Wonder, exhilaration, patience, consideration, planning, disappointment, relentlessness, frustration, curiosity and elation. Research is an incredibly dynamic occupation that requires a variety of skills and provides endless twists and turns of circumstance. When I first began in research, I had no idea how involved I would become. Research truly develops into a way of life. The process of deciding on an avenue of questioning and developing a means to make discoveries is no simple progression. It requires introspection into your own interests as well as an understanding of the knowledge you already possess. This seems like something one is already conscious of, but a careful introspection can reveal gaps in what was once considered well known. Better understanding of what is unknown often comes from learning about the subject of interest. This understanding and basis of planning comes, as every good scientist knows, from the primary literature. As I began to unravel how I would begin my undergraduate research career, I needed to both analyze my own interests as well as the resources available to solve such questions.

I had been directed to this lab by a professor because I had qualities he felt would make me successful with such a mentor. Firstly, my mentor was involved in areas I was interested in. More importantly, my professor understood how I reason and felt I would be energized and invigorated by my potential mentor’s quick thinking and cross-disciplinary experimental designs. He was absolutely right. My first few days launched me into progressive thinking as we engaged in discussion to determine what species and area of physiology I was interested in, and to see if there was a problem that could relate to the area. My mentor was a wealth of knowledge in many aspects of physiology and biotechnology. The discussion was an important step that my mentor graciously took. It made my research much more important and relatable to my studies. It
provided the sense of wonder and exhilaration. Once a topic was decided, the most important part of research came into play—preparation from primary literature.

To understand and prepare for an experiment, it is important to have an unbiased and complete review of the subject. The university library system has provided me with an immeasurable amount of information and data for support of my laboratory work. This information is crucial to developing an understanding of the known mechanisms and unknown aspects of your area of study. Furthermore, the examples laid by research that has been accepted and published help ensure that the experiments you plan will not only have scientific credence, but purpose. After all, if an experiment has already been performed or is in process by another laboratory, you want to know as soon as possible. The library database of primary literature provides innumerable sources across disciplines to ensure you have the fullest understanding possible. While often taken for granted, the vast electronic exposure to publications is an invaluable resource for the review of this existing literature. Access to a single annual online journal can cost over $60 a month. The library offers these services free of charge. Beyond strictly electronic resources, printed publications, old textbooks, and articles help to further this knowledge. As I began in research, my mentor emphasized the importance of these preparatory steps. Going through such a wealth of information requires patience and careful consideration, but is essential to planning experimental goals. Good research can only begin with a deep and critical analysis of existing literature.

After deciding on a topic and scouring countless articles and reviews, I began to design my experiment. This would end up being an unforgettable learning experience. For the next year, I would culture and develop a cell line and attempt to find the perfect balance between variables. As an in vitro experiment testing an entirely new concept, there was a significant amount of trial
and error in the assay development. The disappointment in an imperfect experiment simply had to be met with relentlessness in a search for optimization. With each new attempt, it was important to refer back to resources. Occasionally, an internet search or a call to the company would provide an answer. More often, it was necessary to return to the database and see how the material was used by other scientists. The database of primary literature was such an important resource throughout the process because it was information that could be trusted. Though literature was important for guidance, what is engaging about research is that there is no instruction booklet or kit to answer an unexplored question. It is an entirely different experience than anything found in a classroom as I synthesized information and applied critically thinking in new ways. If I was unsure of an effect or frustrated by a result, I could only use my own curiosity to develop a new test to investigate. Fortunately, after years of work designing the assay and collecting data, I was able to experience the elation of a job well done. One of the most satisfying moments of my life was receiving acceptance of my manuscript.

It was amazing to follow and navigate a project from commencement to publication. The experiences and skills I have gained through research will serve me well in countless forms. The search and analysis of literature is important not only to the success of my undergraduate education, but will serve me in a lifetime of self-education. They are skills that I have been able to develop with the help of the institution of the library and now use eternally. Research is an area I find fascinating because it requires not simply an education and a knowledge base, but a progression of that knowledge. Research explores, discovers, relates, and expands. It pushes your own preconceptions and allows you to explore areas that are unknown to a textbook. As more
information is continually discovered and related through the scientific community, I will continue using such resources and look forward to future findings on the subject.