

OXIDATIVE PHOSPHORYLATION

- Oxidative phosphorylation synthesizes ATP by transferring electrons from NADH and FADH₂ to oxygen.

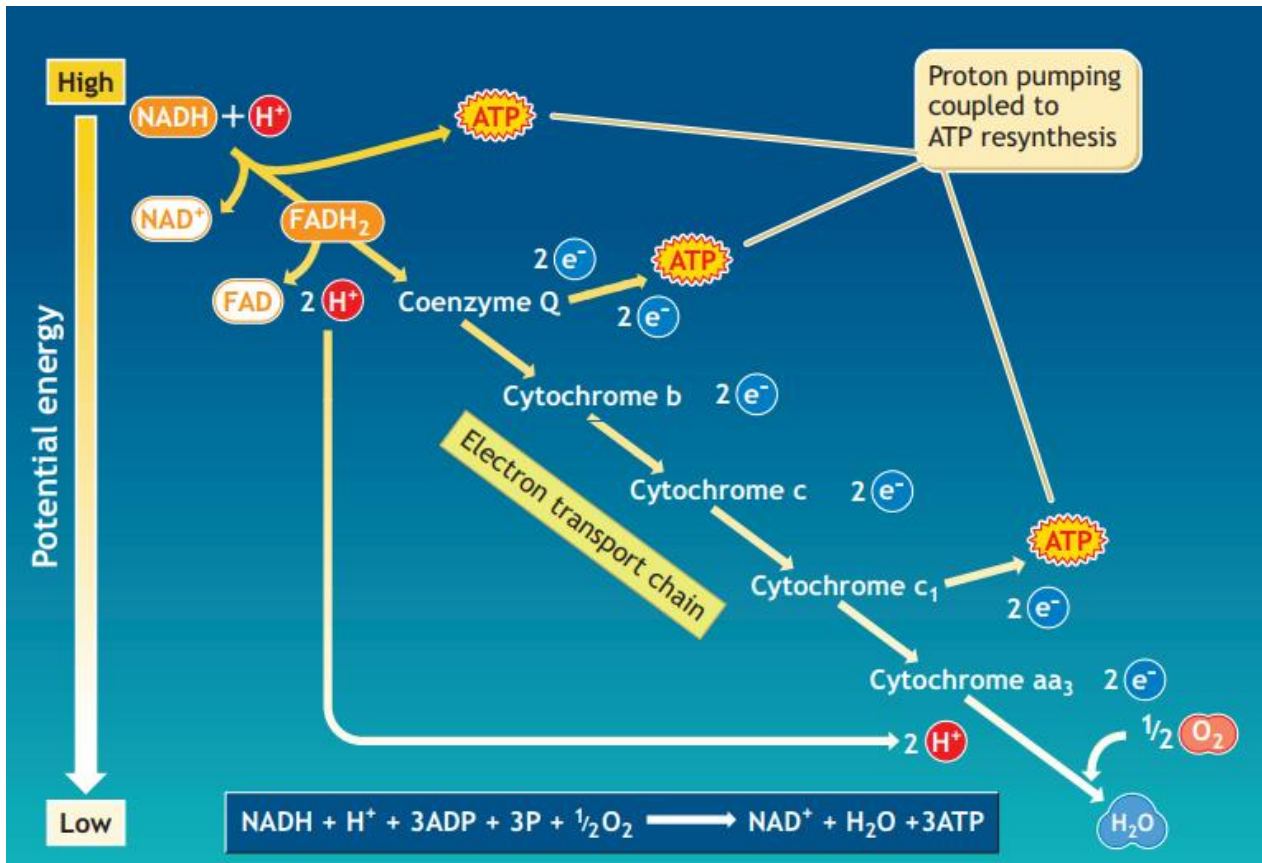
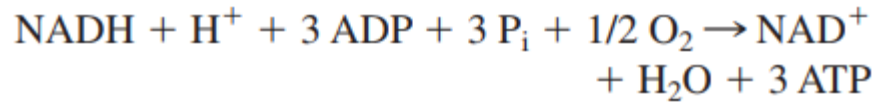


FIG: In the body, the electron transport chain removes electrons from hydrogens for ultimate delivery to oxygen. In oxidation–reduction, much of the chemical energy stored within the hydrogen atom does not dissipate to kinetic energy, but instead becomes conserved within ATP.

- More than 90% of ATP synthesis takes place in the respiratory chain by oxidative reactions coupled with phosphorylation.



ENERGY RELEASE FROM CARBOHYDRATE

1. Carbohydrate provides the only macronutrient substrate whose stored energy generates ATP anaerobically.
2. During light and moderate aerobic exercise, carbohydrate supplies about one third of the body's energy requirements.
3. Processing a large quantity of fat for energy requires minimal carbohydrate catabolism.
4. Aerobic breakdown of carbohydrate for energy occurs more rapidly than energy generation from fatty acid breakdown. Thus, depleting glycogen reserves considerably reduces exercise power output. In prolonged aerobic exercise such as marathon running, athletes often experience nutrient-related fatigue—a state associated with muscle and liver glycogen depletion.

