

Name: _____ Class: _____ Date: _____

Respiration Review Pkt

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. When ADP gains a phosphate to form ATP,
- free energy is released by the loss of a phosphate.
 - energy is consumed.
 - the reaction ends.
 - chemical energy is converted to light energy.
 - ribose loses an oxygen to become deoxyribose.
- _____ 2. The exergonic reaction $1,3\text{-diphosphoglycerate} \rightarrow 3\text{-phosphoglycerate}$ is coupled to the reaction $\text{ADP} + \text{P}_i \rightarrow \text{ATP}$. Which of the following is most likely to be true about the reaction $\text{ADP} + \text{P}_i \rightarrow \text{ATP}$?
- The reaction never reaches equilibrium.
 - The reaction is spontaneous.
 - There is a large decrease in free energy.
 - The reaction is endergonic.
 - Temperature will not affect the rate constant of the reaction.
- _____ 3. Which of the following statements about metabolic pathways is true?
- Complex chemical transformations in the cell occur in a single reaction.
 - Each reaction requires ATP.
 - In eukaryotes, they occur in the cytoplasm.
 - They vary from organism to organism.
 - Each one is regulated by specific enzymes.
- _____ 4. When a molecule loses hydrogen atoms (as opposed to hydrogen ions), it becomes
- reduced.
 - oxidized.
 - redoxed.
 - hydrogenated.
 - hydrolyzed.
- _____ 5. Which of the following statements about NAD is true?
- It is a key electron carrier in redox reactions.
 - It requires oxygen to function.
 - It is found only in prokaryotes.
 - It binds with an acetyl group to form acetyl CoA.
 - It detoxifies hydrogen peroxide.
- _____ 6. When NADH donates two electrons to ubiquinone during respiration, ubiquinone is
- reduced.
 - oxidized.
 - phosphorylated.
 - aerobic.
 - hydrolyzed.

- _____ 7. Which statement about oxidative phosphorylation is *false*?
- It forms ATP by the respiratory chain/ATP synthesis.
 - It is brought about by chemiosmosis.
 - It requires aerobic conditions.
 - It takes place in mitochondria.
 - Its functions can be served equally well by fermentation.
- _____ 8. The role of oxygen gas in our cells is to
- catalyze reactions in glycolysis.
 - produce CO₂.
 - form ATP.
 - accept electrons from the respiratory chain.
 - react with glucose to split water.
- _____ 9. Which statement about pyruvate is *false*?
- It is the end product of glycolysis.
 - It becomes reduced during fermentation.
 - It is a precursor of acetyl CoA.
 - It is a protein.
 - It contains three carbon atoms.
- _____ 10. During glycolysis, for each mole of glucose oxidized to pyruvate,
- 6 moles of ATP are produced.
 - 2 moles of ATP are produced.
 - 4 moles of ATP are produced.
 - 2 moles of NAD⁺ are produced.
 - no ATP is produced.
- _____ 11. The citric acid cycle
- has no connection with the respiratory chain.
 - takes place in the mitochondrion.
 - reduces two NAD⁺ for every glucose processed.
 - produces no ATP.
 - is the same thing as fermentation.
- _____ 12. During the first step of the citric acid cycle, energy stored in acetyl CoA is used to
- create a proton gradient.
 - drive the reaction $ADP + P_i \rightarrow ATP$.
 - reduce NAD⁺ to NADH.
 - drive the reaction oxaloacetate \rightarrow citric acid.
 - reduce FAD to FADH₂.
- _____ 13. In the citric acid cycle, oxidative steps are coupled to
- oxidative phosphorylation.
 - the oxidation of water.
 - the oxidation of electron carriers.
 - the hydrolysis of ATP.
 - the reduction of electron carriers.

- _____ 14. For the citric acid cycle to proceed, it is necessary for
- pyruvate to bind to oxaloacetate.
 - carbon dioxide to bind to oxaloacetate.
 - an acetyl group to bind to oxaloacetate.
 - water to be oxidized.
 - None of the above
- _____ 15. Which of the following is produced during the citric acid cycle?
- FAD
 - Pyruvate
 - Reduced electron carriers
 - Lactic acid
 - Water
- _____ 16. In the cell, the site of oxygen utilization is the
- nucleus.
 - chloroplast.
 - endoplasmic reticulum.
 - mitochondrion.
 - cytosol.
- _____ 17. The respiratory chain
- is located in the mitochondrial matrix.
 - includes only peripheral membrane proteins.
 - always produces ATP.
 - reoxidizes reduced coenzymes.
 - operates simultaneously with fermentation.
- _____ 18. The chemiosmotic generation of ATP is driven by
- osmotic movement of water into an area of high solute concentration.
 - the addition of protons to ADP and phosphate via enzymes.
 - oxidative phosphorylation.
 - the proton motive force.
 - isocitrate dehydrogenase.
- _____ 19. Which of the following statements about the electron transport chain is true?
- Electrons are received from NADH and FADH₂.
 - Electrons are passed from donor to recipient carrier molecules in a series of oxidation–reduction reactions.
 - The terminal electron acceptor is usually oxygen.
 - Most of the enzymes are part of the inner mitochondrial membrane.
 - All of the above
- _____ 20. Which of the following events occurs as part of the electron transport chain?
- Release of CO₂
 - Reduction of CO₂
 - Oxidation of FADH and NADH
 - Reduction of NAD⁺
 - Both a and b

- _____ 21. The water that is a by-product of cellular respiration is produced as a result of the
- combining of carbon dioxide with protons.
 - conversion of pyruvate to acetyl CoA.
 - degradation of glucose to pyruvate.
 - reduction of oxygen at the end of the electron transport chain.
 - None of the above
- _____ 22. The drug 2,4-dinitrophenol (DNP) destroys the proton gradient across the inner mitochondrial membrane. What would be the effect of incubating isolated mitochondria in a solution of DNP?
- Oxygen would no longer be reduced to water.
 - No ATP would be made during transport of electrons down the respiratory chain.
 - Mitochondria would show a burst of increased ATP synthesis.
 - Glycolysis would stop.
 - Mitochondria would switch from glycolysis to fermentation.
- _____ 23. The component of aerobic respiration that produces the most ATP per mole of glucose is
- the electron transport chain.
 - the citric acid cycle.
 - glycolysis.
 - lactic acid fermentation.
 - alcoholic fermentation.
- _____ 24. Which of the following processes occurs when oxygen is *not* available?
- Pyruvate oxidation
 - The citric acid cycle
 - Fermentation
 - An electron transport chain
 - All of the above
- _____ 25. Fermentation
- takes place in the mitochondrion.
 - takes place in all animal cells.
 - does not require O₂.
 - requires lactic acid.
 - prevents glycolysis.
- _____ 26. Many species derive their energy from fermentation, which
- reduces NAD⁺.
 - oxidizes CO₂.
 - ensures a continued supply of ATP.
 - produces acetyl CoA.
 - None of the above
- _____ 27. Compared with fermentation, the aerobic pathways of glucose metabolism produce
- more ATP.
 - pyruvate.
 - fewer protons for pumping in the mitochondria.
 - less CO₂.
 - more oxidized coenzymes.

- _____ 28. Regardless of the electron or hydrogen acceptor employed, fermentation always produces
- AMP.
 - DNA.
 - P_i .
 - NAD^+ .
 - None of the above
- _____ 29. In human muscle cells, the fermentation process produces
- lactic acid.
 - 12 moles of ATP.
 - pyruvic acid.
 - an excessive amount of energy.
 - None of the above
- _____ 30. When the supply of acetyl CoA being produced exceeds the demands of the citric acid cycle, some of the acetyl CoA is diverted to the synthesis of
- pyruvate.
 - NAD.
 - proteins.
 - fatty acids.
 - lactic acid.
- _____ 31. If a cell has an abundant supply of ATP, acetyl CoA may be used
- to enhance fermentation.
 - to enhance oxidative metabolism.
 - for fatty acid synthesis.
 - to convert glucose to glycogen.
 - None of the above

