

Department of Molecular and Cellular Biology
Graduate Seminar MCB*6500

Friday, January 29, 2021 @12:45 p.m.

presented by:

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**“Subcellular localization and cytopathology
of grapevine leafroll-associated virus 3 and proteins
encoded by ORFs 8 and 10”**

Grape leafroll-associated virus 3 (GLRaV-3) is the putative causal agent of the most widespread and destructive viral grapevine disease, grapevine leafroll disease (GLD). GLD has caused reduced quality and yield in grape and wine products, resulting in calamitous economic impacts (1). The virion of GLRaV-3 is long and filamentous. GLRaV-3 is a positive sense, single-stranded RNA virus of the *Ampelovirus* genus in the family *Closteroviridae*. Its approximately 19 kb RNA genome encodes 12 open reading frames (ORFs), making it one of the largest and most complex RNA genomes of all RNA viruses identified. Of these, ORF8, and ORF10 are unique to the *Ampelovirus* genus (2). The roles of each of these genes in the infectious cycle of the virus have not been studied. I hypothesize that proteins encoded by ORF8 and ORF10 will colocalize with mitochondrial markers. I also hypothesize that the mitochondria of GLRaV-3-infected grapevine cells will vesiculate and degenerate. I will generate a green fluorescent protein (gfp) tagged clone for each ORF to induce expression in *Nicotiana benthamiana* using agroinfiltration. I will use an infectious clone of GLRaV-3 to infect virus-free *Vitis vinifera*. Electron microscopy will be used to observe GLRaV-3 infected host cells and the resulting cytopathic effects. The results of this study will be the first step toward the elucidation of the function of ORF8 and ORF10 as well as the interaction of GLRaV-3 with its host. This will reveal some of the fundamental aspects of the biology and pathological properties of GLRaV-3.