Chapter 6b

(Chapter 6, Part 2)

A Quick Review

●_____ molecules are broken down in order to produce ____

●_____ does all of the cellular work in the _____.

●There are two pathways for sugar molecules; _____

●Anerobic occurs in the _____

●Aerobic occurs in the _____

***A Road Map for Cellular Respiration*; Figure in book**

Glycolysis; The First Step

●Glycolysis takes place in the _____

●The ____-Carbon glucose is broken down into two, _____ molecules called _____

●During this breakdown, _____ ATP molecules are _____

●2 _____'s are also produced to carry _____ (used later)

●_____ is not needed for this step, so it is called _____

Krebs Cycle

●In the Krebs cycle, _____ acid from glycolysis is first "prepped" into a usable form, _____

●Pyruvate (_____ acid) enters the _____,

●One carbon atom is removed (as _____), the pyruvate becomes the 2-carbon_____, and _____ is formed to carry hydrogen atoms.

●The acetyl CoA attaches to a 4-carbon molecule making a new, _____ molecule

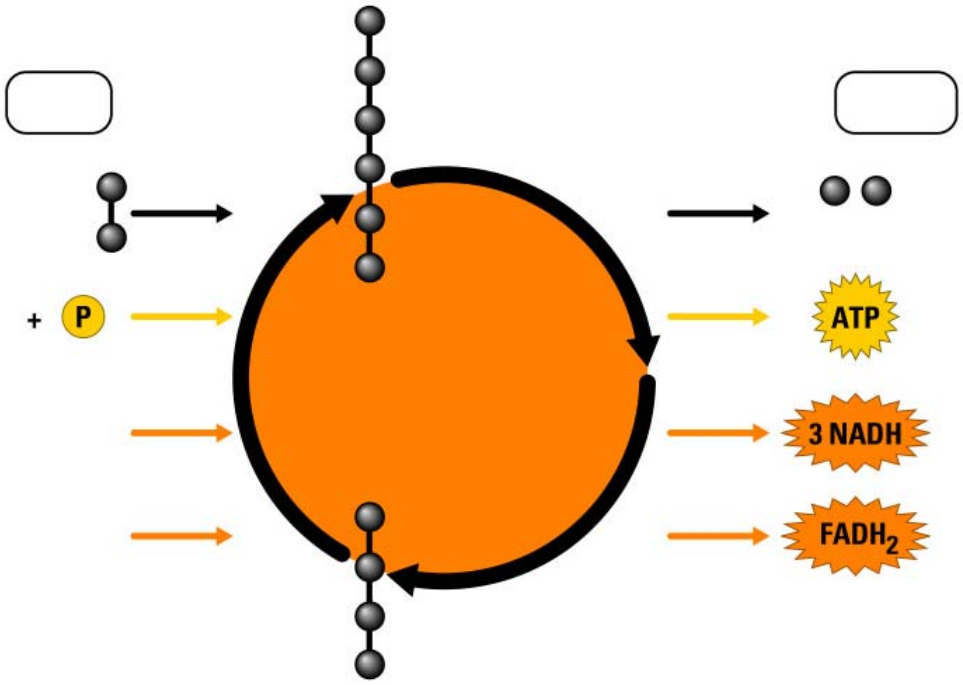
●Another carbon (as _____) is removed making a 5-carbon molecule, and another _____ is formed

●This step happens one more time (4 carbon) releasing one more _____ and making one more _____

●One molecule of _____ is then formed

●The last step is the formation of one more _____, one _____ (another H carrier), and the original 4 carbon molecule from step 2) is _____.

Krebs cycle Visual Summary: Fill in



Krebs in Summary;

●The two carbons of the _____ acid that came into the mitochondria are released as 2 _____

●Five hydrogens become attached to five _____ carriers (4 _____ and 1 _____)

●One _____ is generated

Visual Preview of Electron Transport: Figure from text

Electron Transport System (ETS)

●Most of the _____ a cell makes is in the _____

●All of the _____ and _____ reach the ETS and dump the _____ they are carrying

●When this happens, the _____ in the bonds move down through the protein chain (_____).

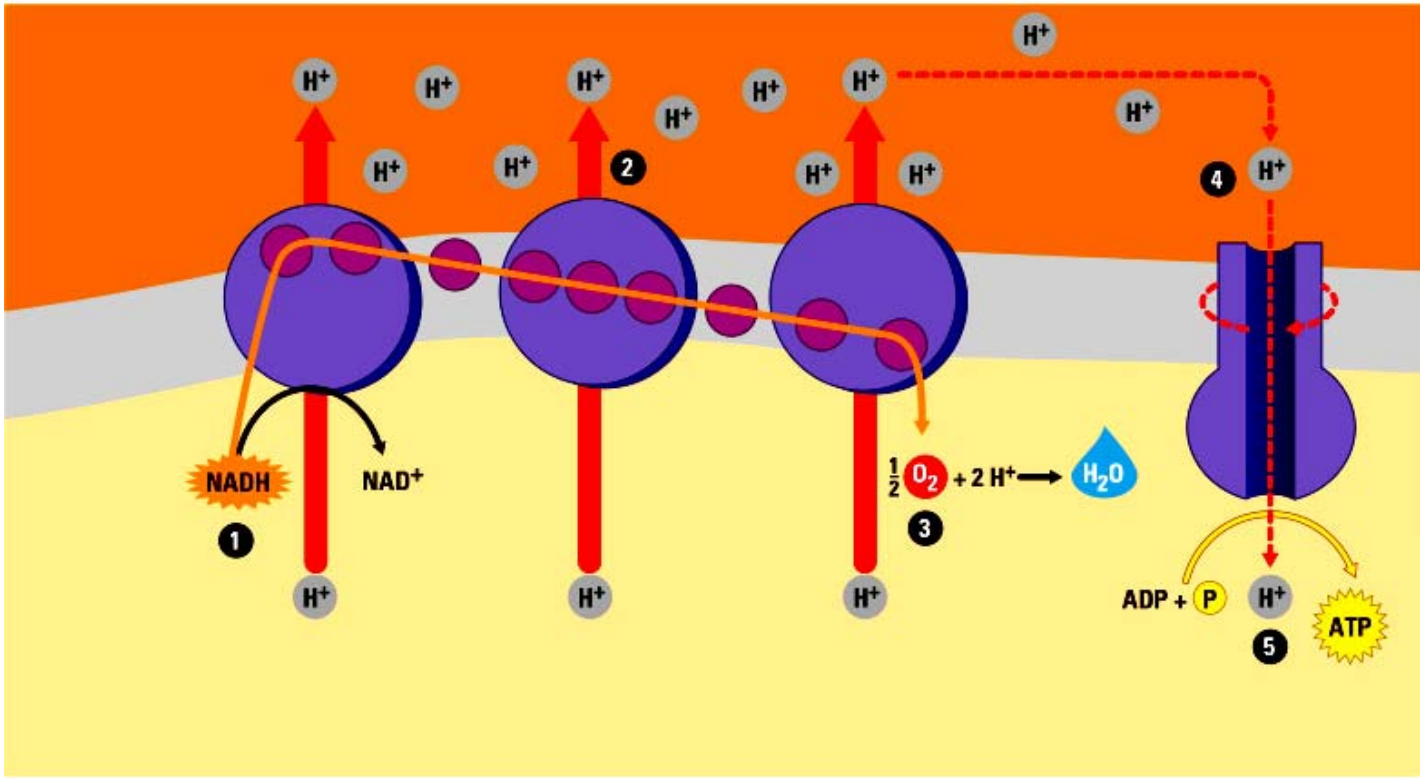
●The moving _____ cause hydrogens to be pumped through the membrane, **against the _____**.

●As the _____ move back through the _____, _____ ATPs (per original glucose) form.

●The moving _____ and free _____ end up bonding with oxygen (that you breath) to form _____.

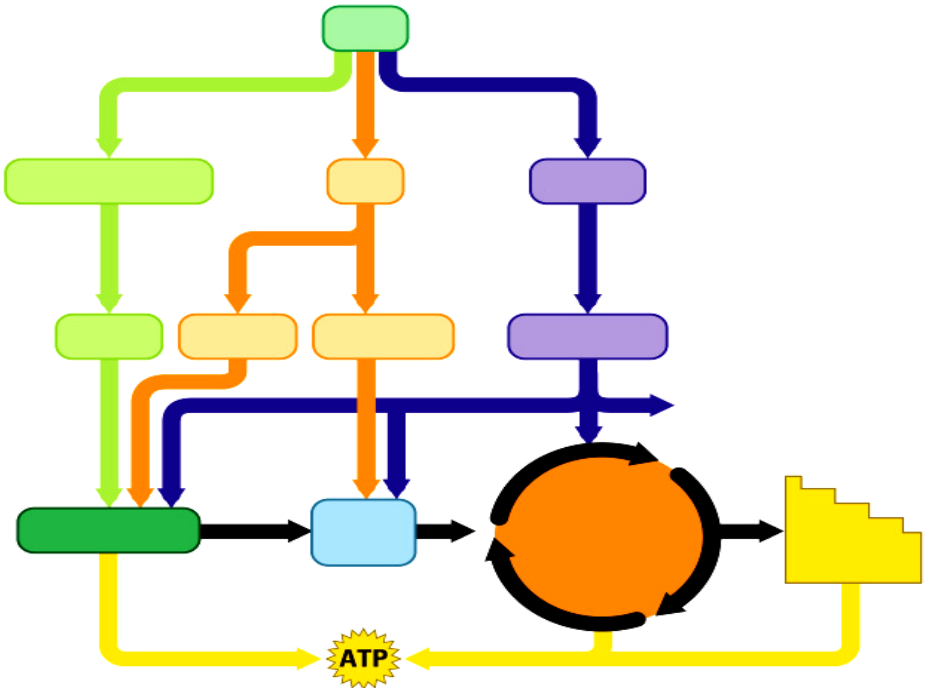
●The _____ can now do cellular _____.

Visual Summary of ETS; Fill in figure below; (THIS WILL BE ON TEST)

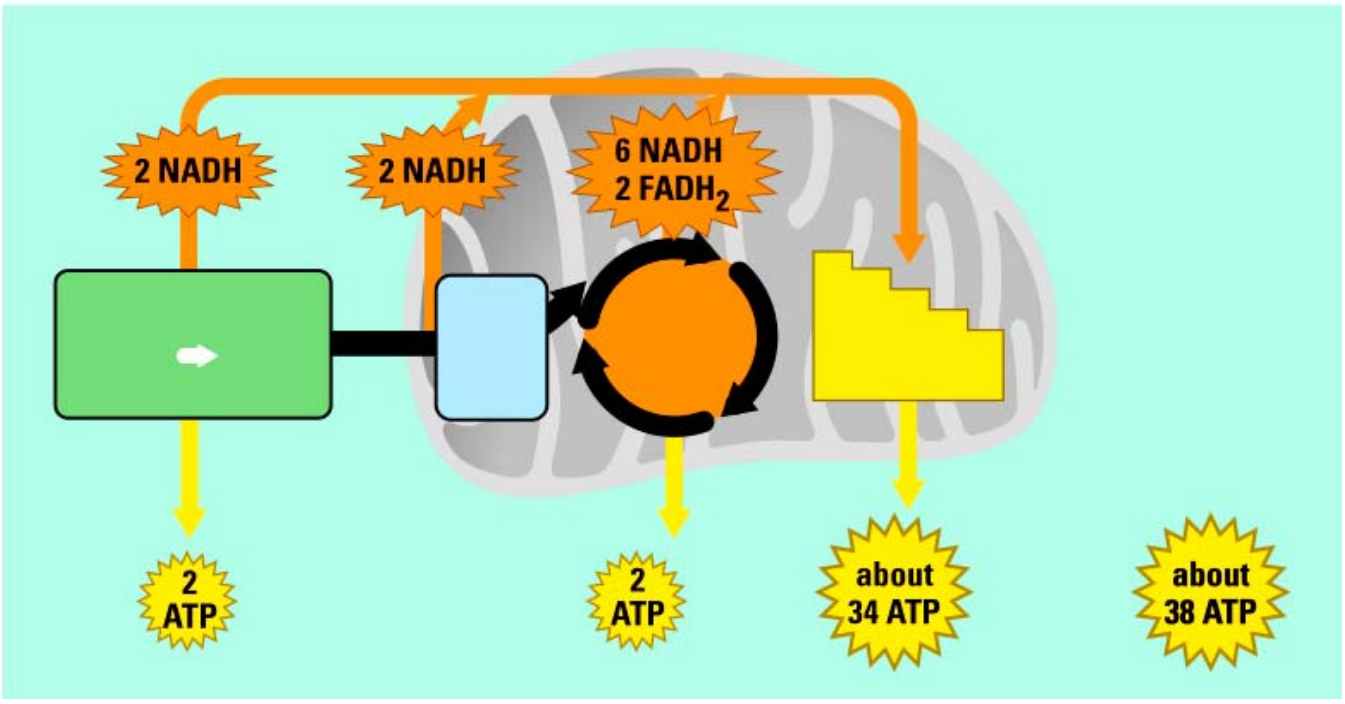


A Review of Cellular Respiration; figure

Different Types of Food Molecules all enter respiration at different points: Figure from book



***Adding Up the ATP from Cellular Respiration*; Fill this in (THIS <u>WILL BE</u> ON TEST)**



Review Questions;

1. What molecules are broken down in order to produce ATP?
   A. ADP
   B. Sugar
   C. DNA
   D. Oxygen
   E. None of the above are correct

2. What does all of the cellular work in the body?
   A. DNA
   B. Food
   C. Glucose
   D. Oompa-loompas
   E. None of the above are correct

3. What are the two pathways for sugar molecules depending of the availability of oxygen?
   A. High and low
   B. Glycolysis and Kreb's cycle
   C. Aerobic and anaerobic
   D. Hydrolysis and dehydration synthesis
   E. None of the above are correct

4. Where (in the cell) does aerobic respiration occur?
   A. Nucleus
   B. Cytoplasm
   C. Mitochondria
   D. In the lungs
   E. None of the above are correct

5. Where (in the cell) does anaerobic respiration occur?
   A. Nucleus
   B. Cytoplasm
   C. Mitochondria
   D. In the lungs
   E. None of the above are correct

6. In the figures, what does a shape with a sunburst pattern  indicate?
   A. Someone is getting punched by Batman
   B. That is where the food is
   C. That is showing the sun
   D. That is where the energy is
   E. None of the above are correct

7. In the figures, what two processes occur inside of the mitochondria?
   A. Glycolysis and ETS
   B. ETS and Kreb's cycle
   C. Kreb's Cycle and glycolysis
   D. Aerobic and anaerobic respiration
   E. None of the above are correct

8. In the figures, what are being carried by the NADH molecules to the ETS?
   A. High energy electrons and Hydrogen atoms
   B. Food molecules
   C. ATP molecules
   D. Water molecules
   E. None of the above are correct

9. In glycolysis, the 6-carbon glucose is broken down into two molecules of;
   A. ATP
   B. NADH
   C. $FADH_2$
   D. CO_2
   E. None of the above are correct

10. How many ATP molecules (overall) are generated during glycolysis?
    A. 1
    B. 2
    C. 4
    D. 32
    E. None of the above are correct

11. What are produced during glycolysis; mainly designed to carry hydrogen atoms and high energy electrons?
    A. ATP
    B. NADH
    C. $FADH_2$
    D. CO_2
    E. None of the above are correct

12. Oxygen is necessary for glycolysis to occur; True (A) or False (B)

13. Where do the pyruvic acid molecules from glycolysis go (into what cycle) if there is plenty of oxygen in the cell?
    A. ETS
    B. Calvin cycle
    C. Kreb's cycle
    D. Downward cycle
    E. None of the above are correct

14. What does pyruvic acid become at the end of the Kreb's cycle prep stage (just before entering the cycle)?
    A. Glucose
    B. ATP
    C. Acetyl-CoA
    D. Carbon dioxide
    E. None of the above are correct

15. What is removed from pyruvic acid that converts it into acetic acid?
    A. ATP
    B. High energy electrons
    C. Hydrogen
    D. Carbon dioxide
    E. None of the above are correct

16. What hydrogen and high energy electron carrier is produced during the Kreb's cycle prep stage?
    A. ATP
    B. NADH
    C. $FADH_2$
    D. CO_2

E. None of the above are correct

17. In what **form** (molecule) are all of the carbon atoms from the original glucose removed during Kreb's cycle?
    A. ATP
    B. Elemental carbon (C)
    C. Carbon dioxide
    D. Carbon monoxide
    E. None of the above are correct

18. What hydrogen and high energy electron carriers are produced during the Krebs cycle?
    A. ATP
    B. NADH
    C. $FADH_2$
    D. CO_2
    E. Both B and C above are correct

19. How many ATP molecules are formed during each Krebs cycle?
    A. 1
    B. 2
    C. 4
    D. 32
    E. None of the above are correct

20. The most important function of the Krebs cycle is to produce ATP directly; True (A) or False (B)

21. The most important function of the Krebs cycle is to produce hydrogen and high energy electron carriers that will be used during the ETS; True (A) or False (B)

22. The by-product (waste) of the Krebs cycle is;
    A. ATP
    B. Elemental carbon (C)
    C. Carbon dioxide
    D. Carbon monoxide
    E. None of the above are correct

23. Where is most of the energy that was in glucose immediately following the Krebs cycle (in what molecule)?
    A. ATP
    B. High energy electron carriers (NADH, $FADH_2$)
    C. Carbon dioxide
    D. Glucose
    E. None of the above are correct

24. During what process is most of the ATP in a cell made?
    A. Glycolysis
    B. Kreb's cycle
    C. ETS
    D. Fermentation
    E. None of the above are correct

25. What do NADH and FADH2 drop off when they reach the ETS?
    A. High energy electrons
    B. Carbon dioxide
    C. Hydrogen ions (H^+)
    D. Their kids at the pool
    E. Both A and C above are correct

26. As electrons move through the ETS, what do they pump to the outside of the membrane?
    A. High energy electrons
    B. Carbon dioxide
    C. Hydrogen ions (H^+)
    D. Their kids at the pool
    E. None of the above are correct

27. When hydrogen ions move back into the mitochondria (through the ATPase), what do they produce?
    A. ATP
    B. Elemental carbon (C)
    C. Carbon dioxide
    D. Carbon monoxide
    E. None of the above are correct

28. Where do the moving electrons and free hydrogens end up at the end of ETS?
    A. Just floating around
    B. Combining with oxygen (O_2) to form water
    C. Back in the cytoplasm
    D. They evaporate
    E. None of the above are correct

29. Why do we need to breathe oxygen? (think about ETS)
    A. To act as the final electron acceptor in ETS
    B. "Because, because, because, because, because , ...because of the wonderful things he does…"
    C. To combine with excess electrons and hydrogen ions at the end of ETS to form water
    D. Both A and C above are correct
    E. None of the above are correct

30. All types of food molecules can enter glycolysis and Krebs cycle to help produced ATM; True (A) or False (B)