Targeting a Redox Dependency in Pancreatic Ductal Adenocarcinoma

Park, Julia (School: Plainview-Old Bethpage John F. Kennedy High School)

Pancreatic ductal adenocarcinoma (PDA) is a highly lethal malignancy due to its late stage diagnosis and limited treatment options. Current treatment options are often counteracted by strong resistance from the PDA tumor microenvironment, thus the need to identify novel therapeutic strategies is urgent. Recently, PDA research has begun to focus on the role of redox homeostasis through the alteration of metabolic pathways, specifically through dependency on glutamine, a nonessential amino acid that becomes conditionally essential in most cancer cells. Glutamine assists in the survival of PDA cells by utilizing a non-canonical metabolic pathway as a means of balancing redox homeostasis in PDA. The goal of this project is to investigate if glutamine dependency in PDA could be a potential target for the development of a novel therapeutic intervention strategy. Results collected by viability assays and the Seahorse XF96 Analyzer demonstrated that non-traditional growth medium supported glutamine independency, which revealed that glutamine-dependency in PDA cells is context-dependent. Thus, non-traditional growth medium was discovered to amend glutamine dependency of PDA cells and provide a cancer-specific proliferative growth advantage by altering their glycolytic metabolism pathways.These findings provide a deeper understanding of redox-dependent cellular regulation, and can help optimize techniques scientists use to study PDA in vitro.