

Chapter 8: How Cells Release Chemical Energy

Energy Releasing Pathways

- ATP is the prime energy _____ for all cells
- ATP can be produced by various _____
 - The _____ reactions of _____
 - _____ respiration
 - Anaerobic Respiration & _____

Overview of Aerobic Respiration

- Fermentation only produces ____ ATP molecules from one _____; aerobic respiration produces ____ ATP
- Aerobic respiration is:

- Three reactions are involved in aerobic respiration: _____, _____ Cycle, and _____
- Glycolysis splits glucose into _____, producing small amounts of _____
- Krebs Cycle turns pyruvate into _____, H₂O, _____, H⁺, and e⁻
- ETP (Electron transport _____) processes H⁺ and e⁻ to make lots of _____; _____ accepts the H⁺ and e⁻ at the end

Glycolysis

1 Glucose --> 2 _____ molecules

- Glucose is first _____ (requiring 2 _____) and then split to form 2 _____ molecules
- PGAL becomes _____ by losing H^+ and e^- to change a molecule of NAD^+ to _____
- _____ ATP are produced, for a net gain of _____ ATP

Krebs Cycle

Also called the _____ acid cycle

- Pyruvate enters the _____ and is changed to _____, forming carbon dioxide as _____
- Acetyl-CoA is processed to produce some _____ and _____ (energy carriers) by adding e^- and H^+ to NAD^+ & FAD
- _____ ATP molecules are formed

Electron Transport Phosphorylation

- _____ & $FADH_2$ pass electrons through a transport system to release their _____
- The energy is used to _____ H^+ out of the mitochondrial _____ and create electric and concentration _____
- The H^+ flow is then used to turn _____ into ATP
- _____ accepts the "spent" electrons and hydrogen to form _____
- The electron transport forms _____ ATP molecules
- The grand total at the end of aerobic respiration is _____ ATP from one _____

Anaerobic Respiration

- This occurs when there is not enough _____; pyruvate is degraded without releasing _____
- The pyruvate must be processed to avoid _____; this process is called _____
- The most common fermentations form either _____ or lactic acid
- In alcohol fermentation, _____ break down _____ into ethanol and _____
 - The alcohol may be used for alcoholic _____ using yeast or _____ for the fermentation
 - The carbon dioxide may be used to raise _____ or to _____ a beverage
- In lactate fermentation, the cells turn pyruvate into _____
 - This occurs in bacteria that eat _____, helping to form cheeses and _____, or can make food _____
 - Muscle cells also form lactate during _____-type exercise to produce _____ energy

Alternate Energy Sources

- _____ are the body's primary energy source
 - New simple _____ are used first
 - Next, stored _____ from the _____ (from past excess carbs) will be processed into _____
- When carbohydrate reserves run low, the body will use stored _____ from _____ tissue
 - _____ enters glycolysis
 - _____ acids directly enter Krebs cycle
 - Because fatty acids have more ____ & ____ atoms, they produce much more energy than _____

- As a last resort, _____ will be used for energy
 - Amino acids are released by _____
 - _____ groups are removed
 - _____ are fed into Krebs cycle for about the same amount of energy as _____