

## Lehninger forts.kurs del 1/3 (5sp)

Tentamen 13.6.2008

1. Match statements. (10 questions with about five different answers each to choose from)
2.
  - a) List 4 aminoacids of a water soluble protein that would most likely have their side chains facing the solvent.
  - b) Which aminoacids can give the most and least flexibility to a proteinchain?
  - c) List 4 aa's of a membranebound protein that would likely be found facing the membrane.
  - d) List 4 aa's whose sidechains could be involved in H-bonding
  - e) List 4 aa's that very likely contribute to the hydrophobic effect and hence drive water soluble proteins to fold into their native 3D structure
  - f) Which 3 aa's are commonly known to be phosphorylated and dephosphorylated by enzymes?
3. Describe the difference between aa's and nucleotides chemistry/structure of the monomers and how the chemistry/structure of their polymers dictates function.
4. Describe the dependence of the melting point of a fatty acid on chain lenght and unsaturation.
5. pH optimum of lysozyme  
Glu<sup>35</sup>  $pK_a=5,9$   
Asp<sup>52</sup>  $pK_a=4,5$   
  - a) what is the ionization state of each residue at pH optimum for lysozyme at 5,2?
6. The D-isomere is more effective than the L-isomere, why is the difference in bioactivity so radically different?
7. The melting temperature of DNA depends on what?
8. What properties of antibodies can be exploited in biochemsitry or biotech application?
9. How do the chemical properties and structures of H<sub>2</sub>O and main classes of macromolecules reflect their main functional roles in living organisms? (proteins, carbohydrates, lipids, nucletides/nucleic acids, water)
10. Why is regulation mechanisms neccessary?
11. What is
  - a) allostery
  - b) feedback inhibition
  - c) proteolytic cleavage
  - d) phosphorylation/dephosphorylation

12. Enzyme kinetics

a) what is  $V_{\max}$  and  $K_m$ ?

b) what happens to  $V_{\max}$  and  $K_m$  when an inhibitor is added?

13. Hb VS Mb

14. (Enzymes) Noncovalent interactions are key to life, why is this so? What would the consequences be if all interactions were covalent?

More stuff I didn't write down from the exam were about titration curves of the aminoacids and how enzymes lowers the activationenergy for reactions in living organisms and...

Protein folding

Structure of DNA and RNA

Protein-ligand interactions

What types of contact/interaction would be expected from a hydrophobic or polar charged group?