Perelman School of Medicine
University of Pennsylvania

NIDDK P30 Center for Molecular Studies in Digestive and Liver Diseases

Research Seminar

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"Exploring Tumor Neighborhoods"

Thursday, February 16, 2023
12:00 – 1:00 PM EST
901 Biomedical Research Building

Due to vascular insufficiency, solid tumors frequently harbor domains where cells have limited access to oxygen and blood borne nutrients (glucose, amino acids, lipids, etc.). Molecular oxygen (O2) is an essential nutrient serving as a key substrate for mitochondrial ATP production and numerous intracellular biochemical reactions. O2 deprivation (hypoxia) triggers complex adaptive responses at the cellular, tissue, and organismal levels to match O2 supply with metabolic and bioenergetic demands. Moreover, if cells are deprived of oxygen, they are very likely to be simultaneously limited for circulating nutrients like glucose etc. In the face of metabolic stress, mammalian cells temporarily arrest cell cycle progression, reduce energy consumption, and secrete survival and proangiogenic factors. These events are coordinated by engaging multiple evolutionarily conserved molecular adaptations, mediated by metabolic transitions, hypoxia inducible factor (HIF) transcriptional regulators, mTOR signaling, autophagy, and endoplasmic reticulum (ER) stress responses. The overall goal of our research is to elucidate molecular mechanisms whereby changes in O2 and nutrient availability modulate normal tissue homeostasis and mammalian pathology, with a particular focus on cancer cell metabolic reprogramming, metastasis, and interactions between malignant and infiltrating immune cells.

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