ARCH Abstract/Summary

Mitochondria are complex and dynamic organelles, primarily responsible for the energy production of the cell. However, mitochondria are also imperative for stress responses, cell growth, and cell survival and death. In cancer, the mitochondrial functions of bioenergetics, i.e. metabolism, and apoptosis mechanisms are affected. In the Chambers lab, I am responsible for understanding the sudden dependency of cancer cells on glutamine metabolism. This will be made possible by experimenting for a better understanding of the metabolic pathways for glutamine and Sab/JNK phosphorylation signaling. Sab-mediated signaling is a newly researched contributor to apoptosis signaling in mitochondria. The experiments to be conducted will make use of uterine cancer cell lines, AN3CA and SKUT-1. The experiments measuring the cancer cell metabolism under the influence of various drugs will be conducted using the Seahorse XF-96 extracellular flux analyzer. I will also evaluate the levels of various proteins involved in glutaminolysis and the proteins involved in Sab-mediated signaling. The protein levels will be analyzed using western blots, in order to quantify their expression. We hypothesize that the AN3CA and SKUT-1 cell lines would show distinct proteins in each of their metabolic pathways, explaining the difference in chemotherapy sensitivity, based on evidence from Seahorse analysis and Western Blot data. This project is significant, as it will provide a new molecular mechanism for regulating metabolism in uterine cancer cells. This will be the first such study in the field of uterine cancer and paves the way for new therapeutic options.