Yields of ATP from Glycolysis

- **Early stages use 2 ATP**
- **Later stages make 4 ATP**
- **Net yield = 2 ATP**

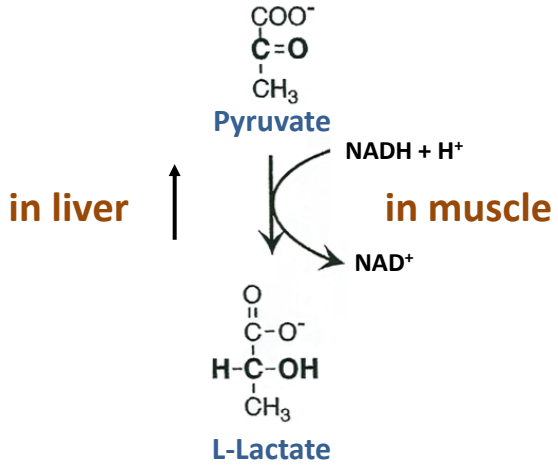
(Plus further ATP from mitochondrial metabolism)

Anaerobic Glycolysis

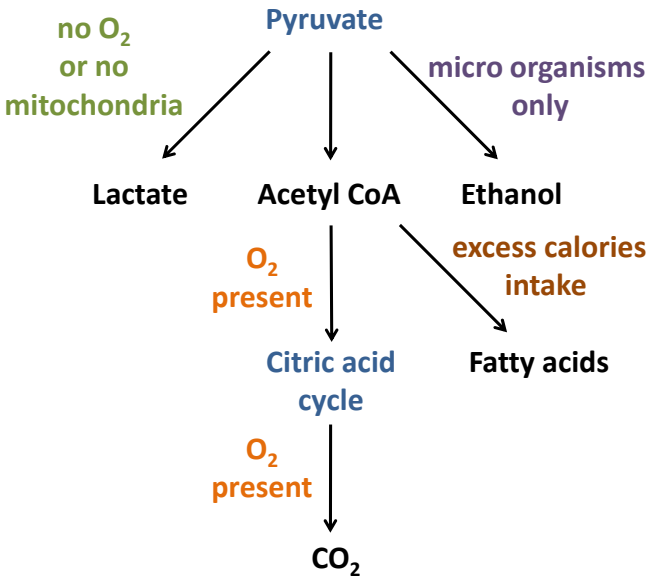
- When oxygen supplies to the tissues are limited, pyruvate is not metabolised to CO_2
- Pyruvate converted to lactate in order to convert the cofactor NADH back to NAD^+

pyruvate + NADH + H^+ → NAD^+ + lactate

Reaction Catalysed by Lactate Dehydrogenase



Metabolic fates of Pyruvate



Specialised functions in Tissues

- **Skeletal muscle:** ATP production during intense exercise
- **Red blood cells:** only pathway for ATP production (no mitoch)
- **Brain:** major source of ATP (cannot use fats as fuels)

Regulation of Glycolysis

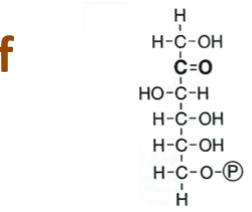
Increased rate of glycolysis

- **intense muscle work & exercise**
- **after high carbohydrate meal (high insulin levels)**

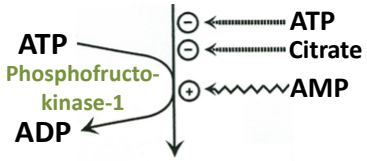
Decreased rate of glycolysis

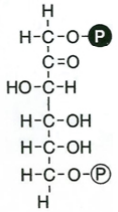
- **Fasting state (high levels of circulating glucagon)**

Feedback inhibition of a Metabolic Pathway



Fructose 6-phosphate





Fructose 1,6-biphosphate

Allosteric control of the enzyme phosphofructokinase

Summary of Glycolysis

- Main catabolic pathway using glucose, present in all tissues
- Only energy yielding pathway that can function either in aerobic or anaerobic conditions (*red cells & skeletal muscle*)
- Energy yields are low (2 ATP) but the pyruvate can enter the mitochondria for further ATP production
- Pathway produces intermediates for fats, etc