

METABOLISM TEST REVIEW

1. Define the terms metabolism, catabolism, and anabolism.
2. Write the balanced chemical equation for aerobic cellular respiration of glucose.
3. How many carbon atoms are in:
a) glucose b) pyruvate c) acetyl-CoA d) citrate
4. a) How many carbon atoms remain from the original glucose at the end of Krebs cycle?
b) Where did the carbon atoms go?
c) Where did the oxygen atoms go?
d) Where did the hydrogen atoms go?
5. a) What does ATP stand for?
b) Draw and label the general structure of ATP.
c) What class of biologically important molecules is ATP related to?
d) Describe how ATP is used to provide energy.
6. Identify the location in the cell and net products of:
a) glycolysis b) matrix reactions c) ETS (oxidative phosphorylation)
7. Identify any special molecules (reactants) needed by each of the following processes:
a) glycolysis b) matrix reactions c) ETS (oxidative phosphorylation)
8. Be able to label diagrams of glycolysis, matrix reactions, and ETS.
9. Draw and label a mitochondrion and its parts.
10. Explain what is happening in these specific steps:
a) conversion of PEP to pyruvate in glycolysis
b) conversion of isocitrate to alpha-ketoglutarate in Krebs cycle
11. If a patient was deficient in the enzyme that converts fructose-1,6-bisphosphate into DHAP, what molecules might start building up in the cell?
12. What is the role of NAD⁺, NADH, FAD, FADH₂? Which is the oxidized/reduced form?
13. a) Describe the role of oxygen in the ETS.
b) How does a lack of oxygen affect both the ETS and Krebs cycle?
c) Is glycolysis affected? Why?
d) What is the effect of cyanide on the ETS?
14. How many glucose molecules would be produced by hydrolysis of these and how many ATP in aerobic conditions?
a) 2 maltose b) 3 sucrose
15. How many pyruvate molecules would be produced by glycolysis of 5 glucose?
16. Draw the reactions for:
a) alcoholic fermentation
b) lactate fermentation
c) What is the real purpose of fermentation?
17. Describe how ATP is synthesized by the ETS. Include in your answer reference to:
- NADH/FADH₂, ETS carriers, H⁺ pumping, respiratory assemblies, ATP synthase, chemiosmosis,
of ATP per NADH or FADH₂, NADH from glycolysis, oxygen requirement, net ATP from ETS
18. Describe how these foods enter into the metabolic cycles of cellular respiration:
a) proteins b) lipids