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Chilo iridescent virus (CIV) encodes two functional metalloproteases

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The genome of Chilo iridescent virus (CIV) has two open reading frames (ORFs) with matrix metalloproteinase (MMP) domains. The proteins encoded by 136R and 165R ORFs contain 178 amino acids with over 40% amino acid sequence identity to hypothetical metalloproteases of other viruses and 264 amino acids with over 40% amino acid sequence identity to metalloproteases of a large group of organisms including primarily variety of *Drosophila* species, respectively. These proteins possess conserved zinc-binding motifs in their catalytic domains. In this study, we focused on the functional analysis of these ORFs. These ORFs were cloned into the *Autographa californica* multicapsid nucleopolyhedrovirus (AcMNPV) Bacto-Bac baculovirus expression-vector system, expressed in insect Sf9 cells with an N-terminal His tag and purified after 96 hours post infection to homogeneity by using Ni-NTA affinity chromatography. Western blot analyses of purified 136R and 165R proteins with histidine tags resulted in 24 and 34 kDa protein bands, respectively. Biochemical assays with the purified proteins, performed using dye-impregnated collagen (Azocoll) and Azo-casein as substrates, showed that both proteins have protease activity. The enzymatic activities were inhibited by metalloproteinase inhibitor EDTA. Effects of these proteins were also investigated on *Galleria mellonella* larvae. Insecticidal activities were carried out by injecting the larvae with the AcMNPV carrying 136R and 165R ORFs. Results showed that the baculoviruses harboring the iridoviral metalloproteases caused early death of the larvae compared to control group which was performed with only wild type AcMNPV. All these data suggest that the CIV 136R and 165R ORFs encode functional metalloproteinases which can be utilized in biological control of lepidopteran pests.

Biography

Remziye Nalcacioglu has completed her PhD in 2003 from Karadeniz Technical University, in Turkey. She has been working in the same university as an academician. She is working on insect viruses including baculoviruses and iridoviruses.

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