

Review 13

Part 1: "Carbon Reactions"--result in conversion of carbon backbone of glucose into CO₂, harvesting of hi-E electrons, and manufacture of some ATP

Part 2: "Electron Reactions"--gleaning energy from high-E electrons and using it to form ATP from ADP and P_i

Cyanide, dinitrophenol and brown fat

What happens when no oxygen is available (or for some reason unable to transfer electrons between cytochromes or to oxygen [as with cyanide poisoning])?

- ① cytochromes fill with electrons
- ② ATP formation from mitochondrial electron transport ceases
- ③ NADH and FADH₂ remain reduced
- ④ Kreb's Cycle stops due to lack of NAD⁺ and FAD--no more ATP from here!
- ⑤ oxidation of pyruvic acid stops due to lack of NAD⁺
- ⑥ glycolysis stops due to lack of NAD⁺--no more ATP from here!
- ⑦ ATP reserves get quickly used up
- ⑧ !!!you're in serious trouble, bub!!!
Oh woe, what to do.....

If appropriate enzymes are present, ANAEROBIC FERMENTATION

- in (cytoplasm of) skeletal muscle:
pyruvic acid ---> lactic acid
NADH ---> NAD⁺ →→→ used to keep glycolysis running and, therefore, ATP production occurring
- in (cytoplasm of) yeast:
pyruvic acid ---> ethyl alcohol + CO₂
NADH ---> NAD⁺ →→→ same benefit

Negatives of anaerobic fermentation:

- very energy "wasteful"
- need to dispose of waste products (lactic acid and ethyl alcohol)

Implications for exercise:

Aerobic.....burn sugars, fats and proteins for energy

Anaerobic.....burn only sugars because all mitochondrial reactions are stopped due to lack of oxygen

Photosynthesis:



Review 13, con't

Pigments: molecules whose molecular structure allows them to absorb light energy

- **color of pigment due to light reflected, not absorbed**
- **reflected energy is “wasted”**
- **absorbed energy is useful**