

The first month of the class we are going to learn some basic lab techniques that are needed before moving on to genetic engineering. Majorly, we are going to learn about cells.

Each month there will be protocols for you to follow to learn new lab techniques. There will also be scientific papers both modern and classic for you to get a glimpse into scientific research on the topic.

Protocols

1. First read and follow through with the How To Pipette, How to Use a Scale/Balance and Sterile Technique Protocols
2. Next make Agar plates using the How to Make Agar Plates protocol
3. Finally, perform the Cultures experiment and share your results on our Facebook group

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.

The Developmental Capacity of Nuclei

This paper is interesting in that the authors remove nuclei and transplant them into embryos to see the effects. It is at a time when scientists were first beginning to understand how genes stored in the nuclei of cells worked.

Measurement Of Current-voltage Relations In The Membrane Of The Giant Axon Of Loligo

This paper is one of the first papers to show how axons work by measuring voltage along a huge cell the squid giant axon. Each cell has a membrane potential which is a difference in charge between the inside and outside of the cell.

Induction of Pluripotent Stem Cells From Mouse Embryonic and Adult Fibroblast Cultures by Defined Factors

This paper is the first to describe how it is possible to create stem cells embryonic and adult cells by adding in 4 genes.

Creation of a Bacterial Cell Controlled by a Chemically Synthesized Genome

This is the most modern paper in cell biology we will be reading dated at 2010. Scientists in this paper synthesized a whole bacterial genome and used some trickery to put it together and inside a bacterial cell.

Things to Remember About Cells

- 1) Cells only come from other cells
- 2) Cells come in all different shapes and sizes. Bacterial cells are small ~1 micron - 5 microns (hard to see clearly under a light microscope) and mammalian cells are 30 microns or bigger and easy to see under a light microscope
- 3) All cells have DNA and replicate their DNA in the same way
- 4) Proteins are little machines inside cells that make them alive and do things.
- 5) Genome size is not correlated with the sophistication of the organism. i.e. humans don't have more DNA than plants.
- 6) Model organisms are bullshit
- 7) Almost everything in cells is made of Hydrogen, Carbon, Nitrogen, Oxygen and Phosphorus