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Rensselaer Polytechnic Institute, Dr Richard Gross's lab

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High School adolescents are highly impressionable people. While many may have a sense of direction most of us are lost, and yearn to go out and discover more than what our educational standards require and feel significant or involved in the society somehow or another. We absorb information at an accelerated pace, and are capable of spreading that information through our communities of just as impressionable peers incredibly quickly. The GNBCC Students and Scientists Breast Cancer/Environment Research Internship Program delivered to me one of the most fascinating and satisfying experiences of my life which will leave an imprint on my decisions for as long as I live. Anyone who loves science, wants to learn more about Breast Cancer and environmental science than school education can offer, and want to be involved in the scientific community should apply and take on this fully interactive summer experience.

For me not only was this about contributing myself towards the battle against cancer but also fully uncovering what it is like in the scientific community. My partners Robin Shum, Michael Shen and I showed up at Rensselaer Polytechnic Institute in Troy, Albany in front of the Biotech center anxiously awaiting our introduction into the lab we would be working in for 6 weeks. What we found was that the next 6 weeks was not going to be an educational hold-your-hand program where the scientists would smile and lead us into their highly complex world.

Within the next 3 hours we were quickly led into the lab center which looked like

the Men in Black headquarters and hurriedly introduced to the researchers working there (All decked out in lab gear and busily working) and then told that we would be using a combination of the work done in the lab with our own work where we would design a project geared towards Breast Cancer prevention.

One section of the lab worked with surfactants and another with Cellulose Nanocrystals. Surfactants are used to keep emulsions (water/oil mixtures) intact. Emulsions are found in an infinite amount of everyday products such as cosmetics, dressings, shampoos, and even some sodas. We found out that many surfactants used commercially are endocrine disrupters and are even carcinogenic. We decided to attempt to replace these surfactants with Cellulose Nanocrystals, or CNC's, which are small enough, and are capable of acting as a surfactant. These CNC's are organic, easy to produce, and nano-sized. One incredible feature of these CNC's is that they can actually be structurally modified at the surface with Bio-Based acids through a process called Fisher Esterification. Depending on how you modify these CNC's they each come out with unique results with specific morphology and properties. I worked on modifying and producing these CNC's and sending them to Michael and Robin who would attempt to apply them as surfactants to create optimal emulsions.

Through hours of lab time, hundreds of pages of papers, and knowledge testing grill sessions with my grad student, I started really getting to know what I was working with and how I could actually help prevent breast cancer. Michael, Robin, and I were given lab access and permission to use almost all of the equipment and our project started to progress. At the end of the fun/work/learning-filled six weeks we were able to create optimal emulsions for Levulinic acid modified CNC's

and unmodified CNC's. This means we are headed in the right direction towards replacing toxic and carcinogenic surfactants with organic CNC surfactants for healthier emulsions. Not bad for some sophomores.

While the lab hours were rough at times, and the work was hard, we did have a blast at RPI. The grad students would show us around and take us to dinner, and all campus facilities and activities were open to us. Probably one of the highlights of my time with GNBCC was going to the BCERP conference in San Francisco to showcase our work. There we truly were thrown into a community filled with scientists with similar goals, and it felt great to have P.H.Ds and Post Docs with several published papers walk up and ask us questions about our work.

The experience overall was wonderful, and is still not over. Hopefully I can continue presenting my work and I will definitely continue being involved in the GNBCC in the future. I want to thank Laura Weinberg and Lisa Levine as well as the rest of the GNBCC for allowing High School students into the Cancer and scientific community. To give us all the opportunity to contribute and learn is wonderful, and the program is truly helping breed the next generation of scientists and cancer leaders. I also want to thank Dr. Richard Gross's lab at RPI for giving us such a wonderful experience and being so helpful. Any student interested in science and cancer should definitely get him or herself involved immediately. Hopefully more organizations like the GNBCC come around, and we open more doors for the next generation and the current to work hand in hand to achieve their goals, in any field.