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Internship Attended: Rensselaer Polytechnic Institute, Dr. Richard Gross

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Scientific research and experimentation is the thankless hero of contemporary society. Exploring new and exciting frontiers that may both lead to the betterment of society and reveal life's greatest mysteries, as well as strengthening the foundation of millennia's worth of human discovery and ingenuity is the mission statement for scientists everywhere. The Center for Biotechnology and Interdisciplinary Studies ('Biotech' for short) at Rensselaer Polytechnic Institute (RPI) is a shining example of such exploration and innovation. The building itself, a shining beacon of futuristic architecture, gave a sense of immeasurable knowledge waiting to be unraveled. Traversing the major halls of the Biotech building left me in a state of perpetual awe and amazement as I gazed at the posters on the wall, depicting past and current experiments taking place. I had the pleasure to participate in a research internship in Dr. Gross' Laboratory at the Biotech building, with a colleague/peer, this summer.

To say that Laura Weinberg, Lisa Levine, and the GNBCC gave me the opportunity to participate in a summer science internship this summer is a gross understatement. The experience I had this summer was new, exciting, and enlightening. I'm only going into my Junior year in high school and I already feel like I was given a once in a lifetime opportunity. At RPI, I grew as a responsible young adult; I was tasked with balancing work hours and the pursuit of scientific knowledge, with everyday tasks such as preparing a proper eating schedule and maintaining a relatively clean dormitory. I feel like a new person leaving RPI, and it was due not only to the generosity of the GNBCC, but of their vigor in pursuing scientific means to combat and prevent cancers such as Breast Cancer from reigning detriment and tragedy over the lives of those afflicted. During the six weeks of rigorous experimentation at RPI, I was lucky enough to have multiple mentors in the form of Dr. Gross, a Graduate student named Taylor who assisted us in the procedural aspects of conducting our experiment, and my research partner, Mohammad Samroz. He not only guided me through the intimidating and daunting aspect of legitimate scientific experimentation, but also provided his very own wisdom and expertise in the form of life lessons that helped me develop a sense of independence as well as develop my work ethic to reflect a sense of pride and determination.

The work and scientific nomenclature was daunting at first, I was in unfamiliar territory and no amount of high school curriculum had prepared me for work in a world renowned scientific laboratory. Fortunately, once given a week to adjust, I quickly found my niche in the laboratory. Upon arrival at the biotech building we were given several topics to choose from in regards to which type of experiment we were to conduct. My partner and I chose to work with Sophorolipids as opposed to polymers in order to successfully examine breast cancer prevention through the means of green chemistry. Sophorolipids are bio-surfactants that are biodegradable and non-toxic, giving it advantageous properties as compared to commercially produced surfactants. The task of surfactants is to lower surface tension of two substances, creating a homogenized, miscible solution. These are used in countless products we come in contact with on a daily basis such as salad dressing, cosmetics, detergents, and soaps. These products use commercially produced surfactants, and a certain branch of commercial surfactants known as ethoxylated surfactants are notorious for their cancerous properties and environmentally deterring production process. One such ethoxylated surfactant is Tween 80, a chemical we were able to use in our experiment. Following the outbreak of the notorious BP Gulf Oil Spill, Tween 80 was used in industrial quantities to contain the crude oil and facilitate the cleansing of crude oil from the Gulf of Mexico. Tween 80 like all ethoxylated surfactants contains 1, 4 dioxane, which is carcinogenic. Our experiment tested the validity and efficiency of the Sophorolipid, Ethyl-Ester, in comparison to commercial grade surfactants like Tween 80 and Triton X-100. To improve efficiency we tested Ethyl-Ester in conjunction with various bioemulsifiers, which help facilitate the reaction and stabilize it over time.

Our experiment, luckily, yielded relatively promising results. With certain emulsifiers, Ethyl-Ester managed to outperform the commercial ethoxylated surfactants. Many of my family members asked me if I'd do this internship again, and while I don't know if I'm going to do this exact internship again next summer, The six weeks I spent at RPI were entirely worth it. It helped me grow as a person, and opened me to the vast and exciting world of college. I'd like to thank the GNBCC once more; they truly opened up a world of opportunities for me and I am eternally grateful.