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research narrative

Out of the Lab and Into the Field

Aaron Neal

It started instantly, jolting me out of a deep sleep. The noise was deafening. The shaking was violent. “What just happened? Is this turbulence? Are we going to crash?” Then, just as quickly as it had begun, it ended. “What is going on here?” My natural bewilderment from just waking up was further exacerbated by a sleepless six-hour layover in Lima. As I finally began coming to my senses, I realized what had happened. The lights flipped on as a stewardess reached for the microphone. “Bienvenidos a Iquitos.”

When I first entered the laboratory of Dr. Julian Rayner, Ph.D., I never imagined my research would take me away

reverberated through my mind. I never imagined our conversation ten months ago would ever amount to anything. Sure, international field research sounded great, but it was unrealistic to a sophomore who had never left the United States. Besides, even if I did have the opportunity to research abroad, how would I ever be able to afford such a trip? As I pondered the once improbable situation, a stifling wave of humid, jungle air brought me back to reality. Regardless of the circumstances, I was spending the next eighteen days in Iquitos, Peru.

As my taxi literally raced from the airport, I took a quick moment between the coconut trees and thatched huts to ponder my research project. Since August 2007, I have explored the genetics and immunogenicity of a promising malaria vaccine candidate known as PfMSP6. Though experiments in the laboratory have showcased the antigen’s

I never imagined my research would take me away from UAB, much less out of the laboratory itself.

from UAB, much less out of the laboratory itself. From the moment I walked through the door, my preconceived notions of a research environment were confirmed. Bottles of chemicals occupied every shelf. “Biohazard” and “Radioactive” labels dotted walls and cabinets. Lab coat-clad graduate students hovered from station to station. Dr. Rayner’s lab personified the traditional stereotype, or so I thought.

As I stood taking in my new surroundings, Dr. Rayner arrived and greeted me. “Welcome to the lab Aaron,” he said in a curiously unique accent. “Before we discuss anything, let’s go grab some coffee.” While I partook in the lab’s morning ritual, Dr. Rayner and I exchanged bits of casual conversation. Our discussion slowly migrated from light chatting to the very reason we were meeting. “So you know I work with malaria,” he began. I did, of course. I had spent the past week virtually memorizing his webpage, in addition to reading his most current publications and reviewing the disease itself. Dr. Rayner’s work targets the blood-stages of the malaria-inducing parasite *Plasmodium falciparum*. It is during this part of its life cycle that the parasite wreaks havoc on the red blood cells of its host, resulting in the clinical symptoms that define malaria. By targeting these stages, the onset of the disease can be prevented and the parasite can be eliminated. In short, Dr. Rayner is seeking the Holy Grail of malaria research: a vaccine. With our cups emptied, the conversation slowly became casual again. “Have you ever been out of the country?” he asked as we left the table. “Stick with the lab and you may find yourself in Peru.”

As I stepped off of the plane, the words of Dr. Rayner

potential, lab results do not always translate to the real world. Because of this, Dr. Rayner formed a collaboration with another researcher at UAB, OraLee Branch, Ph.D. Since 2003, Dr. Branch has maintained a longitudinal cohort study in the jungles surrounding Iquitos. In this malaria hypo-endemic environment, villagers are monitored and treated for malaria. For every infection, blood samples are collected, from which *P. falciparum* DNA and anti-PfMSP6 antibodies can be isolated. Using these components, I am able to escape the confines of lab samples and gauge the real-world potential of a PfMSP6-based vaccine. Though most of these samples are available for me to analyze at UAB, there are some that never leave the Iquitos lab. After all, problems do arise when trying to transport malaria samples into the malaria-free United States.

Little was accomplished after I arrived at Dr. Branch’s rental house. Even though I was able to meet the project staff and experience the full force of the language barrier, I was unable to start any lab or field work. This initial disappointment only fueled my eagerness to travel into the jungles and begin my research. Over the next two weeks, I had several opportunities to visit the study villages and analyze samples. My first trek into the jungle led to the community of Zungarococha, the largest of the study villages. There, I was able to follow a field doctor as he diagnosed patients and collected blood. Despite the many interesting things I observed, the cooperation of the patients made the biggest impression on me. No questions were asked when signatures were needed. No skeptical glares were given when blood was drawn. Everyone willingly complied with whatever the doctor said. As I began thinking

about this unusual trust, the explanation suddenly hit me. While I discussed the dangers of malaria in my comfortable UAB lab, these people were threatened by the disease every day. The small hope that our work may eventually find a cure was enough to win their complete cooperation.

At the end of a long day of visiting families and collecting blood, it was time for the field team to transport the fresh samples to the Iquitos research labs for analysis. These Peruvian labs had many of the same amenities as Dr. Rayner's lab, save a constant power supply, air conditioning, and clean water. Despite working in such "primitive" conditions, I would do the same at UAB if there were that many carambola, mango, and papaya trees on site. Once at the lab, I separated the samples into erythrocytes, which contained the parasites, and serum. The erythrocytes were further processed to extract parasite DNA, while the serum was stored for later use in antibody-quantifying ELISA assays. After following the sample collection process from patient to freezer, I developed a deep respect for the vials of clear liquid I used daily at UAB. For the first time, I realized that the *P. falciparum* DNA did not simply come from the freezer at the end of the hall; it came from the Amazon rainforest over 3000 miles away.

Eighteen days in the Amazon passed by much faster than I had expected. The samples were collected, my research responsibilities were fulfilled, and I even had sufficient results to prepare a poster for the National Collegiate Honors

Conference. As I boarded the plane for Lima, and ultimately Birmingham, I carried with me much more than luggage and souvenirs. I flew out of the jungle with a deep respect for Dr. Branch, Dr. Rayner, and every person enlisted in the war against malaria. Without scientists willing to risk everything on the front lines of disease research, very little would be accomplished in the safety of modern laboratories. The more I thought about it, the more I realized that field research is critical not only to every aspect of what I do at UAB, but to virtually any field of research.

I took my seat on the plane destined for Birmingham. As we ascended, the gentleman next to me began to make conversation. "Where are you coming from?" He asked with slight interest. "The Peruvian Amazon," I replied, capturing his full attention. "Let me tell you a little about my trip..."

