

EXAM III

Name: _____

1.) Imagine that you have the following stock materials:

dH₂O

solid NaCl (FW 58.44)

0.100 M Tris buffer (pH 8.0)

50% (v/v) glycerol

To run an assay, you need 50 mL of the following solution:

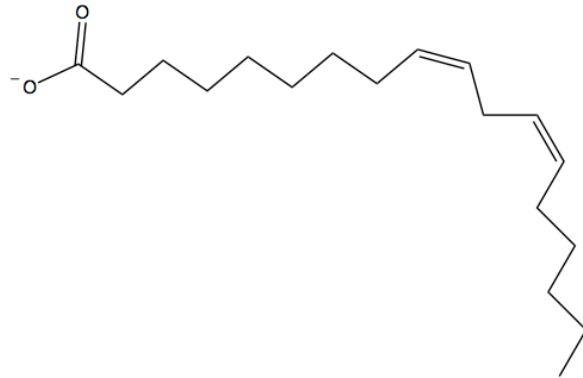
12.0 mM Tris buffer

10 mM NaCl

10% (v/v) glycerol

List the amount (mass or volume) of each stock material needed to prepare the desired assay solution. Show your work.

2.) Describe the process by which your muscle cells breakdown linoleic acid. Include molecular details (structures and enzymes) for each new type of reaction. For repeat reactions, molecular detail is not necessary. Do not proceed through TCA cycle or the ET chain. **How many acetyl-CoA; FADH₂; and NADH are produced?**



3.) Imagine that you are living on a deserted island where there are only two main sources of lipids, chicken eggs from your chicken flock and walnuts. Unfortunately for you, a hurricane has just swept away your chicken flock leaving you with only walnuts.

(i) Do you expect your cholesterol intake to increase or decrease?

(ii) Do you expect expression of HMG-CoA reductase to increase or decrease?

(iii) Explain the mechanism driving the change in expression of HMG-CoA reductase from (ii) in molecular detail.

4.) The degradation pathway for leucine is very similar to that of β -oxidation of fatty acids and ketone body formation. **Start by drawing leucine. Draw the product of each step of the following sequence starting with leucine:**

- (i) transaminase reaction
- (ii) reaction analogous to pyruvate dehydrogenase (or α -Ketoglutarate dehydrogenase; oxidative decarboxylation)
- (iii) reaction analogous to acyl-CoA dehydrogenase
- (iv) reaction analogous to pyruvate carboxylase (add a carboxyl group to one of the terminal methyl groups)
- (v) reaction analogous to enoyl-CoA hydratase
- (vi) HMG-CoA lyase reaction

5.) In the first half of the ping-pong mechanism of transaminases, an amino acid is converted to its α -keto acid with the amine group transferred to the PLP cofactor. **Draw the electron pushing mechanism for the regeneration of the PLP cofactor using α -Ketoglutarate (the second half of the ping-pong mechanism).** Below is the starting point of the cofactor for your mechanism.

