

## Essay

I was given the opportunity to work with the Davis Research Group here on campus at the end of my junior year. I met with Professor Davis and one of his graduate students, and he initially tasked me with the synthesis of the 5'-benzoyl-2',3'-isopropylidene derivative of the Guanosine nucleotide. Eventually, after I had successfully achieved the proper synthesis of the compound, he gave me the daunting task of crystallizing this compound. Prior to my research, crystals of this compound had never been grown to a size or clarity at which they could be analyzed

I was given several sources on the general nature of the guanosine quadruplex by Professor Davis, as well as one regarding the formation of hexadecamer structures of the G-quartets, as they are called. This gave me a starting point for my research, as the papers he gave me had information on the intermediate structure, the 2',3'-isopropylidene derivative of Guanosine. From there, I had to look for additional sources that would lead me to a proper synthesis procedure for my target derivative. Prior to looking for the proper synthesis procedure, I wanted to get more information regarding G-4 complexes and the self-arranging nature of the compound. I took advantage of the Chemistry library's resources to find several books on the aforementioned subject in order to learn more about the compounds I would be working with. Once I was satisfied with what I had learned, I began searching online through Scifinder, Web of Science, and the multitude of journals I have access to as a student of the university, such as the Journal of the American Chemical Society and the Royal Society of Chemistry journal. Given all of these resources, I was able to find a number of different methods of achieving my goal. I was also lucky enough to find articles on reliable crystallization methods which proved invaluable in my successes. Had these not been available, I would not have been able to come anywhere near finding the correct procedure, short of brute-forcing the synthesis through trial and error which would have probably taken more time than I had in the semester.

Over the course of the semester, I sought aid from both Professor Davis, as well as one of his graduate students, Keith Sutyak, who had worked on similar projects in the past. Both helped greatly in that they were able to offer advice regarding synthesis processes I had found for my goal compound, informing me when I found a procedure that used materials that were excessively strong and had fitting substitutes, or to caution against outdated procedures which had used dangerous and potentially explosive compounds, such as picrates. I have to thank Professor Davis and Keith for their guidance, as it took my research in a direction which was safe, efficient, and cost effective for my resources and time frame.

I evaluated the potential sources by a number of metrics, several of which being vetting by Professor Davis and Keith, the focus of the sources on G-quartet related material, and their inclusion of synthesis schema. In my use of SciFinder, I found out that I was able to draw in specific structures I was looking for in papers, which led me to exceptionally relevant sources, many of which ended up being very useful for either my actual procedures or my background knowledge of the subject. The access to prestigious journals such as JACS and the RSC journal gave me many reliable peer reviewed sources. The methods within the papers were the vetted by Keith, who helped me parse what would be useful, and what was extraneous and unnecessary.

I learned a number of incredibly useful skills, not only for very specific organic synthesis procedures, but for being a researcher as a whole. Over the section of my research when I was gaining background knowledge, I was parsing and learning how to properly read these scientific documents such that I could

find exactly what I needed and would be able to pass over the papers unrelated to my subject matter. When I enter the professional world, these skills will prove invaluable to me in terms of productivity, making me a more savvy and efficient researcher. As a result of this research, I have also become trained in NMR400, which not only makes me a more valuable asset to companies, but also opens up a wider area of research for me to dive into.

I don't think I would really change anything about my research experience. All of the missteps and shortcomings that came before my success helped me learn how to be a better researcher. In my opinion, learning from failures is much better than having everything go off without a hitch in a research venture. I'm not really sure what sort of reasonable requests I could make that would make the library a better place for my research needs, aside from access to a journal of obscure and complex organic chemical synthesis.