General Biology: Cells and Molecules
Week #1a Homework Assignment Answers

ALL homework MUST be stapled. No exceptions. Homework is due one class meeting after it is assigned. Homework will not be accepted late. You may type or handwrite your answers. Please make your handwriting as legible as possible.

In your text, please complete the following for homework:

1. Chapter 3: pg 60 Self Quiz questions 1-10
2. Chapter 3: pg 60 For Discussion questions #1-4.

Answers:

Self Quiz questions

1. E
2. E
3. C
4. D
5. B
6. A
7. C
8. E
9. A
10. D

Discussion Questions:

1. Cellulose is a giant polymer of glucose alone, joined by β-1,4 linkages. (See Figure 3.16*a*.) Cellulose is much more stable chemically than starch and more difficult to hydrolyze chemically and enzymatically. This quality makes it an excellent structural material. Phospholipids have two hydrophobic ("water-hating") fatty acid tails and one hydrophilic ("water-loving") phosphate attached to the glycerol. (See Figure 3.20.) As a result of this structure, phospholipids orient themselves so that the phosphate group faces water and the tail faces away from water. In aqueous environments, these lipids form bilayers, with heads facing outward, and tails facing inward. (See Figure 3.21.) Cell membranes are structured this way.

2. Changing a lysine for an aspartic acid causes a change in the primary structure of the protein. This may have a ripple effect and *MAY* cause changes in the secondary structure. Tertiary structure is the three-dimensional shape of the completed polypeptide. (See Figure 3.6d.). The primary determinant of the tertiary structure is the interaction between R groups. Therefore, switching a lysine for an aspartic acid changes the R group and thus could change the tertiary structure. The quartenary structure may be influenced but remember that quaternary structure is only for proteins made of subunits.

3. With a total of 20 amino acids, it is possible to generate 400 different dipeptides. That is calculated by taking the total number of amino acids (in this case, it is 20) and raising it to the 2 power (the total number of amino acids in the peptide). 2^{20}. Similarly, 20^3 would result in 8000 different combinations of tripeptides. For trinucleotides,it would be 4 (the number of bases – A, C, G, or T) raised to the 3^{rd} power or 4^3 which gives you 64 combinations. The total number of different RNAs possible in a 200 base sequence would be: 4^200!

4. You should be able to do this by looking up information in the chapter!