Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, October 23, 2020 @12:00 PM

presented by:

Mariann Lobbezoo

(Advisor: Dr. J. Colasanti)

"Investigating florigenic mechanisms that regulate flowering in domesticated maize and its wild ancestor, teosinte"

Flowering at the correct time is vital for reproductive success in higher plants. The shoot apical meristem (SAM) contains undifferentiated cells that develop into both vegetative and floral tissues. Flowering occurs when the SAM transitions from vegetative to reproductive growth. When plants perceive signals that cause flowering, mobile proteins, known as florigens, are synthesized in leaves and travel to the SAM to promote flowering. In the model plant, *Arabidopsis*, the *FLOWERING LOCUS T* (*FT*) gene encodes a florigen that accumulates under inductive long day photoperiods that promote flowering. In maize (*Zea mays* ssp. *mays*), *ZEA CENTRORADIALIS* (*ZCN*) genes are homologous to FT. Temperate maize flowers regardless of daylength, but was domesticated from wild progenitor teosinte (*Zea mays* ssp. *parviglumis*), which requires short day photoperiods to induce flowering. *ZCN8* expression follows a circadian pattern in photoperiod-dependent teosinte and tropical maize but not in temperate maize. The gene *INDETERMINATE1 (ID1)* mediates autonomous flowering in maize and *id1* mutants exhibit severely delayed flowering. ID1 is a key transcription factor that controls flowering through carbohydrate sensing and a molecular network separate from one present in photoperiod-dependent lines. This project will elucidate how florigens and ID1 mediate flowering in *Zea mays*. A near isogenic line of *id1* teosinte was created to evaluate circadian expression of *ZCN8* and other *ZCN* genes under different photoperiods. Further, *id1* teosinte will be analysed to determine if *ID1* mediates flowering via a carbohydrate sensing mechanism. The effects of *ZCN* genes on flowering will be tested through *Arabidopsis* transgenic analysis.

■ *MCB Brown Bag Seminar – online presentation*