AUTOGRAPHA CALIFORNICA NUCLEAR POLYHEDROSIS VIRUS REPLICATION IN NON-PERMISSIVE *LYMANTRIA DISPAR* CELL LINES

Edward M. Dougherty[1], David Guzo[1], Kathleen S. Shields[2],
Dwight E. Lynn[1] and Susan K. Braun[1]
[1]USDA, Agricultural Research Service, Insect Pathology Laboratory, Beltsville, MD 20705
[2]USDA Forest Service, Northeastern Forest Experiment Station,
51 Mill Pond Rd., Hamden, CT. 06514

ABSTRACT

Autographa californica nuclear polyhedrosis virus (AcNPV) the prototypic group A baculovirus, has the widest reported host range of the baculoviruses and is considered to be one of the most virulent baculoviruses studied. The gypsy moth *Lymantria dispar* is not considered a natural host of AcNPV, however. To determine the factors regulating AcNPV restriction in *L. dispar*, *in vivo* and *in vitro* studies on AcNPV replication in gypsy moth cells have been initiated.

In vitro studies of AcNPV infection of *L. dispar* cell lines originated from egg, larval and pupal tissue sources revealed a variety of cell responses to infection. Cell susceptibility has ranged from permissive to non-permissive. Two cell lines, IPLB-Ld652Y and IPLB-LdFB have been shown to partially replicate AcNPV (semi-permissive cell lines) and thus are used to study at least one mechanism of AcNPV restriction in *L. dispar* larvae. Synchronous infection of these lines produces no budded virus nor viral occlusion bodies, however, distinct cytopathic effects are observed including nuclear hypertrophy, cell clumping (in IPLB-Ld652Y cells) and very condensed nuclear material (in IPLB-LdFB cells).

Growth rates and mitotic indices of infected cells are significantly inhibited, however, cell viability is not significantly affected initially. The kinetics of viral genome replication are normal (compared with viral DNA replication in permissive cell lines) as measured by DNA-DNA hybridization. Protein synthesis is drastically altered in both systems. Only a few of the early viral proteins are observed before there is a rapid total shut down of both viral and cellular protein synthesis. Analysis of transcriptional events in these systems reveal aberrant viral transcriptional regulation, however, cell translational processes appear normal.

Both *in vitro* systems are serving as models for events which are being monitored simultaneously *in vivo* and may give insight into *in vivo* AcNPV restriction mechanisms in *L. dispar* larvae.