**DAS Lab 12: DNA or Protein?**

**Please fill out this data sheet during the laboratory. A completed DAS with all post-laboratory questions answered is due next week in lab.**

**Experimental Observations Parts 1 and 2**

1. Describe in detail the appearance of your recovered DNA. Draw a picture of the “ladder” model of DNA using letters to represent your chemicals. Show the sugar phosphate “rails”. +2pts

It was gauzy, clear-to-white, some of it was small white pieces. Some of it was long and slimy.

Want a diagram with A-T C-G etc. and 2 lines (labeled S-P or sugar phosphate) for the outer portions of the ladder.

1. Describe the appearance of the DNA T-a and Protein T-b tube contents. How do they look similar? Different? What would you expect to happen to protein when it is subjected to heat? What is this called? Discuss. +2pts



DNA is soluble when placed in a boiling water bath, caused by the separation of its double strand, resulting in a clear solution. However, albumin changes its conformation from a globular form to a random aggregation as a clot, resulting in a cloudy suspension.We denature proteins with heat, destroying secondary, tertiary and quaternary structure.

1. Describe the appearance of the DNA A-a and Protein A-b tube contents. How do they look similar? Different? What would you expect to happen to a protein when subjected to acid? What did we discuss in class? Explain fully. +2pts

The denaturing effect of a change in pH is also observed in DNA and proteins in an acidic medium. The DNA double strand is separated and solubilized in 1.0M HCl, But the conformation of the egg white is altered and acquires a new conformation as a filamentous white aggregate. In 0.1M HCL, both were clear.

1. Describe the appearance of the DNA P-a and Protein P-b tube contents. How do they look similar? Different? The Biuret test is a test for the presence of proteins. It is based on the ability of Cu (II) ions to form a  violet-colored complex with peptide bonds (-CONH-   groups) in the presence of base. What can you infer from your experimental results? Which of your two samples contains peptide bonds? Discuss. +2pts

Proteins form a complex with copper salts in alkaline solution. When a protein reacts with this reagent, a light purple complex is formed. It is a simple method used to specifically identify the presence of proteins. Pure DNA should give a negative reaction. It was pale clear vs pale purple.

**Post-Lab Questions – To be completed outside of lab.**

1. Describe what you learned about the properties of DNA and proteins during today’s lab. Which was more stable to heat? To acid? One has polynucleotides. The other has polypeptides. Think of a rope versus a rope ladder. Which would you expect to be more stable? Discuss fully. How are DNA and proteins similar? different? What does each contain? (Hint…think about the protein models from class, and how your text describes peptide, polypeptides and proteins). +2pts for DNA discussion +2pts for protein discussion.

DNA is composed of long chains. It was fragile and easily broken down. It floated at the top of our beaker. It is composed of polynucleotides, a base, a sugar, and a phosphate. It forms an extensive double helix chain that is very long, and apparently more stable to the lab conditions we experienced today than the protein. DNA is more stable in the presence of acid and heat. Proteins form white globs. Proteins form a purple color with Biuret’s solution. DNA remains clear.

Proteins are composed of polypeptides, which are amino acids. These are much shorter chains, and more suspecptible to acid and heat denaturation. Discuss primary, secondary, tertiary, quat structure.

1. What structural characteristics of DNA allow it to be spooled out on a glass rod? Why is it not possible to spool out precipitated proteins? +2pts

The long chains allow us to do this. If they were short, we couldn’t do it. Proteins are much shorter, so they are not spoolable.

1. The homogenizing solution also contains a metal chelator (a molecule that binds tightly to metal ions) called EDTA. The chelator is added to inhibit the enzyme activity of DNA phosphodiester hydrolase.
	1. Looking at the name of the enzyme, describe the reaction you think DNA hydrolases catalyze. +1pts

It hydrolyses the DNA and breaks it down.

* 1. Why would we want to inhibit these enzymes at the beginning of our procedure? +1pts

If we didn’t, we wouldn’t have any DNA to isolate!

1. There are two hydrogen bonding pairs in DNA that enable the formation of a double helix.
	1. Draw the hydrogen bonding between adenine and thymine. Show all the hydrogen bonds. +2pts



* 1. Draw the hydrogen bonding between cytosine and guanine (Show all the hydrogen bonds). +2pts

