

INVITED LECTURE T1

Three-dimensional structures of two Partitiviruses infecting the fungus *Penicillium stoloniferum*

W. F. Ochoa¹, W. M. Havens³, A. S. Rusnak¹, B. Sinkovits¹, M. L. Nibert⁴, S. A. Ghabrial³ and T. S. Baker^{1,2}

¹*Department of Chemistry & Biochemistry and* ²*Division of Biological Sciences, University of California-San Diego, La Jolla, California 92093-0378, USA.*

³*Department of Plant Pathology, University of Kentucky, Lexington, Kentucky 40546-0091, USA*

⁴*Department of Microbiology and Molecular Genetics, Harvard Medical School, Boston, Massachusetts 02115, USA*

Two electrophoretically and serologically distinct viruses, PsV-F and PsV-S, are isolated together from the fungus *Penicillium stoloniferum*. The bipartite dsRNA genomes of these viruses are separately encapsidated in capsids comprised of 60 asymmetric coat protein dimers arranged in a so-called T=2 organization. We used cryo-electron microscopy and three-dimensional (3D) image reconstruction techniques to determine the structures of PsV-F and PsV-S virions at resolutions of 16 and 7.3 Å, respectively. The two ~35 nm diameter capsids have very similar morphologies. Both particles are composed of 12 pentons, each of which consists of five curved and elongated protrusions formed by two closely associated coat protein monomers. The dimer-dimer contacts and the orientations of the subunits relative to the 2-fold axes differ in PsV-F and PsV-S. In addition, the two viruses exhibit different organizations of the RNA genome inside the capsids. The 7.3 Å 3D map of PsV-S shows numerous rod-like densities, characteristic of α -helices and consistent with secondary structure prediction and sequence and phylogenetic comparison with well-characterized fungal viruses like the yeast L-A virus. These are the first structures determined for any viruses of the family *Partitiviridae*.