Session 11 - Shuttles and Redox Neutrality

Now that we have done glycolysis, PDH and TCA - we can see how shuttles allow the cytoplasm to stay in redox balance.

Path of electrons →

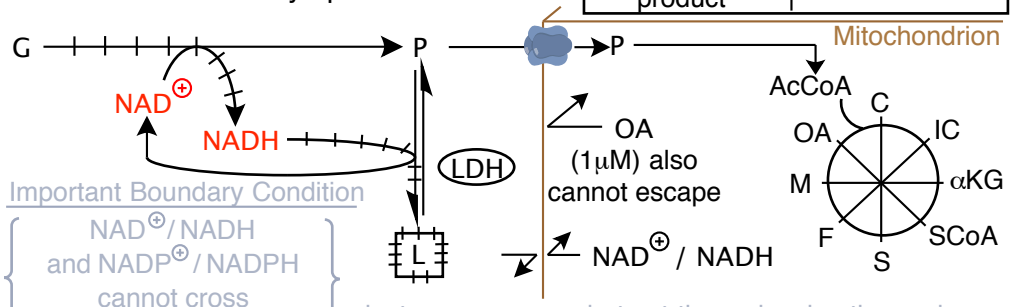
1. Lactate Dehydrogenase (LDH)

-- "Lactic Acid Fermentation"

-- We did this redox loop earlier, which was confined to the cytoplasm

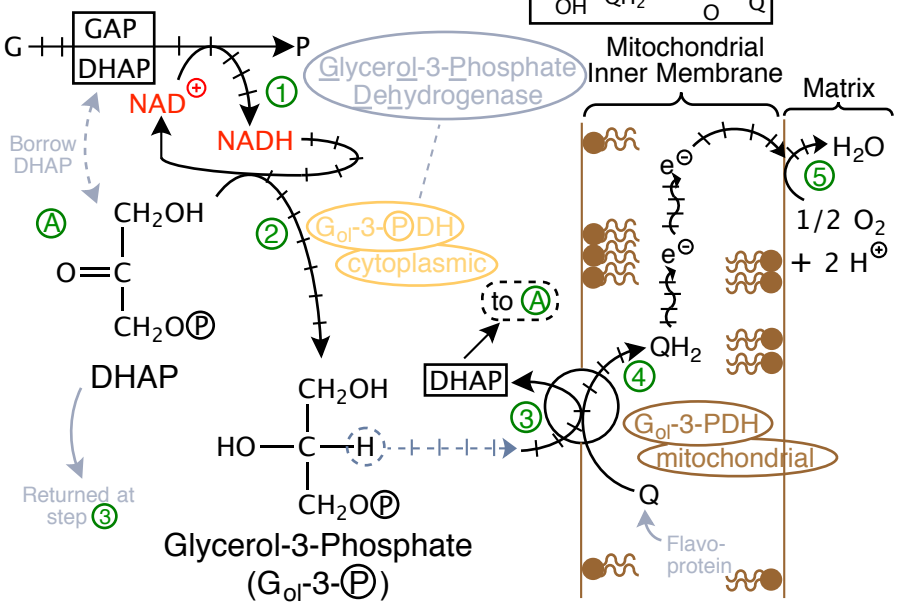
P = Ketone (C=O) / Alcohol (HC–OH, more reduced)

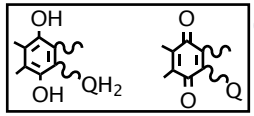
Lactate = "waste product"



2. Glycerol-3-Phosphate Shuttle

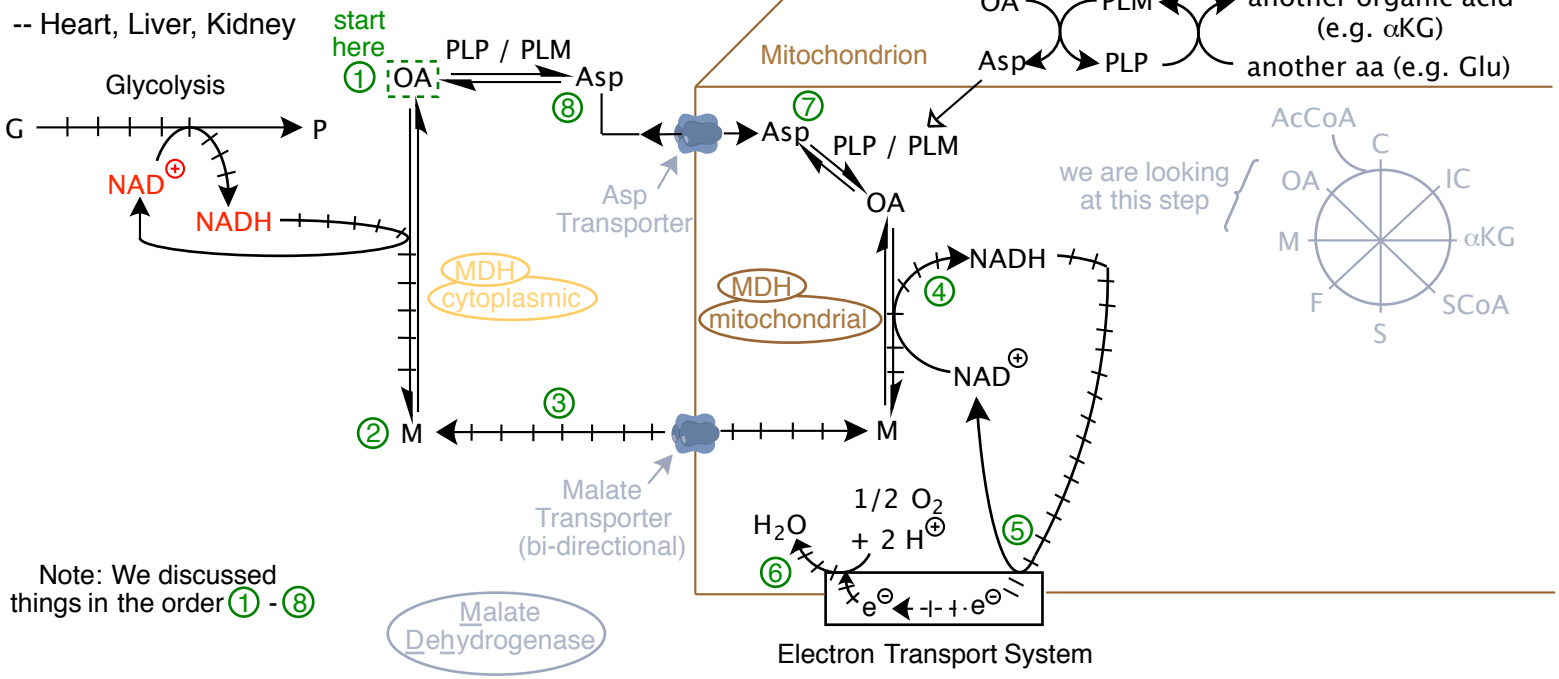
-- Brain and Skeletal Muscle



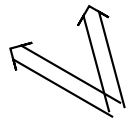


3. Malate-Aspartate Shuttle

-- Heart, Liver, Kidney



Note: We discussed things in the order ① - ⑧



So, all of this was done to achieve redox neutrality in glycolysis.

We needed to convert OA in mitochondrion (step 7) to Asp (PLP reaction) because OA cannot escape the mitochondrion.

5.07SC Biological Chemistry I
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