MCB PLANT BIOLOGY SEMINAR SERIES W2009

Chris Trobacher,
Department of Molecular and Cellular Biology
University of Guelph

"A KDEL-tailed cysteine proteinase associated with programmed cell death in post-germinative tomato endosperm"

Monday, January 19 2009
3:30 p.m.
SCI2315

ABSTRACT: Endospermic dicot seeds, such as castor oil seed and tomato, utilize programmed cell death (PCD) to remove the endosperm cells providing additional nutrients for seedling establishment. In a situation analogous to that seen in *Ricinus communis* seeds, here we show that post-germinative tomato endosperm cells accumulate PCD-specific organelles, ricinosomes, prior to their death. The organelles contain SlCysEP (Accession EU122386, 76% identity to *R. communis* CysEP), a KDEL-tailed cysteine proteinase. With the collapse of the vacuole at the point of death, these organelles degenerate releasing the inactive protease into the acidified cytosol. The acidic environment stimulates auto-catalytic activation of the enzyme and subsequent degradation of any remaining proteinacious material in the cell corpse, completing the PCD process. The living endosperm, however, can be isolated from the presumed source of the death signal, the embryo, and will remain viable allowing for *ex situ* perturbations. While the signal(s) for producing ricinosomes and marking cells for death remains unclear, we demonstrate that GA, normally produced by the embryo, induces accumulation of SlCysEP, and that ethylene signals for the rapid processing of SlCysEP and perhaps for the execution of PCD. The post-germinative tomato endosperm system should be valuable for studies into the molecular control of various phases of PCD in plants.