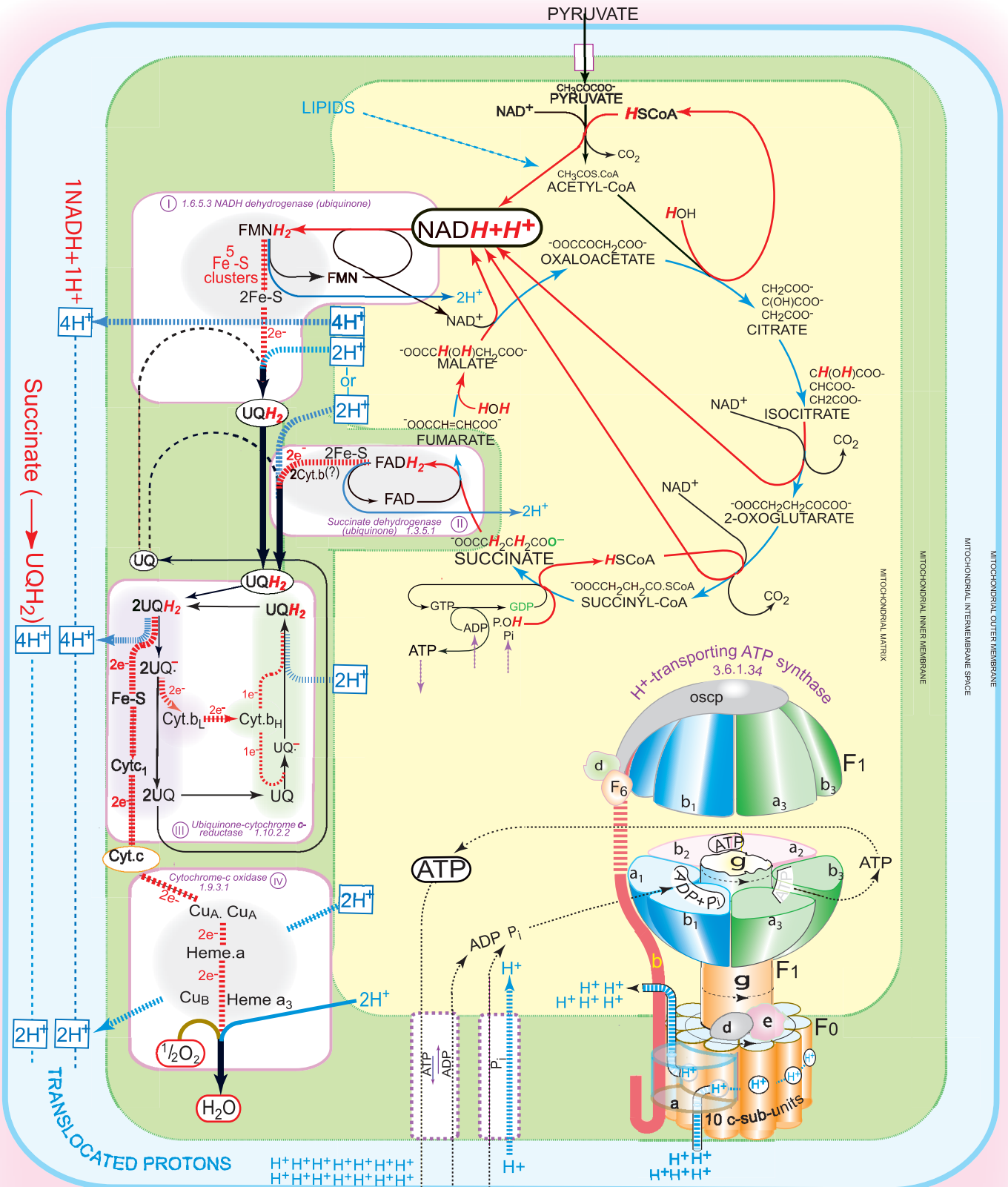


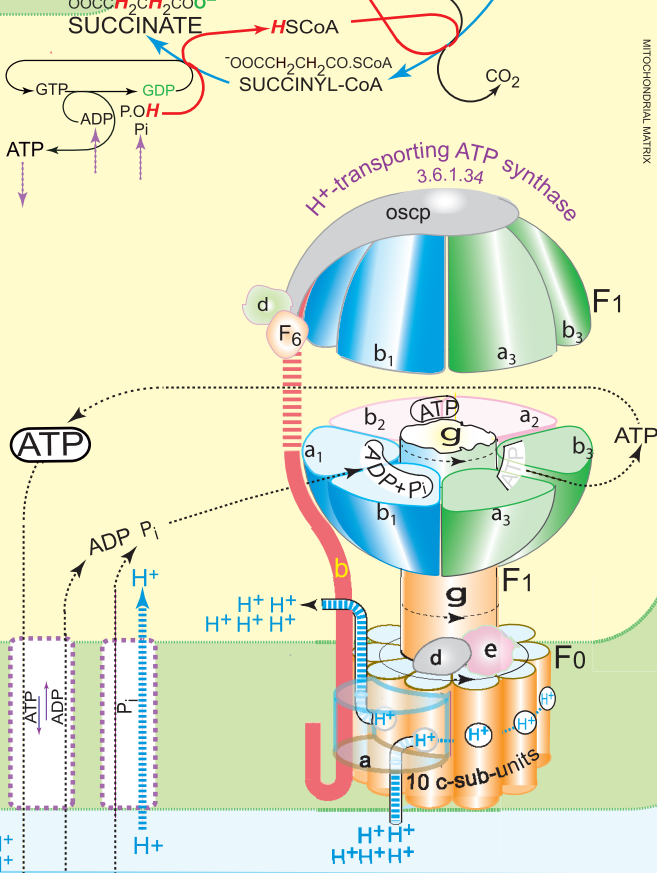
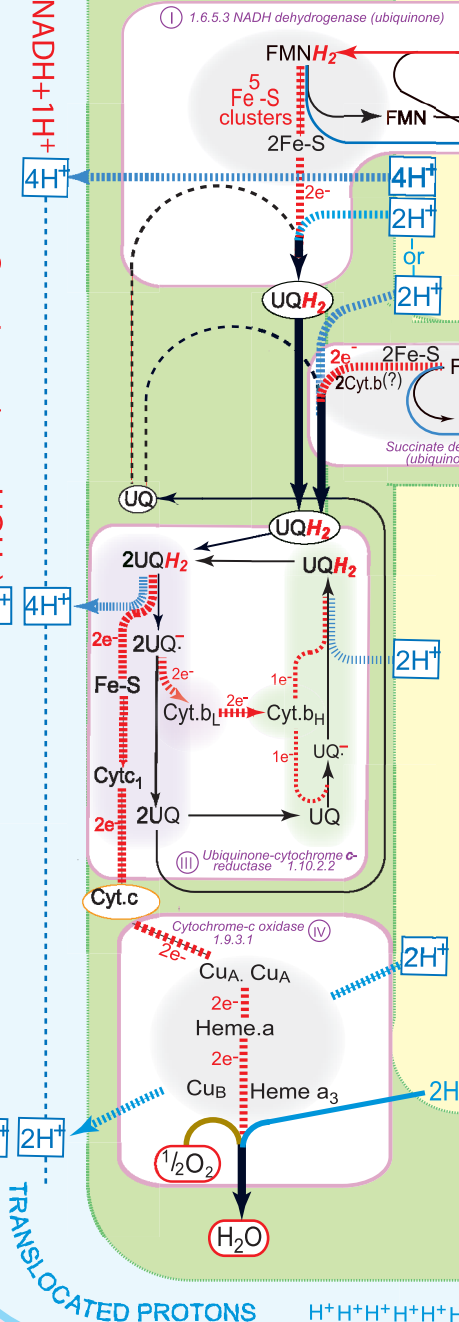
MITOCHONDRIAL ATP FORMATION



1 NADH + 1 H⁺
4 H⁺

Succinate (- → UQH₂)
4 H⁺
4 H⁺

2 H⁺
2 H⁺



- (2) Electron flow (electric current)
- H⁺ Source of hydride ions in NADH
- (2) Proton flow
- (2) Proton Translocation from Matrix to Intermembrane space or vice versa

The **g** rotor rotates in three 120° stages within the three (static) **a₁b₁**, **a₂b₂**, and **a₃b₃** subunit pairs in the F₁ complex. In each revolution each of these pairs is sequentially activated:

- Stage 1: (Loose) **a₁b₁** binds ADP and Pi **loosely**
- Stage 2: (Tight) **a₂b₂** binds ADP and Pi **tightly** to form ATP
- Stage 3: (Open) **a₃b₃** **releases** ATP

Thus 3 ATP is formed from 3ADP+3Pi in each revolution of **g**. One revolution of **g** is driven by 10 retro-located protons circulating through 10 c-subunits (- but this may vary).

The design and function of some of the sub-units shown is not yet clear and others (not shown) are a major focus of research.