[redacted] Eportfolio

The cancer sciences course has been interesting as a final course to take in my final semester in a Bachelor of Medical Science. It suits nicely to the upcoming honours year and prepares us for the difficulties ahead. In particular, a lot of the common techniques and experimental design discussed in scientific papers have made a lot of more. For example, understanding the common fluorescence stains used in animal imaging, including DAPI and FITC that I can recognise such terms.

When we were first taught about eportfolio, I was again reminded that learning does not only occur in the classroom but is everywhere, and we should never stop trying to learn. As I tutored HSC chemistry throughout this year, I had to revisit the HSC chemistry syllabus and were profoundly surprised to finally appreciate the importance of what we learnt (for example pollution and its varying impacts on the atmosphere, soil, water) but also to be revisiting concepts that I had recently learnt, including seeing the use of linear accelerators in radiotherapy, which we had previously learned in nuclear chemistry for the development of radioactive elements. The co-curricular classes helped widen the experience that learning doesn't stop. It was great having actual professionals talk about their work and about the things they operate. I particularly loved that we could learn about nanoparticles, which is more innovative science, and with it, the enormous amount of factors needed to be considered in its usage. These factors include size and type of nanoparticle, the surface charge and how a particular charge may be desirable for reducing macrophage uptake, yet undesirable for tumour uptake.

What I got most out of the course was probably the project design assignment, wherein we all put an amazingly disproportionate amount of time, effort and hard work (in relation to the weighting) into the assignment. But honestly having said that, I wouldn't have changed a thing. I was willing to invest that much time and work because I really enjoyed the free nature and creativity of the work. I have learnt quite a lot from it, in being able to take control in creating our own experiment. The things I have come to learn were things like the thorough need to check the adequacy of controls put in place. For us, it was to do with having the controls of 'no hydrogels' and 'hydrogel only' implantation in the mice. I realised the amount of work needed to validate the usage of hydrogels, in terms of checking the proper release of RI-BK from it over time, and the possibility of non- specific release. I learnt the statistical considerations regarding 'power' and the amount of thinking that needs to be done regarding the number of mice used in a study, which takes into account the % tumour take rate (growth rate of tumour implanted) and also accounting for failures in tumour development. From question time in our presentation, there were so many other factors I hadn't taken in consideration, such as the inflammation that may be induced after hydrogel implantation and the implications of that with MMP release, as well as other likely complications such as cerebral oedema by which its extent was unknown to us. It would be really incredible to actually perform the experiment itself one day (or have someone else do it) because I am so curious as to whether our hypothesis could be shown to work: that RI-BK (retroinverso bradykinin) would in fact be able to draw the tumour into a resectable body.

I have found for myself an incredible interest in the complexities of experimental design and this was able to be complemented by the latter half of the lectures (with particular note to the lectures: statistics, animal models, clinical trials and study designs, predictive and prognostic factors.) The

assignment had a strong integrative nature that taught us the practicalities of science. The harsh realities of working in research also became more apparent. I realised this when I looked over the lectures on animal models, the advantages and disadvantages of each model system, and that 95% of conventional proliferation targeting drugs that work really well in animal models will actually fail in the clinic in terms of effectiveness. This had been because of the exaggerated proliferation seen in tumours in cell lines and animal models. It is therefore critical to target cancer specific molecules, as opposed to generalised increased proliferation. With this in mind, I have become more critical of reported successful drugs in the laboratory that have not yet reached clinical trials.

With regards to what I am thinking about in my future, my eyes have been open to much more opportunities out there for science students. I always had a fixed idea of only two pathways which was research or medicine, and there was nothing in between, but coming from the radiation therapy co-curricular class, I realised I could work towards nuclear medicine and become a radiation therapist. Or, I could apply to be a flow cytometry specialist. Or I could be a research assistant or hospital scientist, or even a clinical trials officer? These different possibilities were made known to me through the CV/resume assignment. I am really glad for that assignment because I had always been really unconfident with my resume, not knowing what employers really thought of it.

This year I've had to really think hard about what I am going to do with my life. Particularly since I don't have much of an idea of where I should go beyond my honours year. In honesty, the honours year is both a 'stalling' and discovery year of whether I feel like I am suited to research. As a Christian, I was able to attend a short camp in my mid semester break for this semester where we looked at how we could be serving God with our lives in whatever we do. My thought processes about the future were about whether the workplace would allow me (personally) to use my gifts/abilities in the best way and also share the Gospel. I've become convinced that the world ultimately needs Jesus and this means every other work, though still important, cannot be the prime focus of my life/purpose. With this in mind, my own considerations for my immediate future (ie straight after honours) were medicine, or a graduate job like hospital scientist, or research assistant, and lastly, I may even take a gap year.

I was able to gain a greater insight into some of the tasks and responsibilities of doctors. In particular, I had also been taking the course 'Visceral Anatomy' which has been very clinically relevant. While I contemplate over whether medicine is the right path for me, I had some realisations while taking cancer sciences. This was in regards to the 'principles of chemotherapy' lecture, where the lecturer stated that before he treats the cancer patient, he has already decided whether he would try to cure the patient or only palliate them. I found this quite confronting (but logical), because the intention was clear from the very beginning, and the life and death decision had already been made. Along with what doctors do, I realised what they didn't do – calculate the radiation doses and administer the radiation, which was the job of the radiation therapist.

One of the important things and skills I have learnt has been to ask questions. I have become more aware that being able to come up with questions is actually a skill. Furthermore, science doesn't exist without a question. Coming up with the research question was incredibly difficult because it required us to know the background literature really well, and to be able to criticise papers in order to identify the literature gap. This critical analysis we have done in one of the assessments and through the

assignment has been matched with another course I had also been taking as a general education subject called “Contemporary issues in International Relations”. In this arts course, the need to critically analyse a paper’s arguments for its strengths and weaknesses has been essential. Something quite different to sciences, international relations is made up of theoretical perspectives or lens by which one can make sense of the world, and so facts or truth is hard to come by because it is based on your underlying beliefs/worldview that shape the way you interpret certain actions on an international scale. It is less defined in terms of working out facts and truths. However I have come to realise that even in science, though truth is the ultimate goal/aim, the nature of science as a practical discipline is always in constant revision, changing and dynamic. At one point in time, something may be believed to be true, but a few years later, something may be found to disprove it. And so the process of science must be critically examined and understood, always being aware of its limitations and the concluded results of the paper.