

## Post-Fellowship Report

### **Organization:**

During my fellowship, I conducted research in the Department of Leukocyte Biology in the Children's Nutrition Research Center (CNRC) at Baylor College of Medicine on the Texas Medical Center Campus. The CNRC is a federally funded research center, which focuses on topics involving children, nutrition, and health. The CNRC is not only linked to Baylor College of Medicine by funding but also by the research staff that work in the labs. Lastly, the CNRC and Baylor College of Medicine are among several research facilities and hospitals that make up the Texas Medical Center.

The Department of Leukocyte Biology makes up the entire sixth floor of the CNRC and is under the direction of C. Wayne Smith, MD. On my first day, I met Dr. Smith and he introduced me to the graduate student, Danett Brake, who would supervise and instruct me during my fellowship. In this initial meeting, the three of us talked about my research background and the focus of my project for the summer. The floor as a whole works on several topics all related to leukocytes, while my specific project focused on what they referred to as "the obesity project". The research focused on how the immune system plays a role in obesity.

### **Overview:**

Before I arrived at the CNRC, I had never had any coursework or research experience pertaining to immunology. My graduate student had me read several articles in my first week in order to give me a background of immunology and introduce me to the topics on which I would be researching. Once I had developed this background, my graduate student introduced me to the techniques and protocols I would be using during my research. Danett would demonstrate the process to me, watch me perform the task and then would leave me to perfect my technique. This

introduction lasted for the first three weeks of my fellowship so that I would be prepared enough to have as little human error as possible.

I focused on the role of Toll-like receptor 2 in the development of adipose inflammation in obesity. After synthesizing the appropriate cDNA, the RNA of several inflammatory cytokines was measured using quantitative realtime-PCR. I harvested tissue from wild type and TLR-2  $-/-$  mice fed either a control or high fat diet. Although I measured some inflammation in the TLR-2  $-/-$  mice, my results showed the receptor has a role in regulating Tumor Necrosis Factor and Interleukin 10 in early obesity in response to a diet high in saturated fats.

### **What I Learned:**

Once again, before my fellowship at Baylor, I had a rudimentary understanding of the immune system, but after my time with the CNRC my knowledge about and appreciation for the subject have increased. Also, prior to Baylor, I had never associated obesity with the immune system, however, I now know many of the health issues related to obesity are caused by a frustrated or overworked immune system. There is, in fact, a very important link between obesity and the immune system. In obesity, the body is under a chronic state of inflammation. In other words, the immune system is frustrated and is always at work without an infection to fight.

Aside from my new knowledge on immunology, I learned a lot about the process behind the research itself. I now understand how and by whom research is conducted, what goes into such research, and how that research plays into future medical treatments. I was surprised to find out that medical doctors conduct research much like many PhDs. During lab classes at Cornell, the experimental model is set up for the students, but at Baylor, I was able to see how a person takes an idea and develops the experimental model to test such ideas. At Cornell, we are required to do data analysis and keep lab books for class, but the quality of both that is needed to get

significant results, is much higher in a research setting like at Baylor. Though I work hard at Cornell, I was surprised at how I had to put even more care and focus into analyzing the data, applying the techniques and documenting the results in my lab book during my time at CNRC.

### **Good vs. Bad**

To begin with the positives of my experience I will commend my graduate student, Danett. She had a good sense of when my mind was saturated and when she should push me harder. Danett was good at giving me the independence I needed to make my own mistakes and recover from them instead of guiding me the entire way. Much like Danett, everyone in Dr. Smith's lab was courteous, professional, and willing to help me in any way possible.

During my time at Baylor, I was not only able to work independently and at my own pace, but the work I performed will have an impact. Unlike the experiments we conduct for class at Cornell, this research and its results are now under my ownership and will help Danett complete her PhD. My fellowship presented me with a challenge that was above my level of education and forced me to respond. This proves to me that I do, in fact, have the ability to work at a higher level.

Before my fellowship started I was met with the challenge of finding relatively affordable housing in an expensive area of Houston. Because my fellowship was only to last two months, most possibilities for residence were out of the picture. When I finally did find a place to live, I was forced into a rather awkward living situation with a stranger. In addition to this initial struggle, paying for rent, utilities, travel expenses, and food on the allotted stipend was nearly impossible. Aside from the basic living issues, the first week and a half at Baylor was filled with red tape and technicalities, which could have been dealt with before my arrival. Though it is understandable to have such rules and regulations at a place like Baylor, many of the issues

could have been cleared up if students knew what to expect when coming to Baylor. I was only slightly frustrated by these formalities (getting access cards, an internet account, etc.), but when my graduate student at Baylor told me that older and more experienced students had an easier and more accommodating transition, my irritation grew.

**Impact on my Future:**

My experience at Baylor proves to me that I have the academic prowess and drive to work at a graduate level. Hopefully this discovery will bode well for my acceptance into medical school. Similar to my previous research, my work at Baylor greatly shaped how I conduct and understand science, so I think future lab classes should be enhanced because I will be able to more readily understand the experimental models and conduct the experiments. Though I would like to be a medical doctor, it is encouraging to know that MDs and DOs can also conduct lab research as they wish.