

BIO 5099
Homework Assignment #7

Name _____

Due start of class, **Tuesday October 8th**.

Late assignments are not accepted; show your work for partial credit.

Assignments may be e-mailed to: christiaan@xiaan.com or rbaror@dmibio.com anytime, or faxed to (303) 556-2889 between 3:00 and 4:00 p.m. on Tuesday.

Define **in your own words** and give an example:

1. (2 pts) Catabolism

2. (2 pts) Gluconeogenesis

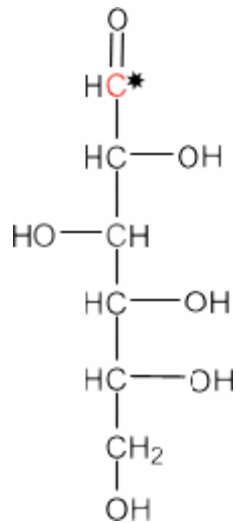
3. (2 pts) Cytochrome

4. (2 pts) Allosteric regulation

5. (2 pts) Transamination

6. (2 pts) Why do we study knockins and knockouts, what can they tell us?

7. (3 pts) Assume you have a radio-labeled glucose molecule with the following structure:



After one turn of the Krebs cycle (until oxaloacetate) where is the radio labeled carbon? Draw the structure of the molecule that contains it.

8. (5 pts) What is the ATP yield of the complete oxidation (to CO_2) by the complete process of glycolysis, Krebs & oxidative phosphorylation of various intermediates (Pyruvate, NADH, Glucose, etc...)? Explain.

9. (4 pts) Often products of enzyme catalyzed reactions inhibit the activity of the enzyme.

a) What do we call this situation?

b) Sketch what the reaction progress (product concentration) vs. time might look like given this situation.

10. (6 pts) Write a balanced equation for

a) The conversion of aspartate into oxaloacetate by way of fumarate.

b) The synthesis of triglyceride (triacylglycerol) from glycerol and fatty acids.

c) The synthesis of alanine from glucose

11. (4 pts) The change in Gibbs free energy of fumarate to malate is -3.8 kJ/mol. Using the equation $\Delta G = -RT \ln K_{eq}$ and assuming physiological temperature (98.6 C) where R is $8.3144 \text{ J mol}^{-1} \text{ K}^{-1}$ find the equilibrium constant for this reaction (hint: watch your units on temperature!)
12. (6 pts) McArdle's Syndrome is characterized by a deficiency in phosphorylase B and results in muscular pain, fatigability and muscular cramping upon exercise. Explain what phosphorylase B does and why the symptoms above manifest themselves.