

Ask Weber

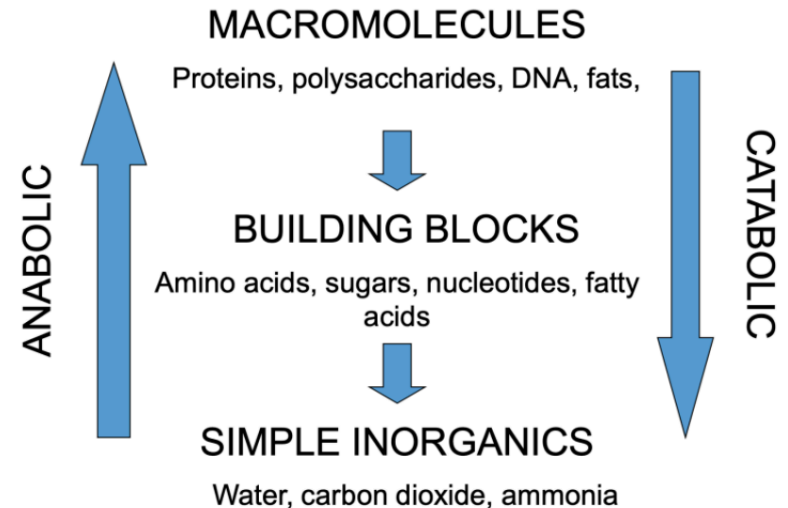
Topic 17 **Cellular Respiration**

Cellular Respiration

Metabolic Definitions

Explain the difference between catabolism and anabolism in terms of molecular formation/breakdown and use of energy

- Think of ‘anabolic steroids’
 - i.e. what the body builders use to get BIG



Respiratory biochemistry

Where does glycolysis occur and what is its function?

- Cell cytoplasms
- Glycolysis is the lysis ‘breakdown’ of glyco (glucose) – it is the first step for any respiration, but this process itself is catabolic and produces energy

What are the products of glycolysis?

- 2 x pyruvate
- ATP (net 2 gain)
- NADH
- H₂O

Respiratory biochemistry

How does your body determine if it should undertake anaerobic or aerobic respiration after glycolysis?

- Your body assess if there is enough oxygen for aerobic respiration (e.g. if there is ENOUGH in a situation of increased demand)
- You will tend to see this happening if you reduce supply or increase demand

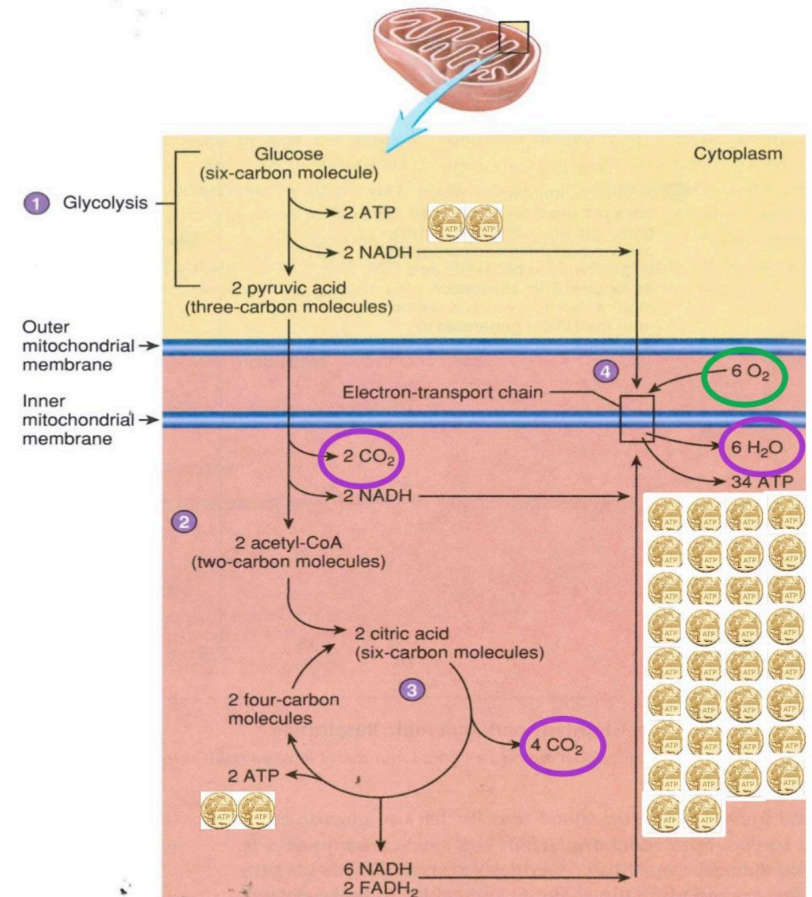
What does anaerobic respiration produce, and how does your body deal with it?

- Lactic acid — this can cause your body to become more acidic (part of the reason why you would also breathe faster — to remove acidic CO₂)
- Metabolised by the liver to form pyruvate again

Aerobic respiration biochemistry

What are the steps of aerobic respiration

1. Glycolysis - 'preparation of glucose'
2. Acetyl-CoA formation – occurs as pyruvate moves into the mitochondria
3. Citric acid cycle – Formation of (some) ATP, but produces the H^+ and e^- carriers ($FADH_2$, $NADH$)
4. Electron transport chain



Electron Transport Chain

Describe the function of the complexes within the electron transport chain

1. Complex 1 – breakdown of NADH (produces $2e^-$ and H^+)
2. Complex 2 – breakdown of $FADH_2$ (produces $2e^-$ and $2H^+$)
3. Complex 3 and 4 – uses e^- to drive H^+ into intermembrane space
4. Complex 4 – Removes H^+ in inner mitochondrial compartment through water formation (to maintain a H^+ gradient)
5. ATP-synthase – forms ATP through coupling reaction with H^+ gradient movement (oxidative phosphorylation)
6. Carrier molecules transports ATP out in return for $ADP + P^-$

