Ketogenic Context and Glycolytic State Are Associated With Fatty Acid and Glutamine Coordination in Pancreatic Ductal Adenocarcinoma

Fareed, Salma (School: Hathaway Brown School)

Pancreatic ductal adenocarcinoma (PDAC) survives nutrient stress by rewiring metabolism. Prior ketogenic-diet (KD) evidence indicates increased TCA-cycle activity and higher glutamine (GLN) signals, consistent with greater reliance on GLN-fueled mitochondrial metabolism. Because KD also elevates a diverse circulating fatty-acid (FA) pool, I test which FA structures matter under KD-like stress and how FA?GLN coupling (correlation-based) shifts across tumor metabolic states. In KD-like assays, nine fatty acids produce structure-dependent cell-number/growth effects (dsDNA readout), and in GENIE PDAC transcriptomes (n = 172) stratified by glycolysis level, FA?GLN coupling shifts with state, most prominently in sphingolipid (SL) and glycerophospholipid (GPL) families, with orthogonal support from metabolite inference (n = 173) and independent CPTAC-PDAC proteomic validation (n = 140).

Awards Won: