

Biology Seminar



Western
UNIVERSITY · CANADA

12:30 - 1:30 pm

Friday, October 16, 2020

Seminar to be held via ZOOM



Thomas Seyfreid
Professor
Biology Department
Boston College

Special Seminar: The Uchida Lecture

Cancer as a Mitochondrial Metabolic Disease: Implications for Novel Therapeutics

Cancer is a mitochondrial metabolic disease involving disturbances in energy production through respiration. The mutations observed in tumor cells and all other recognized hallmarks of cancer are considered downstream epiphenomena of the initial disturbance of cellular energy metabolism. The disturbances in tumor cell energy metabolism can be linked to abnormalities in the structure and function of the mitochondria. As a result of damaged respiration, cancer cells become dependent on fermentable metabolites (glucose and glutamine) for growth. Consequently, cancer growth and progression can be managed following a whole-body transition from fermentable metabolites, primarily glucose and glutamine, to respiratory metabolites, primarily ketone bodies. Calorie restricted ketogenic diets can lower circulating glucose and elevate ketone bodies. The metabolic transition from glucose to ketone bodies will not only keep the normal cells healthy, but will also reduce tumor angiogenesis and inflammation while enhancing tumor cell apoptosis. Malignant brain cancer in preclinical models and in humans will be used to illustrate general concepts. New information will be presented on glutamine fermentation, the missing link in Warburg's theory of cancer. Also, presented will be the Glucose/Ketone Index (GKI), and the Press-Pulse therapeutic strategy for non-toxic cancer management and prevention. It is anticipated that metabolic therapies targeting glucose and glutamine, while increasing therapeutic ketosis, will significantly improve quality of life and overall survival for most cancer patients.

