



BIOLOGY COLLOQUIUM

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Hosted by Prof Hew Choy Leong

Mechanisms for the control of metabolic homeostasis

By

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Cells possess remarkable proteins that can sense the availability of nutrients and energy levels. Autophagy represents a key catabolic process that can recycle cellular components to sustain energy levels for survival under nutrient-poor conditions or growth factor deprivation. We previously delineated a pathway, in which glycogen synthase kinase 3 (GSK3) in cells deprived of growth factors, phosphorylates and activates the acetyltransferase TIP60, which in turn stimulates the protein kinase ULK1 to elicit autophagy. ULK1 is a critical core kinase responsible for initiation of autophagy. AMPK (AMP-activated protein kinase) plays a central role in maintaining cellular energy homeostasis. When cellular energy levels are low (increased AMP/ATP ratio), AMPK is activated to enhance catabolic activities with concurrent inhibition of anabolic processes such as fatty acid synthesis. In this seminar, I will present our recent discovery of a mechanism by which AMP, as a low energy signal, can autonomously initiate the assembly of an activating complex for AMPK in response to starvation.