

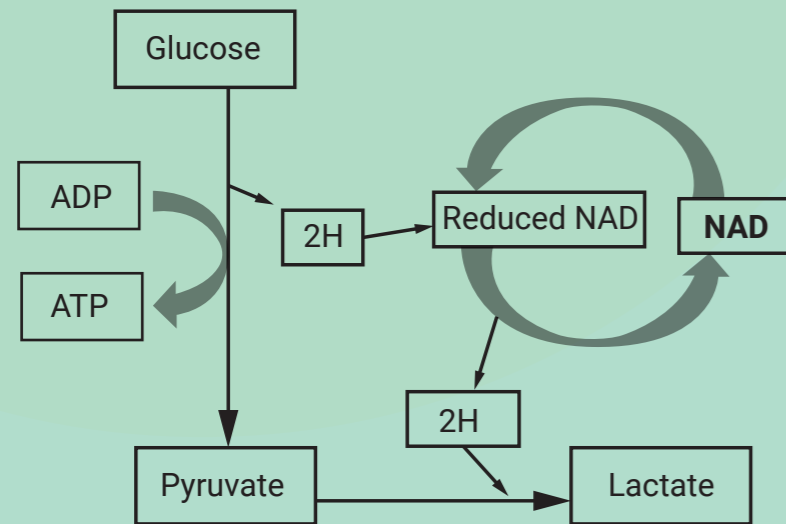
Unit 3: A Level Biology

Anaerobic respiration and energy budgets

Anaerobic respiration in animals

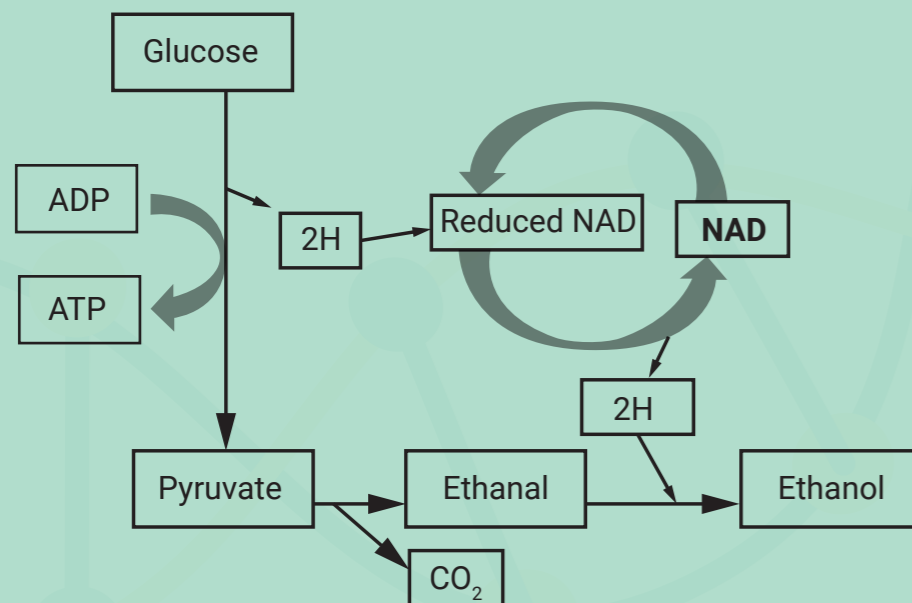
Anaerobic respiration occurs in the absence of oxygen. Without oxygen to act as the final electron acceptor, biochemical reactions inside the mitochondria grind to a halt as any reduced NAD and FAD cannot be reoxidised to pick up more hydrogen.

A mechanism in glycolysis allows reduced NAD to transfer hydrogen to pyruvate, allowing NAD to again accept hydrogen from glucose in a reaction that produces a very small yield of 2 ATP.



1. Glycolysis occurs.
2. Triose phosphate is converted to pyruvate with the release of ATP and reduction of NAD.
3. Reduced NAD reduces the pyruvate, forming lactate.
4. The oxidised NAD can again be reduced during glycolysis. The cycle continues.

Anaerobic respiration in plants



1. Glycolysis occurs.
2. Triose phosphate is converted to pyruvate with the release of ATP and reduction of NAD.
3. Pyruvate is decarboxylated, releasing carbon dioxide and forming ethanal.
4. Reduced NAD reduces the ethanal, forming ethanol.
5. The oxidised NAD can again be reduced during glycolysis. The cycle continues.

Respiration energy budgets

	Glycolysis	Link reaction	Krebs cycle
ATP produced from substrate level phosphorylation	2		2
Reduced NAD produced (will give 3 ATP each)	2	2	6
Reduced FAD produced (will give 2 ATP each)			2
ATP from oxidative phosphorylation of reduced coenzymes NAD or FAD.	6	6	22
Total	8	6	24
Total for aerobic respiration	38		
Total for anaerobic respiration	2		