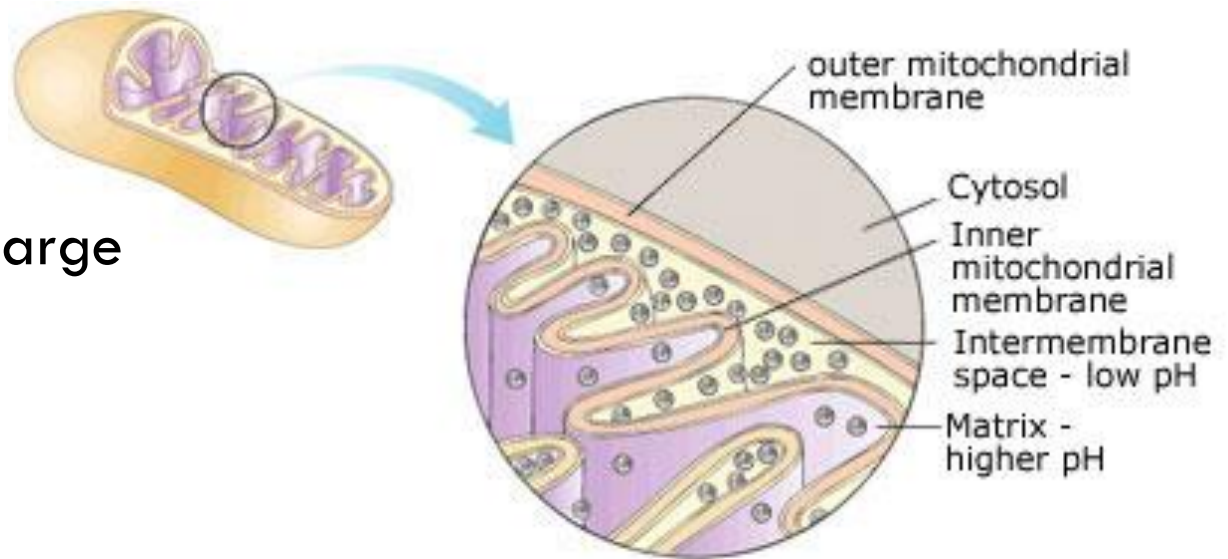
ELECTROCHEMICAL GRADIENT

Intermembrane space is:

- more **acidic** (more H^+)
- has a +ve charge

Matrix is:

- more **alkaline**
- lower positive charge



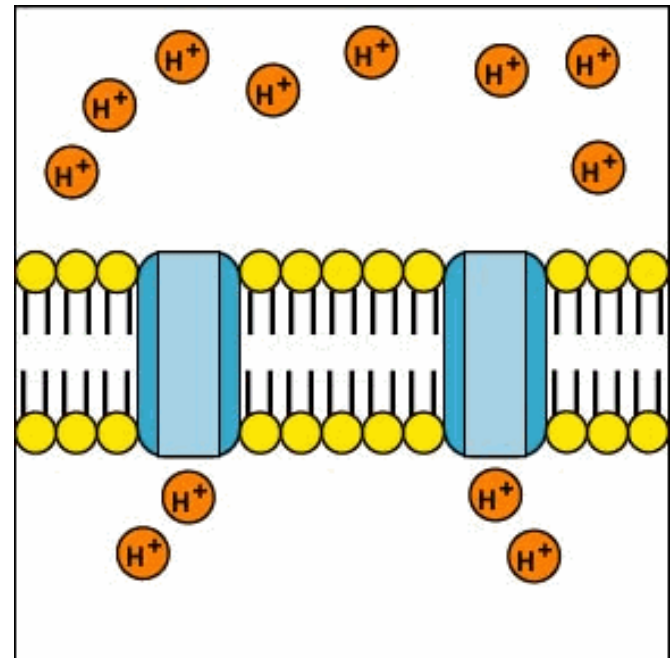
CHEMIOSMOSIS

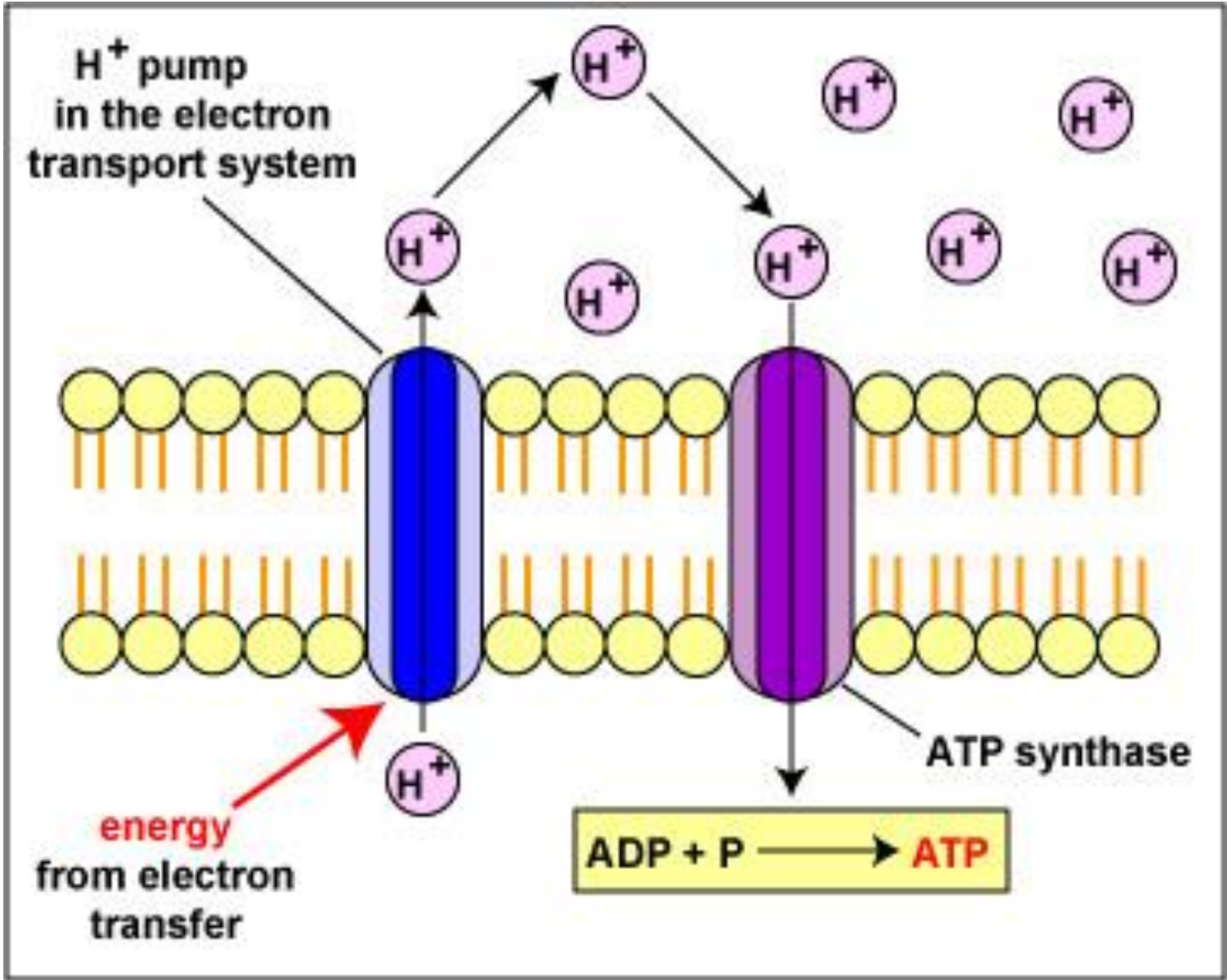
Movement of **ions** across a selectively permeable membrane, down their electrochemical gradient.

PMF: Proton-motive force

- energy stored in the form of an electrochemical gradient of protons across a membrane

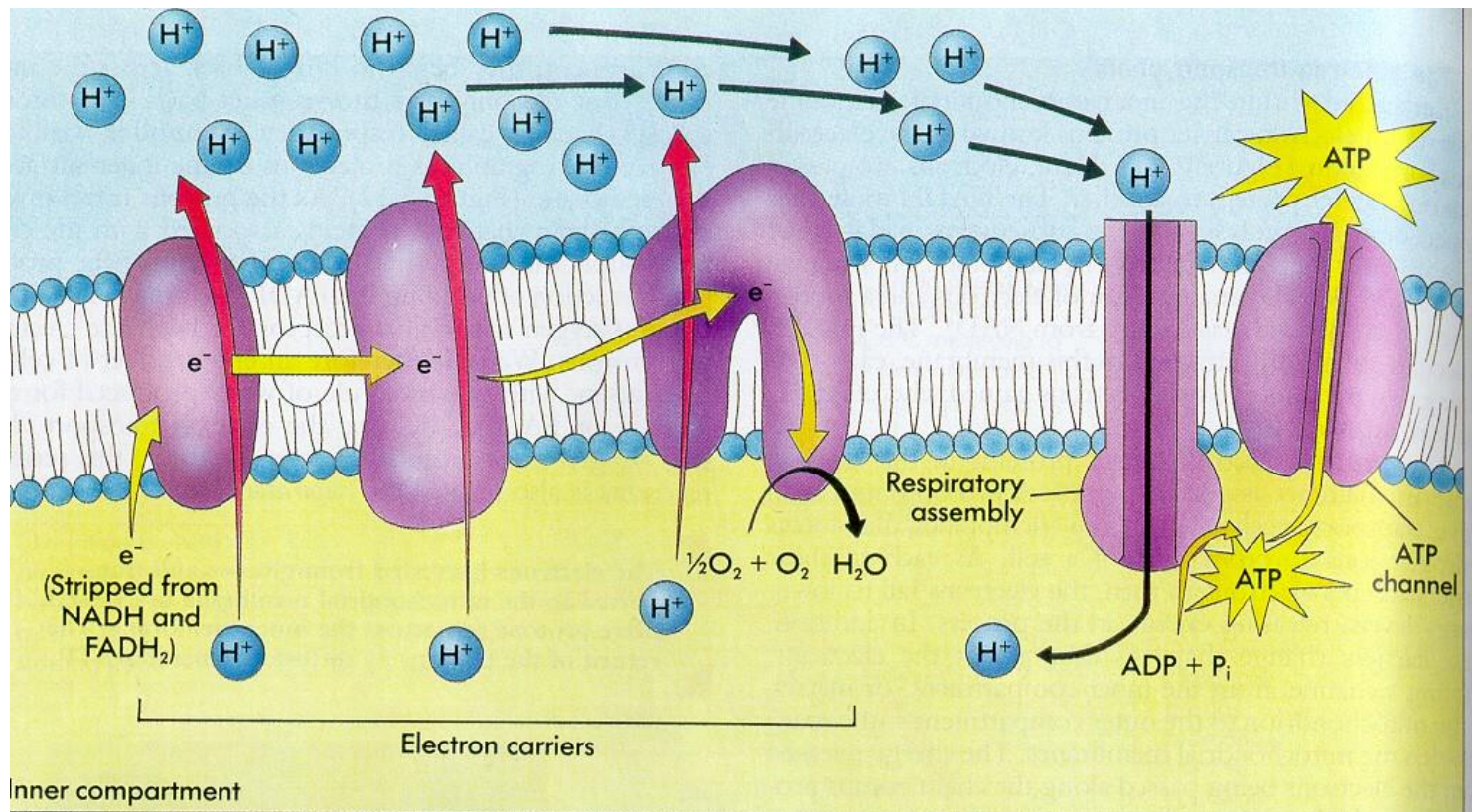
PMF **allows** H^+ protons to **enter** ATP synthase complex and synthesize ATP





OXIDATIVE PHOSPHORYLATION

Combination of an electrochemical gradient and chemiosmosis



OXIDATIVE PHOSPHORYLATION

For every H^+ (proton) through the proton channel 1 ATP is formed:

- **NADH** yields **3 ATP**
- **FADH₂** yields **2 ATP**

