Hey everyone!

With last week's lecture on cell biology and biochemistry by Neil, we will have a few questions on that topic. We will give points based on answers to the questions and have a leaderboard of the people with the most points, and have prizes for those with the most points after some number of weeks. You can feel free to use any online resources and certainly discuss with others—the point here is for you to learn how to think about deeper questions and learn the important skill of diving into wikipedia articles and get invested in **understanding** biology. Through thinking about these questions, I hope you'll see that biology is not at all mere memorization, and this should become clearer the more time you put into learning biology.

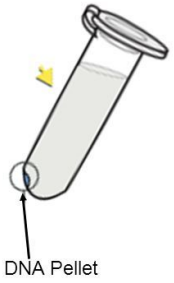
We I'll assign some arbitrary point values for now, but our system may very well change in the future. Next week, I will provide explanations to these questions, but it is extremely important that you develop your own approach to thinking about questions and finding resources.

1. (100 pts) Explain why the hydrophobic interaction isn't so much an interaction as, say, dipole-dipole forces are.
2. (200 pts) What happens to the water that surrounds a hydrophobic molecule (find the term that describes the configuration of the water molecules around it)?
3. (200 pts) Why might the hydrophobic interaction be one of the main driving forces of protein folding?
4. (300 pts) Suppose we have a solution in which the following polypeptides are present: DDDDDD, SHIVAM, and EDWARD. If we gradually add in ammonium sulfate, in what order we see the polypeptides precipitate?

5. (300 pts) Consider the below procedure for extracting/purifying DNA from a solution. Notice how salt (sodium acetate) is added. Why should salt be added?

Ethanol Precipitation

1. Add sodium acetate to 0.3M -
2. Add two volumes 100% ethanol
3. Mix; spin 30 minutes at 4C
4. Wash: Remove supernatant carefully Fill tube halfway with 70% ethanol; spin 2 minutes.
5. Repeat wash.
6. Carefully pipette out or decant supernatant. There will be a clear pellet on the bottom. It may be difficult to see.
7. Dry the pellet by placing the tube upside down on a rack. It shouldn't take longer than 30 minutes – just until all residual ethanol has evaporated.
8. Dissolve pellet in appropriate amount of TE or desired buffer



6. (500 pts) Now we get to a quite complex question. Remember that the purpose of this process is to precipitate DNA and to remove as much impurity from the resulting DNA as possible. Why does the procedure call for using 100% ethanol first, then 70% ethanol, which would be a more polar mixture (due to a greater proportion of water)?

Hint: the fact that it is 70% the second time is arbitrary, it just matters that it is intermediate to ethanol and water.
Another hint: consider the relative order of polarities of what's in the test tube)

Maybe you should check this out: https://www.youtube.com/watch?v=TIMGH2z1eh4
(This channel is quite good for a wide range of topics)