

- What is its reduced form?
 - NADH
- Why is the reduction of NAD^+ an important event (what is the ultimate goal)?
 - The ultimate goal of the NAD^+ is shuttle electrons so that there is enough to keep the reactions going.

10. Compare and contrast substrate-level phosphorylation with oxidative phosphorylation.

- a. Substrate-level phosphorylation
 - i. Enzyme transfers phosphate group from substrate to ADP and the process is slow
 - ii. There is only a little bit of ATP made
- b. Oxidative phosphorylation
 - i. There is a lot of ATP produced and the action is fast
 - ii. Generates chemiosmosis and proton motive force
 - iii. Phosphorylation powered by electrons

11. What are the 3 major stages of aerobic respiration?

- What early process will occur w/ or w/o O_2 ?
 - Glycolysis: starts with or without oxygen
- What happens during the above process?
 - Glucose starts to breakdown of glucose in cytosol
- What determines which pathway pyruvate will take?
 - If there is oxygen present then it goes to the mitochondria, if oxygen is not present then there is anaerobic fermentation

Glycolysis:

12. What are the first 5 steps of glycolysis referred to as? Why?

- a. Preparatory (or investment) phase, since they consume energy to convert the glucose into two three-carbon triose phosphates

13. What are the second 5 steps of glycolysis referred to as? Why?

- a. pay-off phase- Since glucose leads to two triose sugars in the preparatory phase, each reaction in the pay-off phase occurs twice per glucose molecule.

14. What must happen to pyruvate before it enters the Krebs's cycle?

- a. Pyruvate must be first decarbonized, then oxidized then the two carbon fragments attach to a vitamin CoA

Krebs's Cycle:

15. Summarize the 8 stages of the Krebs cycle including what carbon molecule is produced at each step, when CO_2 is released, when NADH and FADH_2 get produced, and when ATP is produced.

- a. The first step- Acetyl CoA is added to 2C to oxaloacetate (4C) making citrate (6C)
- b. Citrate is then turned into isocitrate using water (6C)
- c. Isocitrate (6C) loses carbon dioxide forming alpha ketoglutarates (5C), which becomes oxidized, making NAD^+ to NADH
- d. alpha ketoglutarates (5C) loses another carbon dioxide to form succinyl CoA(4C) NAD^+ is reduced to NADH again
- e. CoA(4C) is displaced by phosphate group forming succinate (4C) ATP is formed
- f. E^- and 2H^+ transfer to FAD making FADH_2 , fumarate (4C) is formed
- g. Water is added to form malate (4C)
- h. Malate is oxidized to regenerate oxaloacetate (4C), NAD^+ reduced to NADH