Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, April 9, 2021 @12:45 p.m.

presented by:

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"Maintenance of glucose repression by the GID complex ubiquitin degradation pathway"

Saccharomyces cerevisiae is a model eukaryotic fungus which plays an integral role in brewing, baking, and winemaking. When grown in glucose abundant conditions, the yeast undergoes a phenomenon known as glucose repression, a form of carbon catabolite repression. This process favours aerobic fermentation by the targeted repression of alternate carbon metabolism, respiration, and gluconeogenesis through transcriptional inhibition and protein degradation. Two primary mechanisms involved in the stability of glucose repression require the transcriptional repressor Mig1 and the GID complex, an E3 ubiquitin ligase. Mig1 is a key transcription factor involved in maintaining the glucose repressive state through the direct repression of gluconeogenic genes like *FBP1,* which encodes fructose-1,6-bisphosphatase. Under the same glucose conditions, the ubiquitination and degradation of Fbp1, and other key gluconeogenic enzymes, is being performed by the GID complex. Together, their activity provides a multi-pronged approach to regulating the shift between glycolytic and gluconeogenic processes. As glucose is consumed, Mig1 activity is inhibited through phosphorylation by Snf1 and the GID complex stops targeting gluconeogenic enzymes through the loss of its targeting subunit. This project will use time course experiments to complement existing research by analyzing the maintenance of glucose repression during gradual changes in nutrient conditions. The GID complex will be inactivated through deletion of its catalytic subunits, Gid2 and Gid9. The impact produced by their deletion will be measured through qRT-PCR of transcript levels, western blot analysis of Mig1 post-translational modifications and abundance, and degradation assays through cycloheximide chases of Mig1 and Fbp1.