

Improvement of Insecticidal Activities of Baculoviruses Expressing Scorpion Neurotoxin using Polydnavirus Promoters

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Baculoviruses have a long history of safe use as specific, environmentally benign insect control agents. However, their use has been limited by several factors, especially their slow speed of action. A number of approaches have been taken in order to produce baculoviruses with improved speed of kill or decreased effective feeding times. Amongst these approaches, expression of insect-specific scorpion neurotoxin, AaIT showed the most significant increase in pathogenicity. *Cotesia plutellae* polydnavirus (CpBV) is obligate mutualistic insect virus found in parasitic wasp and causes several obvious physiological changes such as immune suppression and developmental disturbance in parasitized hosts, *P. xylostella* larvae. Recently, we cloned several early promoters from CpBV including ORF303, ORF305, ORF306 and ORF307 promoters. In this study, we intended to improve the insecticidal activities of *Autographa californica* nucleopolyhedrovirus (AcNPV) by expressing AaIT under the control of early promoters of CpBV. For this, recombinant AcNPVs, Ac303ProAaIT, Ac305ProAaIT, Ac306ProAaIT and Ac307ProAaIT expressing AaIT under the control of ORF303, ORF305, ORF306 and ORF307 promoter, respectively were constructed. Among these recombinant viruses, Ac307ProAaIT showed highest insecticidal activity against 3rd instar larvae of *Spodoptera exigua*. These results suggested that early promoters from CpBV could be successfully applied to improve pathogenicity of baculoviruses.