Summer 1 Reflective Report (Leadership and Research)

Introduction

The following report details my experience of the research project and leadership development programme, my first summer participating in the Laidlaw Research and Leadership programme at Trinity College Dublin. This report summarises the journey and development of my research project, aims, goals and ultimate outcomes of this experience as well as my personal development and further reflections on leadership. My research project, The Innate and Adaptive T cell Response to SARS-CoV-2, was carried out under the supervision of Dr. Derek Doherty, Associate Professor and Head of Immunology at Trinity College Dublin.

Research Experience

The week before I was officially due to start my research project, I met with my supervisor Dr. Derek Doherty to discuss the plan for the following six weeks, in terms of what we should expect and what I ultimately hoped I would achieve through this experience. This gave me a lot of reassurance as to the course of the project and our planned outputs. Previously I'd had very little laboratory or research exposure, having just completed the second year of my medical degree. This made the whole thing rather daunting! Thankfully Derek was fantastic and put me at ease about the whole process. Together we made a detailed plan for the coming weeks which included regular lab meetings where data from various research projects that are ongoing in the lab are presented and discussed. After our first meeting I couldn't wait to get started and to meet the people I would be working with for the next six weeks.

The first lab meeting I attended was chaired by a PhD student preparing her thesis on the role of innate lymphocytes in inflammation associated with neonatal encephalopathy. It was absolutely fascinating to listen to, especially when other Masters/PhD students would question and constructively criticise certain findings or methods. A lot of what was discussed was outside my comprehension, however it was captivating to see the scientific method at work. Despite feeling slightly intimidated, I was really looking forward to meeting everyone and getting started!

My first day in the lab was a busy one. I was introduced to an MSc student, Kiran, whose thesis was closely aligned with my research project and who I would be working with for the following six weeks. She was incredibly welcoming and extremely thorough and concise at explaining everything to me despite her busy schedule. Having never before worked in a laboratory setting, I was first introduced to the basics: health and safety, pipetting, aseptic techniques, cell counting. As the days went on I became more confident in the procedures and even managed to figure out where the different

reagents and equipment were kept (in a very busy and cluttered lab, this is more difficult than it sounds!). I learned how to isolate white blood cells from blood packs retrieved from the Irish Blood Transfusion Service. This is achieved through a lengthy and repetitive process of centrifugation and pipetting by hand. I also learned how to stain and count cells and perfected my use of a microscope. It was riveting to begin to see the work that goes into each small step of the experiment and to connect the dots between my knowledge of immunology and its application in a practical setting. Furthermore, my supervisor was always available to answer any questions I had and took the time to explain concepts relating to each step of the experiment.

I left the lab at the end of the first week feeling exhausted and overwhelmed but ultimately delighted with the progress I had made. The nerves and apprehension I had felt on my first day were replaced by openness to new opportunities and an excitement about the work I was doing, even if I could not understand each piece of information I was presented with! Throughout the week I had the opportunity to discuss other pieces of research with various researchers, post-docs, PhD students and MSc students. I found these conversations really interesting and they broadened my awareness of the various specialties within immunology. Overall, my first week had been exciting and engaging, from my interactions with other researchers to the preliminary results we were beginning to see from our experiments. I remember sitting on the 123 bus leaving St. James' hospital on Friday evening, already looking forward to Monday!

The second week of my project served to deepen my understanding of the various lab techniques and procedures. I also began to read various research papers that were relevant to my project in order to provide a background for the work we were doing and to inform myself of similar work being done on the topic of the innate immune response to SARS-CoV-2. It took many hours of reading and research, however after discussing different immunological concepts with my supervisor in depth, I began to become more self-assured in my grasp of the background immunology relating to my project which was a breakthrough for me personally! Finally, developing my knowledge of immunology through asking questions became natural and I began to lose the self-doubt I began this project with.

The second week of my project was the week I attended the Trinity COVID-19 Immunology conference. This was a four hour online conference comprised of presentations given by leading experts in immunology including Luke O'Neill, Kingston Mills and Aideen Long. Despite spending four hours sitting at my laptop, frantically taking notes, it was a fascinating and riveting experience. It was also so inspiring to see leaders in their field presenting cutting-edge research on such important topics, ranging from development of therapeutics for COVID-19 to vaccine efficacy and immunity. I had volunteered at medical conferences in the past, and attended lectures given by visiting international

experts however I had never before been involved in that work personally. It was an uplifting and fascinating experience that I won't forget. Those first two weeks taught me so much about how being "thrown in the deep end" however intimidating it may be at first, is often the best way to learn and develop skills. It was satisfying personally, to see this change in mindset and this allowed me to fully engage with and become truly passionate about my research project.

During week three, I began to really fall into routine in the lab. Each day was more exciting than the day before and we were beginning to see consistent results from our experiments. I also met Stefan, a previous Laidlaw scholar and medical student who was studying the T cell response to mycobacterium tuberculosis. We got on really well and he was so helpful, both with my Laidlaw research project and with advice on how to navigate my medical degree. Towards the end of week three, I began to realise that it would be hugely beneficial for me to spend more time in the lab, rather than to perform a meta-analysis as had been initially planned. My supervisor agreed and informed the Laidlaw programme co-ordinator at Trinity, who approved this change to our original proposal. Looking back, I'm so happy that we made this change, as I can truly say I enjoyed every minute I spent in the lab and learned so much about the scientific method, immunology and laboratory techniques that will stand to me for the rest of my career.

In week 4, we began to suspect that one of our samples was contaminated with LPS, a ubiquitous bacterial membrane component. If this was the case, it would invalidate some of our previous results. Unfortunately, after performing tests over several days, it appeared that our sample was in fact contaminated. While disappointing initially, I soon realised that it was much better to catch this flaw early on instead of producing inaccurate or misleading data. In order to continue our experiment, my supervisor approached another immunologist working with similar samples and we were lucky enough to be able to use some of his reagents that were uncontaminated in order to produce valid data. Eventually we began to see consistent results from that particular sample and were reassured that our findings were valid.

In week 5 we primarily focussed on repeating our experiments so we would have an n=3 result that was consistent across all tests. This repetition allowed me to really internalise each step of the experiment and to become more familiar with the flow cytometer, an extremely complex and rather intimidating machine to operate. I also had some exposure to the data analysis software used to elucidate the results from our experiments. At the end of week 5 I had the opportunity to go out for a meal with many of the researchers across all the immunology labs in St. James' hospital. This was a lovely evening and a fantastic way to get to know a little more about the work being undertaken as

part of the Trinity COVID-19 Immunology Project and to meet scientists from labs other than the one I was working in.

The final week of the project was spent putting together my research poster, which ended up being a work in progress over several weeks due to the lengthy process of data interpretation which took a little longer than anticipated. Overall I had a wonderful experience and can't think of a better way I could have spent those 6 weeks! I enjoyed my time in the lab so much that I plan to spend some time there throughout the year and continue to attend weekly lab meetings.

Leadership Experience

The first official leadership session I attended as part of the Laidlaw programme at Trinity was on the 28th of May 2021. We were provided with a variety of articles on different aspects of career guidance theory prior to the session, which allowed us to form a picture of our own leadership styles and methods. These articles covered a multitude of different topics from approaching career decision making to personal leadership styles. We were separated into small groups before the session began in order to discuss these articles amongst ourselves. We found many things in common, in particular the feeling of "Imposter Syndrome". This seemed to be a significant concern among many of us. Sarah Jones from the Trinity Careers Service allayed this common fear by reinforcing the fact that we had earned our places as Laidlaw Scholars. This was hugely beneficial for all of us. Dr Tamara O'Connor from Student Learning & Development then worked with us on the topic of time management and effective communication, something that was important to keep in mind for our upcoming research projects. We finished up with a Q&A session with Provost Linda Doyle where she detailed her experience in Trinity as a professor and researcher, but also her campaign for the position of Provost. My perception of team-working, professional relationships, the value of research and my own leadership style was altered after this engaging and rewarding session.

I wrote on my initial Leadership Statement in my application for this scholarship "In my opinion, a leader is someone who has the ability to show empathy as well as strength and who knows how to be assertive and compassionate at the same time. The communication of clear goals, being an example of the standards of performance you expect to see, and the creation of environments that encourage people to be self-motivated, are all skills which I've observed in leaders I admire". While I still agree with the sentiment of this statement, I've learned so much over the past few months about the nuances of good leadership and have developed an awareness of my own leadership style and preferences. I've also witnessed ethical and effective leadership in others over the course of my research project and this has been a priceless learning opportunity for me personally. From examining my core values and personal understanding of and experience with different leadership styles, I've

come to the realisation that a “coaching style” or “persuasive style” of leadership is one that I feel the most comfortable with. I had the opportunity to discuss this with Orla Bannon, Director of Careers at TCD, which was a hugely valuable session and allowed me to really interrogate my own strengths, weaknesses and areas for improvement.

Prior to my session with Orla, I wrote a personal development plan. Here I set specific and measurable goals for myself that were relevant to different aspects of my project and career path. Some of these included speaking up more in groups, improving social networking and enhancing time management skills. I’m happy to say I’ve definitely improved my public speaking/ group discussion skills through attendance at lab meetings and when meeting up with my ALS (action learning set) group! I’ve also developed my LinkedIn profile and increased my number of connections substantially, using some of the techniques Sinead English (Career Management Consultant) mentioned in our second leadership session. In terms of time management, I’ve started a habit of setting weekly goals, something that I’ve noticed has improved my productivity considerably.

Overall, my experience of the Laidlaw Undergraduate and Leadership programme has been fantastic and I’m looking forward to the second half of the programme!