IMPACT OF ENHANCIN GENES ON POTENCY OF LDNPV IN GYPSY MOTH

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ABSTRACT

Lymantria dispar nucleopolyhedrovirus (LdNPV) contains two enhancin genes (E1 and E2) encoding proteases that degrade key peritrophic matrix (PM) proteins, thereby promoting infection and mortality by the virus. In a previous study, gypsy moth larvae inoculated with LdNPV in which both E1 and E2 were deleted (double deletion virus) resulted in a non-additive decrease in viral potency compared to potencies of viruses with only 1 of the 2 genes deleted. Earlier studies on enhancins encoded by granuloviruses show there are specific binding sites on midgut cells for enhancins, suggesting enhancins may function to facilitate virus entry into midgut cells. We investigated the potency of viruses lacking E1 (E1cat), E2 (E1del) or both (E1delE2del) in larvae fed on artificial diet in the presence or absence of the PM using the fluorescent brightener M2R to degrade the PM. We hypothesized that if the enhancin genes have a function in addition to increasing permeability of the PM to virions, then the double deletion virus should be significantly less potent than the wildtype virus (A21) even in the absence of the PM. Removal of the PM as a barrier to baculovirus infection did not change the reduced potency of the double deletion virus in comparison with the wildtype virus. These data support our hypothesis that the enhancin genes of LdNPV have another function beyond increasing permeability of the PM to virions. We plan to determine the role of one or both of the enhancin genes of LdNPV (E1 and E2) in viral entry into midgut cells.