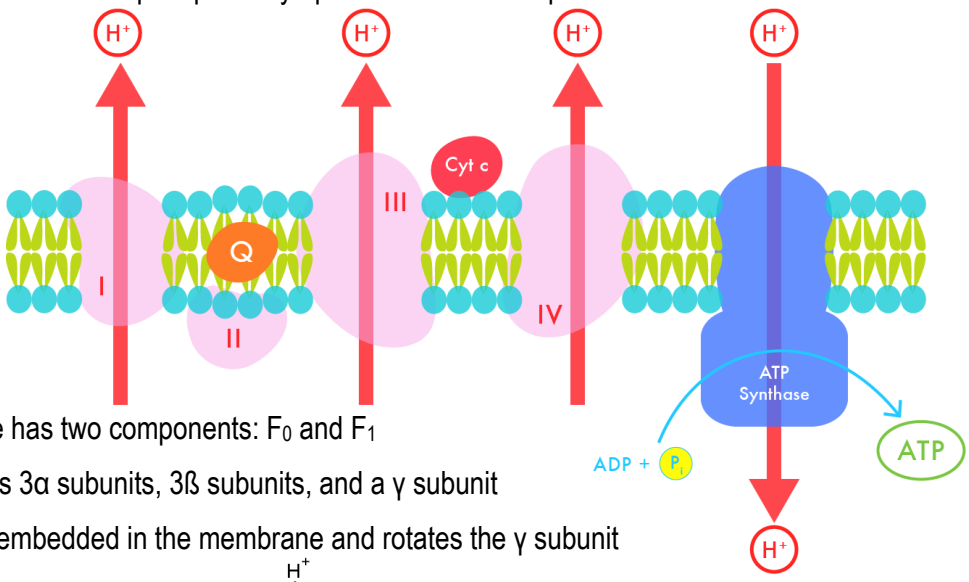
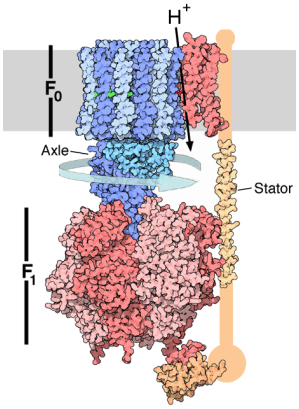
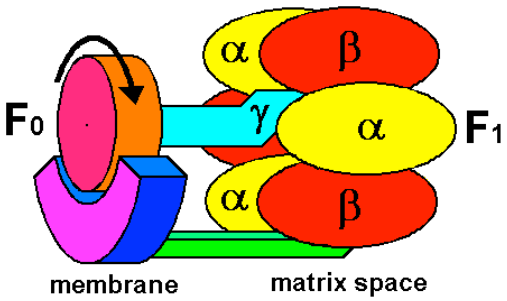
CONCEPT: OXIDATIVE PHOSPHORYLATION

- Proton motive force – due to the electrochemical gradient of H^+, drives ATP synthase to synthesize ADP + P_i → ATP
- Adenine nucleotide translocase – antiporter that moves ATP out, and ADP in, to the mitochondria
- Phosphate translocase – phosphate symporter that uses the proton motive force

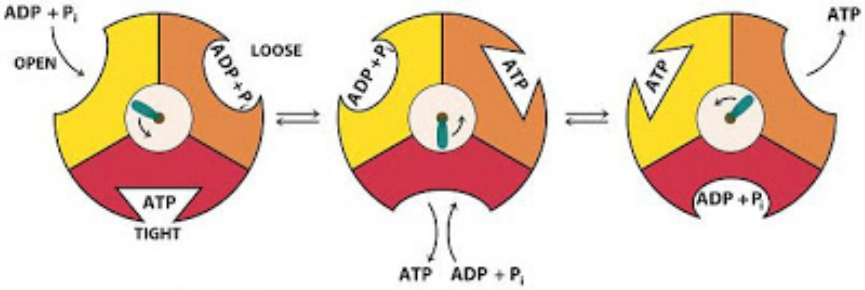


- ATP synthase has two components: F_0 and F_1
  - F_1 has 3α subunits, 3ß subunits, and a γ subunit
  - F_0 is embedded in the membrane and rotates the γ subunit





- F_1 experiences conformational changes due to the rotation of F_0, and the ß subunits can be found in three positions
  - Open – ATP is released, and ADP + P_i can enter
  - Loose – ADP + P_i are loosely bound
  - Tight – ATP is bound tightly
- Protons enter a channel in F0 and move through it, displacing F_0 and causing F_1 to undergo conformational changes



- Oxidative phosphorylation – metabolic pathway by which mitochondria form ATP using energy from oxidation of nutrients