3.5.2 RESPIRATION

Outline of Respiration

- Involves oxidation of glucose to produce $CO_2 + H_2O$ → generating ATP
- form of heterotrophic nutrition - deriving nutrition from substances organic molec

ATP is needed to drive a range of metabolic processes:

- Anabolic + catabolic reactions
- Active transport
- Endocytosis / secretion
- DNA replication

ATP consists of:

- Ribose sugar
- Adenine
- 3 phosphate groups

Role of ATP

- phosphorylation
- stores energy → released quickly small amounts

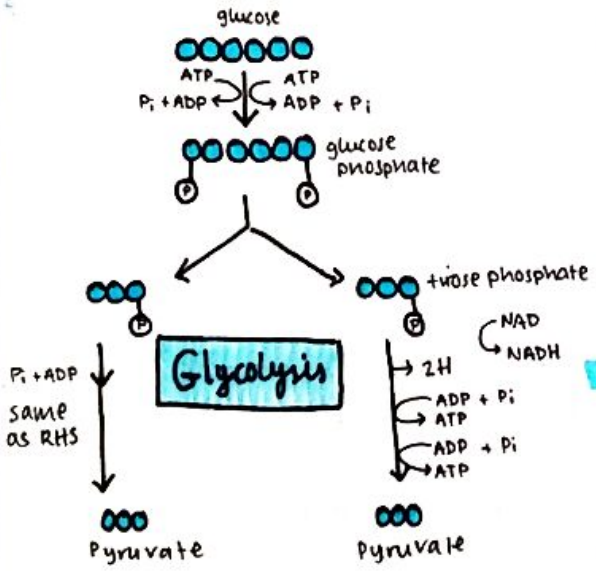
The Mitochondrion

- inner membrane folded into cristae - LSA
- Matrix enclosed by membranes
- densley packed cristae

Glycolysis

Doesn't need oxygen | Cytoplasm of cell

1. Phosphorylation of glucose as it isn't reactive → glucose phosphate (using ATP)
2. glucose phosphate split into two 3C molec → Triose phosphate
3. H^+ removed from each of two TP molec transfered to NAD to form reduced NAD
4. TP oxidised to form pyruvate (3C). Two molec of ATP regenerated from ADP



Net products of Glycolysis:

- 2 x ATP
- 2 x NADH
- 2x pyruvate
  - ↳ 2 molec produced per glucose molec
  - ↳ actively transported into matrix for aerobic R
  - ↳ in absence of O_2 → changed to lactate/ethanol

Link Reaction | Matrix

- pyruvate molec actively transported into matrix
- pyruvate oxidised into acetate by losing CO_2 and H^+
- H^+ accepted by NAD to form reduced NAD → used to form ATP
- Acetate (2C) combines with coenzyme A → acetylcoenzyme A

Pyruvate + NAD + CoA → acetyl Co A + reduced NAD + CO_2