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The Affect of DHA Concentration on Lipid Membrane Fluidity

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The Effect of Docosahexaenoic Acid(DHA) on Lipid Membrane Fluidity

Executive Summary

By: Elise Rezabeck, Shuzhen Liu, and Kai Gu

The purpose of this experiment was to determine the relationship between the concentration of Docosahexaenoic Acid(DHA) and lipid membrane fluidity. To determine the fluidity giant unilaminar vesicles(GUVs) were created utilizing 1-palmitoyl-2-oleoyl phosphatidylcholine (POPC) and cholesterol. These vesicles acted as lipid membrane bilayers for the purpose of these experiments. These vesicles were created utilizing the Flim hydration method and imaged utilizing total internal reflection fluorescence (TIRF) microscopy. With a camera attached to the microscope videos of these vehicles could be recorded. These videos are then analyzed by tracking the individual lipids in Image J utilizing the Trackmate plugin. The data extrapolated is then used with a Matlab program to calculate the fluidity of the various vesicles.

The results of this experiment will help further the understanding of DHA's effect on our bodies. This will also further our understanding of lipid bilayers as the GUVs act as lipid bilayer membranes. Our bodies utilize lipids and bilayer lipid membranes in various places to carry out various functions throughout our bodies. Understanding the interaction between DHA and lipid membranes is a jumping-off point for more research to further understand how our bodies function and cells can be positively and negatively influenced. These influences can guide us to comprehend many biochemical processes further. Furthermore, more information on this topic can help from a medical standpoint by broadening our understanding of certain health issues we face and how we can combat them.

The detailed methods, results, and conclusions found from these experiments are withheld from this report. The full report can be viewed and read when published later this summer.