The second month of the class we are going to learn how to work directly with microorganism. Bacteria are the main organism genetic engineers work with because they are easy to grow and can take up and replicate DNA very well.

**Protocols**

1. First read and follow How to Streak Bacteria or Yeast on an Agar Plate
2. Read through and follow Bioluminescent Grow Kit Protocol

**Papers**

If you are not used to reading through scientific papers it can be a hard and slow process. Don’t feel bad if you don’t understand the papers, it is like reading a foreign language and can take time. I recommend printing off a copy of the paper if possible and looking up words and techniques you don’t understand and taking notes. You can also feel free to ask questions about the papers during our live chat sessions or on the Facebook group.

This months focus is on proteins but we also through in some extra papers on DNA that we thought were cool and relevant.

*De novo design of potent and selective mimics of IL-2 and IL-15*

This paper is about how scientists can use computational protein structure and function prediction to design new drugs!

*Dynamic Personalities of Proteins*

This paper is a super technical paper about how protein actually move and function on the thermodynamics and physical level. Don’t feel bad if this article is way over your head. Just being familiar with the names and ideas of these concepts is helpful

*Genetical Implications of the structure of Deoxyribo nucleic acid(DNA)*

Historic paper on DNA.

*Central Dogma of Molecular Biology*

Definitely read this paper as it discusses the foundations for genetic engineering. How DNA makes proteins.

*Junk or functional DNA? ENCODE and the function controversy*

Does all DNA have a function? Is there such thing as Junk DNA?

*What Does It Mean to Be 75% Pumpkin? The Units of Comparative Genomics*

Exactly what the title says. Interesting read.

**Things to Remember About Proteins**

1. Proteins are little nanomachines that makes everything “alive”. They are literally nanotechnology.
2. Watch these videos:
   1. <https://www.youtube.com/watch?v=FzcTgrxMzZk>
   2. <https://www.youtube.com/watch?v=X_tYrnv_o6A>
3. Proteins are composed of combinations of 20 different amino acids. There are more amino acids but they are just not used to make proteins.
4. DNA is converted into RNA by proteins in the cell which translates the RNA into proteins.
5. Proteins can be very large, Titin is 27,000 amino acids but the average size of proteins is around 200-300 amino acids.
6. Proteins can interact with most any molecule.