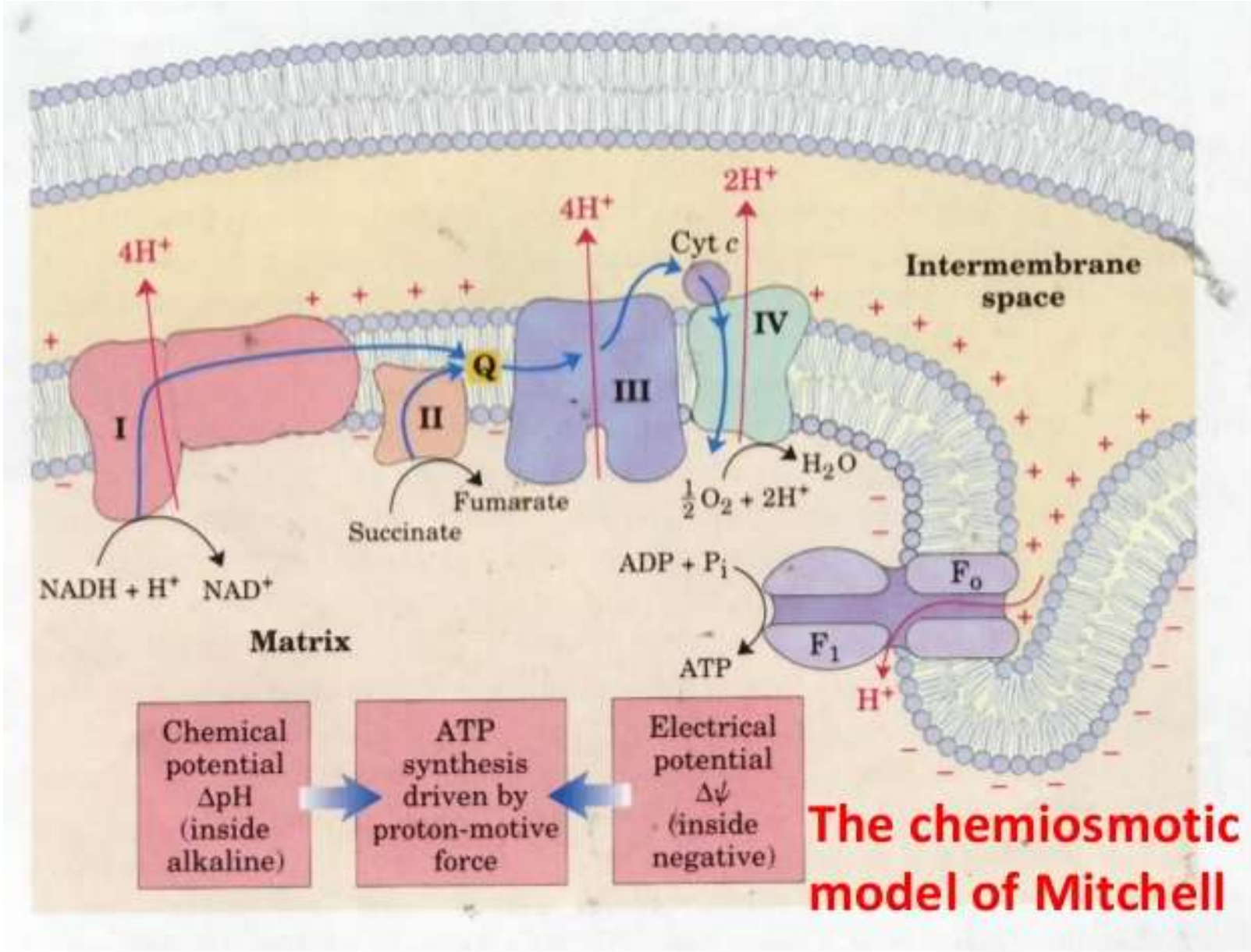


The chemiosmotic model of Mitchell

Summary of ATP synthesis & translocation of ATP,ADP & Pi

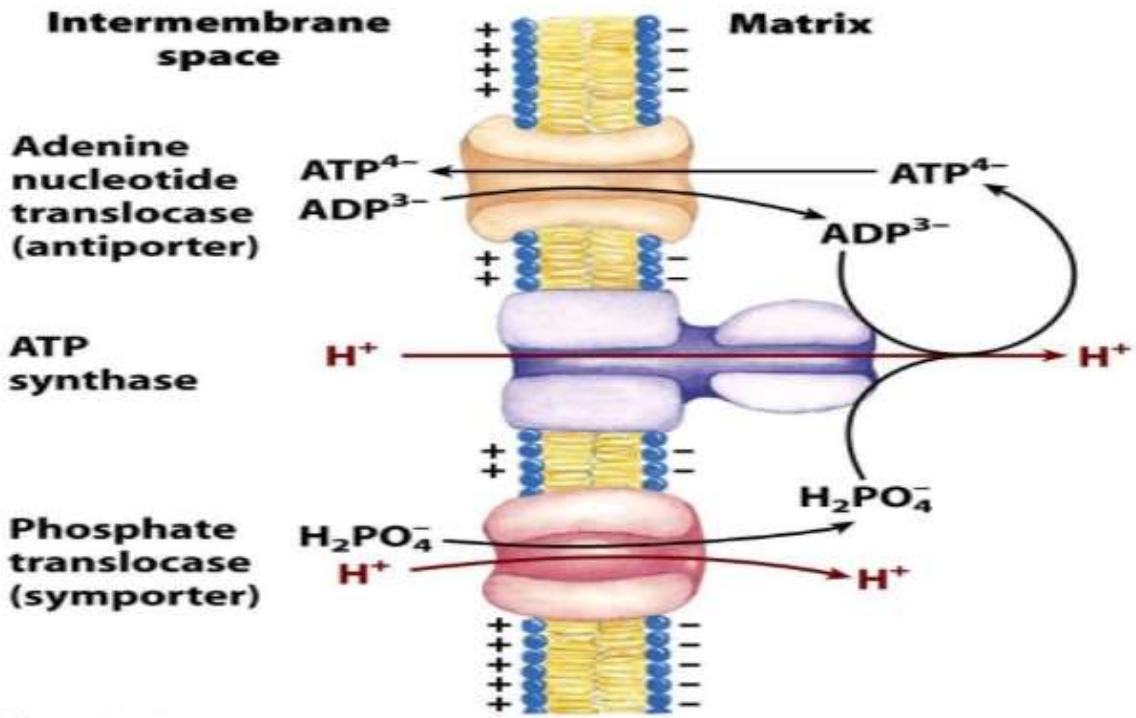
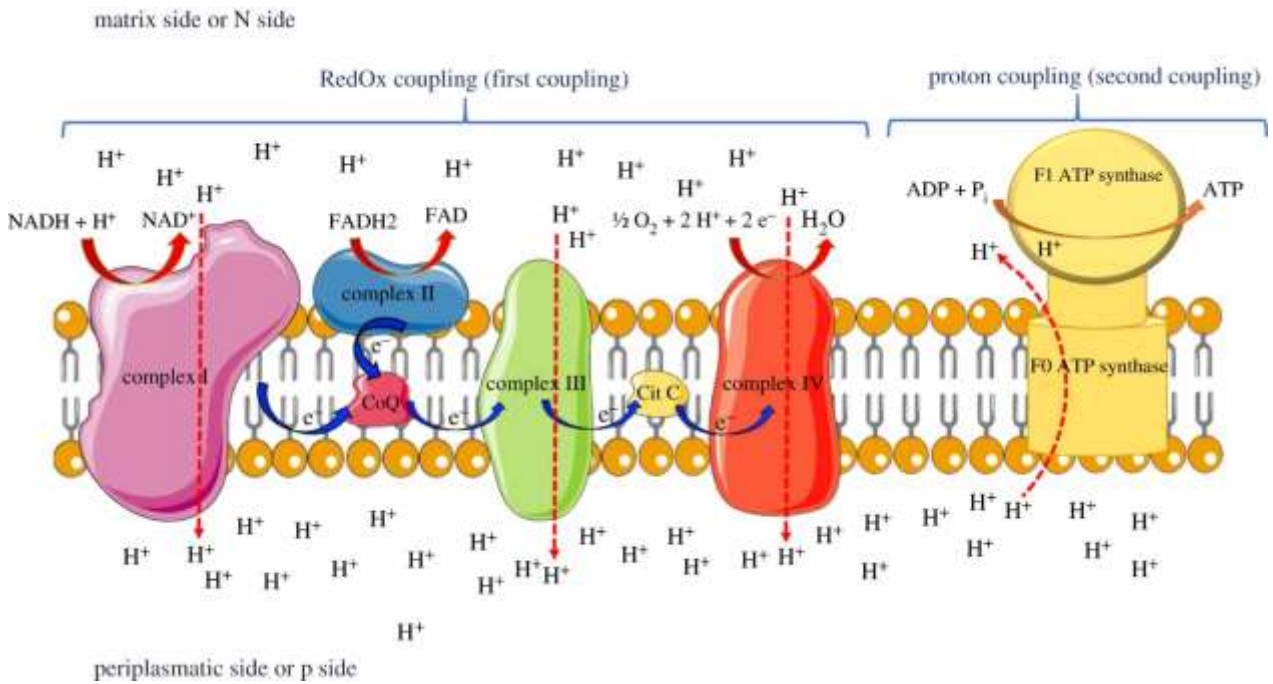


Figure 19-28
Lehninger Principles of Biochemistry, Fifth Edition


matrix side or N side
RedOx coupling (first coupling)
proton coupling (second coupling)
NADH + H+
NAD+
FADH2
FAD
½ O2 + 2 H+ + 2 e−
H2O
ADP + Pi
F1 ATP synthase
ATP
F0 ATP synthase
complex II
complex I
CoQ
complex III
Cit C
complex IV
periplasmatic side or p side

The mechanism of ATP synthesis from ADP and P_i

The binding Change Mechanism

1. **Open**: new ATP is released and ADP and P_i bind

2. **Loose**: bound ADP and P_i cannot be released

3. **Tight**: condensation of ADP and P_i is favored to form ATP. The ATP formed is very tightly bound.

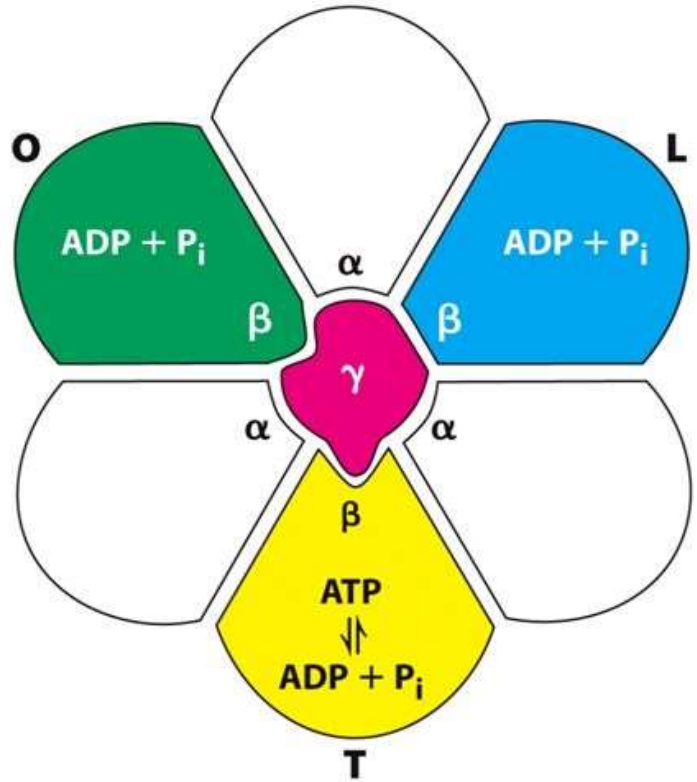


Figure 21.4

- Conservation of the free energy available from the reaction of oxygen and reduced cytochrome oxidase is postulated to involve a conformational change of this protein to a state which binds with high affinity at specific sites the water molecules produced at coupling sites II and III by electron transport through the redox protein E_s. The dehydrated form of the oxidized cytochrome oxidase is the high energy form, while the hydrated form is the low energy form. The reduced oxidase is assumed to have a low affinity for water, and the water molecules are released to the medium from the reduced form of this enzyme.

- This hypothesis postulates that there is a fourth site of energy conservation at cytochrome oxidase which is thermodynamically coupled specifically to sites II and II

- **Redox potential** (also known as **oxidation** / **reduction potential**, ORP, pe, ε, or) is a measure of the tendency of a chemical species to acquire electrons from or lose electrons to an electrode and thereby be reduced or oxidised, respectively. **Redox potential** is measured in volts (V), or millivolts (mV).

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