

MCB PLANT BIOLOGY SEMINAR

John Greenwood,
Department of Molecular and Cellular Biology,
University of Guelph

"Ricosomes: Subcellular Morticians"

Monday, January 31, 2011

3:30 p.m.

SCI2315

ABSTRACT:

Originally discovered in 1970 in separate investigations by Mollenhauer and Totten, and by Vigil, the rinosome is an organelle similar in size (0.4 - 1 μ m diameter) and shape to peroxisomes and glyoxysomes. Rinosomes are distinguished from the latter organelles by the retention of ribosomes on the bounding membrane. The organelles are thought to be unique to plant cells, so unique that their existence seemed limited to the castor bean plant, *Ricinus communis*, and to the cells of one tissue, the endosperm of the germinated seed. Following their discovery, the rinosome remained virtually ignored for the next thirty years. Through a series of, initially fortuitous, studies by Gietl and co-workers, rinosomes are now recognized as organelles involved in the terminal stages of developmental programmed cell death in the castor bean endosperm. The organelles contain a high concentration of a unique, but inactive, protease. Upon cell death, and with the associated collapse of the central vacuole and acidification of the cytoplasm, the protease is released from the rinosome and self-activates. Having relatively broad specificity, the released enzyme acts in the processing of the cell corpse by digesting those proteins that remain following the cell's death. The digestion products then aid in the nutrition of the growing seedling. During this talk we will follow the history of establishing the rinosome as a subcellular mortician, both in predicting the death of the cell and being involved in cellular corpse processing. The classification of rinosomes as organelles, their involvement being restricted to very specific occurrences of programmed cell death, and reasons why their existence might be essential in certain circumstances, are examined and presented.