**Spring 2018 Semester Research Progress**

I began doing research with Professor Sostarecz this semester using the Langmuir Monolayer Trough to construct and analyze monolayer films. At the beginning of the semester, I began learning the Langmuir Monolayer technique, some of the background information, and began performing trials.

The first lipid that i performed trials on was DPPC, or Dipalmitoylphosphatidylcholine (shown below). DPPC is an amphiphilic molecule meaning that it has both a hydrophilic head and a hydrophobic tail. Due to this, when applied to a water subphase, DPPC orients itself upright with the carbon chains point up, and the head group pointing down into the water. Once the lipid is applied to the subphase and is allowed to orient and assemble a monolayer, the film is compressed and its area and pressure are recorded on a Compression Isotherm(shown below).
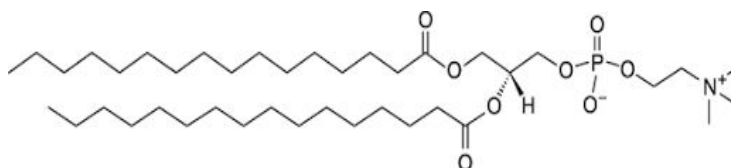

Dipalmitoylphosphatidylcholine
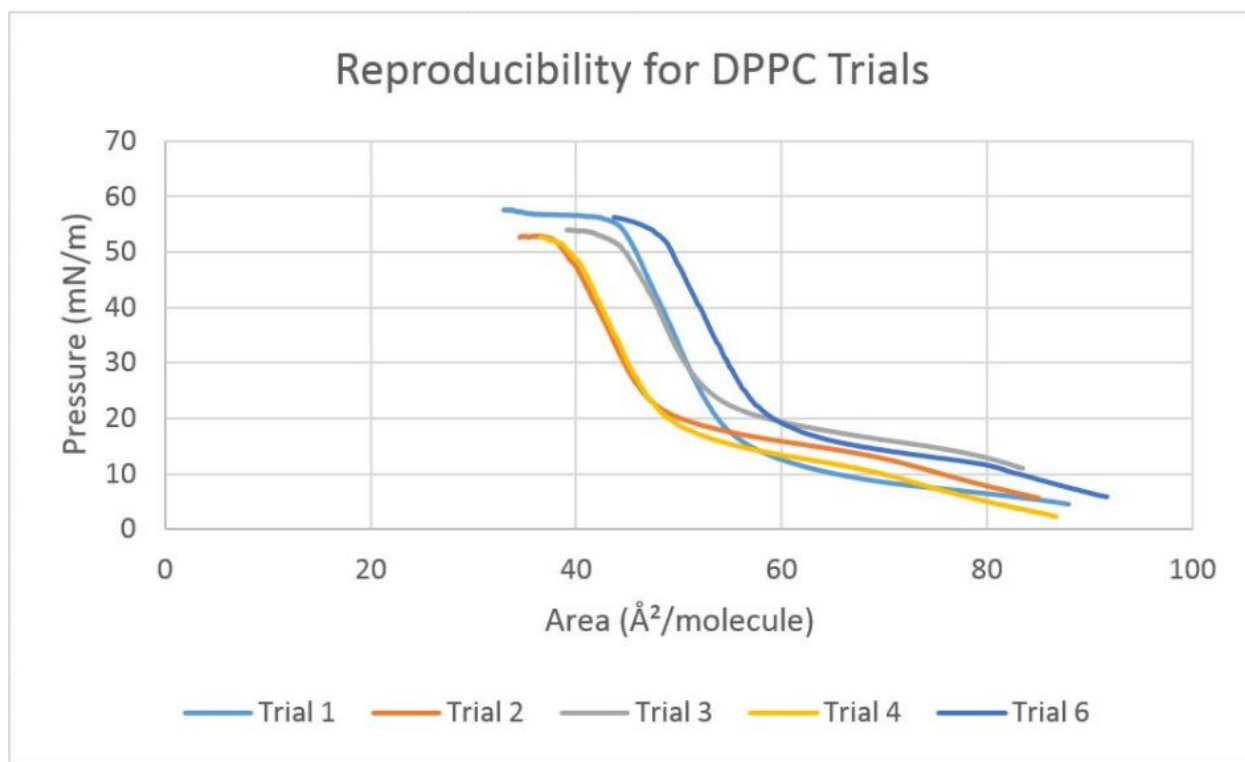
The plot of trials for DPPC is shown above. This is considered a reproducibility graph when compares trials performed on a singular graph. From this you can determine if your trials were reproducible(everything is the same shape and in the same general region) or not reproducible(not much correlation between trials). Since trials all started around the same area and pressure, had similar phase changes, and similar collapse pressures, it was concluded that the trials performed had reproducibility and I was allowed to begin running trials on another lipid: Cholesterol.

Cholesterol(shown below) is a sterol which consists of a polycyclic ring group to which a hydroxyl group, which is polar and hydrophilic, is attached(on the A-ring). The rest of the structure is hydrophobic. Since cholesterol is composed of large, rigid rings and has such a small "tail" group, it doesn't interact with itself until the monolayer is fairly compressed($\sim 40 A^2$/molecule).
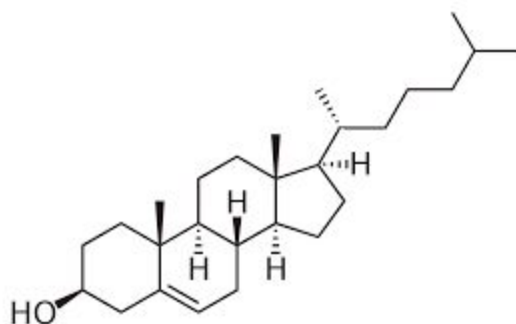
Cholesterol
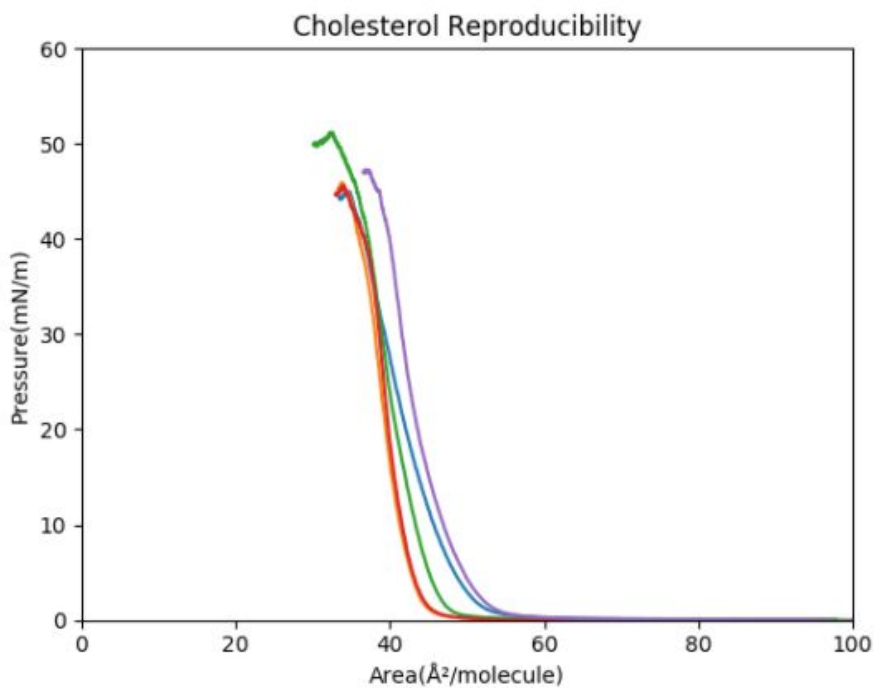
During my trials with this lipid, my first seven trials were performed using a bad cholesterol solution, so the trials had to be redone using new cholesterol. The trials were graphed once again and were plotted using Brandon's reproducibility software. Aside from the initial phase change, the trials are relatively similar, so it was decided that a level of reproducibility had been attained.

I will soon be starting trials with DPPE to understand how it works and what it's isotherm looks like. This will also be another way to gain reproducibility while using the Langmuir Trough, which is crucial when performing research.

I have also been reading articles on insulin and research on it using the Langmuir Trough. I plan on doing research on Kate's project during this summer during the Doc Kieft Summer Research Program. I still need to have a talk with Kate about what she would like for me to do during the summer.

Along with the research I will be performing on Kate's project during the summer, I will also be learning Python, the code for Brandon's data analysis programs, and maybe constructing a Fluorescence Microscope with Brandon.