

Eugene Park

What exactly is an endocrine disruptor? What are these shapes in this picture? I flipped through the pages of a journal article titled “Does Breast Cancer Start in the Womb?”, trying to absorb as much information as I could before taking off in my journey to Boston. However, it just seemed impossible; every time I tried to discern a certain word or idea mentioned, even more unknown terms appeared. Discouraged yet unsatisfied, I kept reading on until I thought I had the right idea. Little did I know that my “idea” was miniscule compared to what I was going to learn within the next two weeks.

“The first day is always the worst” I thought to myself. Savitha and I were the first students to go to the Soto-Sonnenschein lab as a duo. We knew that everything had to be a team effort. Together, we slowly crept onto the subway with our lifesaving cards that we had received during the orientation. After some navigating through the streets of Boston, we then found ourselves in front of the Jaharis building in which our adventure would take place.

Maricel was the first one to introduce us to the lab. She kindly welcomed us and gave us our own little workstations in her office. Then we got a tour of both labs. I will admit: I felt very awkward and uptight during the first hour of the experience. However, everybody, including the laboratory technicians, treated us so kindly that I soon felt that I was part of their own. The awkward and uptight feelings transformed into openness. And as a part of this change, I also got a sense of how a real laboratory really worked. I saw how there were groups working on individual projects which all aimed at reaching the same target. Not only this, but I also observed the social atmosphere of this particular lab which was very open. Everybody cracked jokes, yet stayed focused on their work.

As a part of the program, Savitha and I had premade schedules. In the beginning, we mainly just learned about what the scientists were working on. However, we started branching off to actually doing procedures. At first, we looked at whole mounts with Perinaaz. She explained the effects of BPA and how it affects some mammary glands. It was also amazing to see the structure of the mammary gland as well as see the different stages of development. Also, later on in the program, we were able to score whole mounts in terms of development and density. And to further supplement our knowledge, we actually processed mammary gland whole

mounts to learn what exactly we were looking at. We were given instructions and helped step by step by Jen, a lab technician. The next procedure we did was Hematoxylin & Eosin (H&E) staining. In this part, we were given another set of instructions with specific time intervals that we needed to follow. This procedure was supervised by Andrew, another lab technician. After the procedure, we mounted the slides using permount. When the slides dried, we looked at these and examined the structures. Similar to the H&E staining, we did an Immunocytochemistry (ICC) which was overseen by Adeline and Lucia. We raised antibodies against a specific protein to determine whether or not a 3D culture was viable to use as an alternative to a real mammary gland. Like the case with the H&E stains, we observed these under a microscope and passed or failed certain sections. Finally, with Andrew, we did morphometric analysis using the program AxioVision.

By doing all these procedures, we learned about how breast cancer is linked to certain environmental links. The main chemical that the lab worked with was Bisphenol-A. The problem with this chemical is that it is a xenoestrogen which binds to estradiol specific receptors which in turn raises estrogen levels. What this does is disrupt the homeostasis in an organism which can lead to many problems. The lab has been looking at primarily are effects on mammary gland. The reason they used this is that the mammary gland is considered “plastic” because it changes so much: when homeostasis is broken, certain detrimental effects can occur. BPA was shown to somehow proliferate the mammary gland by altering developmental triggers which would control growth. For example, some of the mammary glands of subjects exposed to BPA during the lactation period would have swelled up alveoli. Overall, these changes can lead to increased risk of tumors, which in turn lead to cancer. To top off the danger of this chemical, I learned that does not discriminate based on sex. Males exposed to BPA have been shown to have enlarged prostates which in turn lead to prostate cancer. Not only does this occur but so can fertility. And once again, all this is caused by a disruption in the homeostasis between estrogen and testosterone levels.

So the question arises: what have I gained from this experience? I can honestly say from the bottom of my heart that I have gained a defense that will help me throughout my life, knowledge. As Dr. Maffini has told us, prevention of disease is always the best approach, because the problem should never arise in the first place. Armed with my new knowledge on

BPA, I can limit my exposure to this chemical in my everyday life experiences. I can stop drinking out of soda cans, buy things as a smart consumer, and overall use plastics sparingly. Before this experience, I was just another consumer who did not see any real foul in plastics or corporations. However, now I am no longer a brainwashed individual – rather, an informed individual who must spread the knowledge.