Progress Report – Brain Tumour Foundation of Canada

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Due to the generosity of Brain Tumour Foundation of Canada, in association with the Taite Boomer Foundation, I had the privilege of joining the research team at Dr. Lisa Porter's Lab and dive into the project which will help to better understand the role of the SPY1 protein in Glioblastoma Multiforme (GBM) and eventually contribute to finding new potential ways to fight GBM aggressiveness and therapy resistance.

What We Found

Over the past summer, I have learned and utilized several *in vitro* and *in vivo* techniques essential for my project's success. Importantly, I spent great amount of time optimizing the technically challenging injections of patient GBM cells into the brains of zebrafish, which is our *in vivo* model. This model allows cells to grow in a setting that mimics their natural environment.

Furthermore, I was able to obtain data from my work with *in vitro* GBM cell cultures. In collaboration with the Henry Ford Hospital System we obtained nine GBM patient lines of known genomic signatures. I mastered cell culture techniques involving the primary lines and began initial characterization. In order to dissect the Brain Tumour Initiating Cells (BTIC) composition of each tumour I performed series of flow cytometry experiments followed by magnetic bead sorting and Fluorescent-Activated Sorting (FACS) assays. These assays were conducted based on expression of known BTIC markers such as CD133 and CD44. Primary results revealed a strong correlation of specific marker combination within distinct GBM signatures, when three patient samples per subtype were tested. Performing the magnetic bead sort as well as FACS I was able to obtain a panel of several different BTIC populations which constitute an essential tool to determine the role of SPY1 protein in GBM expansion and therapy resistance, using both *in vitro* and *in vivo* systems. Through qRT-PCR analysis, I determined that there is a high significant correlation of SPY1 levels with specific BTIC populations which set a direction for assessment of potential new therapy targets and treatment strategies, however, still requires careful and detailed investigation.

Future Directions

Upon detailed and complete characterization of the BITC population panel I will be manipulating the levels of Spy1 protein to address its role in expansion and therapy resistance of GBM. I will be utilizing 3D *in vitro* cultures as well as an *in vivo* zebrafish model to investigate the tumour burden changes and drug treatment response in face of both decreased and upregulated levels of Spy1. I plan to increase the patient sample pool in order to statistically evaluate the findings of my study.

Personal Impact of This Award

The award has given me the opportunity to learn so much more than what I have learned in the classroom setting. Upon reflection of the past summer, I surprised myself due to the amount of knowledge I was able to gain in the Porter Lab, about the complexity of brain cancer, within that short period of time. I was working with my laboratory supervisor, Dr. Dorota Lubanska, who has explained and went out of her way to make sure I understood each and every aspect of the question at hand. I would have never expected to learn the surplus of information I did, each and every day in the lab.

I have observed myself grow over the first half of the studentship as I have been able to become a true researcher. Being a true researcher denotes having the patience and devotion during experiments, but to also care about your research deeply and ponder novel questions that have not been asked before.

This is an opportunity that I am so grateful to have and I truly do find satisfaction in learning and trying to help people with my research. I have gained collaborative skills to work alongside people that are all motivated to make a difference in various healthcare related fields. Although I have not decided what I would like to pursue after University this award has given me a completely new perspective and will give me a lot to think about for my future endeavours. I have already started preparing and running some experiments for the upcoming summer and I am eager as ever to continue researching. I appreciate and acknowledge Brain Tumour Foundation of Canada for giving many students this momentous opportunity and I hope to continue to work to the best of my ability.