

Chapter 9: Review List

- How many ATP do NADH and FADH₂ yield?

10 NADH x 3ATP/NADH = 30 ATP

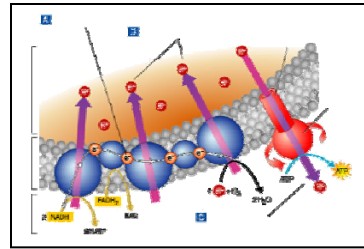
2FADH₂ x 2ATP/FADH₂ = 4 ATP

A total of 34 ATP's are produced in the ETC

- How many ATP are gained in each step of cellular respiration? Which is most efficient?
2 in Glycolysis, 2 in Krebs, 34 in ETC, ETC is most efficient **
There is a net of 36 ATP's per 1 glucose (-2 ATP's to transport pyruvic acid into the cell)

- Describe how and where the cell uses a H⁺ gradient to make ATP.

The H⁺ gradient is used to create a charge difference to generate ATP as H⁺ ions flow through ATP Synthase.



gradient to

difference to Synthase.

- Electrons:
 - Where do the electrons required for cellular respiration originate? **GLUCOSE**
 - What is the first electron carrier/acceptor? **NAD⁺ (glycolysis)**
 - What is the final electron acceptor? **O₂ (ETC), which will make water when combined with excess hydrogen ions.**
- What is PGAL? What cellular reactions is it involved in?
PGAL is a 3 carbon intermediate molecule in glycolysis. First glucose is converted to PGAL then to pyruvic acid. It is also the final product of the Calvin Cycle of photosynthesis before glucose is created.

FERMENTATION:

- Define: Fermentation – **Anaerobic respiration that occurs when oxygen is not present. All cells can do fermentation.**
- What are the 2 types of fermentation? **Lactic Acid, Alcoholic**
- What is the product of both types of fermentation? **NAD⁺ (to regenerate glycolysis)**

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Pathway	Reaction
LACTIC ACID	PYRUVIC ACID + NADH → LACTIC ACID + NAD+ *occurs in muscle cells for short term energy production, also used in the production of foods ex. yogurt, Kim chi, sauerkraut
ALCOHOLIC	PYRUVIC ACID + NADH → ALCOHOL+ CO₂ + NAD+ *occurs in yeast cells and is used in the production of beer, wine and bread

- What is regenerated in fermentation? Where does it go? **NAD+, back to Glycolysis**
- Why is this regeneration beneficial? **without NAD+ Glycolysis cannot occur and energy cannot be made. For some organisms this is the only way to get energy. For others fermentation allows them to make energy short term when oxygen is unavailable.**
- Under what circumstances does a cell undergo Fermentation?
When no oxygen is present
- Under what circumstances does a cell undergo Cellular Respiration?
When oxygen is present

PHOTOSYNTHESIS vs. RESPIRATION

Compare and Contrast: Draw the organelle responsible for each. Label the major parts, show where all processes are occurring and show where the H⁺ concentration occurs.

Cellular Respiration

- breaks down glucose
- releases energy
- Forms water (reduction of O₂)

Photosynthesis

- make glucose
- captures energy
- Splits water (oxidation of O₂)

Both

- double membrane bound organelles
- H⁺ gradient to make ATP
- Electron Transport Chain

