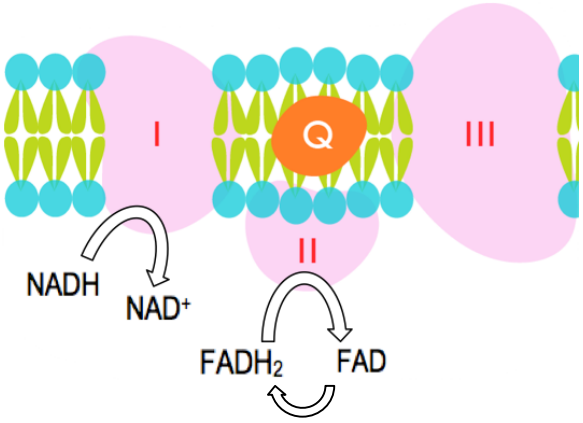
CONCEPT: OXIDATIVE PHOSPHORYLATION

- NADH can pass its electrons to FAD via mitochondrial glycerol 3-phosphate dehydrogenase
  - □ NADH → NAD^+ to reduce DHAP → glycerol 3-phosphate to reduce FAD → $FADH_2$



- Malate aspartate shuttle – transports NADH across the mitochondrial membrane at no energy cost
  - □ Malate dehydrogenase in cytosol reduces oxaloacetate (OAA) to malate, oxidizing NADH to NAD^+
  - □ Malate is transported into matrix via an antiporter that moves α-ketoglutarate into the cytosol
  - □ Malate is oxidized to OAA due to the pull of citric acid cycle, and NAD^+ is reduced to NADH
  - □ OAA is converted to aspartate by aspartate aminotransferase, using glutamate → α-ketoglutarate