Development of Pre-Clinical Assays for Quality Control of Cancer Imaging Agents

Chu, Ashley (School: Hathaway Brown School)

Glioblastoma is the most aggressive primary brain tumor, with an average survival of 14.6 months even with treatment. Prior research has shown that a protein, PTPμ, is cleaved in tumor tissue, and the abundant fragments allow them to serve as a tumor biomarker. Glioblastoma rapidly proliferates, making it difficult for surgeons to fully resect the tumor. Peptides derived from a short portion of PTPμ's amino acid sequence are thought to bind to the fragments. By conjugating these peptides to fluorophores, surgeons can better identify what they need to resect. Using two in vitro assays, a bead aggregation assay and a fluorescent bead binding assay, we evaluated the effects of buffer conditions on peptide-protein interactions. Additionally, we sought to identify optimal conditions for peptide binding to PTPμ in hopes of improving clinical imaging agents for glioblastoma resection. With the bead aggregation assay, we found that particular types of media support the best aggregation. There is also a possible effect of pH on aggregation. When moving onto the fluorescent bead binding assay, preliminary research suggests that certain peptides have a strong affinity to PTPμ. Many more buffer conditions and peptides will be tested in future research to determine the conditions under which the peptides have the strongest binding to PTPμ, so they may be used as imaging agents.

Awards Won: