Characterization of Shrimp White Spot Syndrome Virus (WSSV) Structural Protein VP51A (ORF294)

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ABSTRACT

White spot syndrome virus (WSSV) is an important crustacean virus causing high mortality in cultured shrimp. WSSV is a double-stranded DNA virus with a genome size of about 300 kbp. So far, 58 viral structural proteins were identified. In this research, one of the structural protein translated form ORF294 (GeneBank accession no. AF440570), the VP51A, was studied. Gene structure analysis showed that the transcription initiation site of vp51A was located 135 bp upstream of the translation start codon ATG. TATA box, or its related consensus sequence was not recognized is 5 ’ untranslated region of this gene. The poly-A addition signal was overlapped with the translation stop codon TAA and the poly-A tail was added 23 bp downstream of the stop codon.The vp51A transcripts was observed 6 hours after virus infection and the expression levels increasing with the infection time course. Computer software anlysis discovered a conserved sequence of the nuclear localization signal (NLS) between 37 and 43 of VP51A coding region, but such prediction wasn ’ t confirmed by the following in vitro analysis performed in Sf9 cells. Immunoelectron microscopy analysis and Western blot hybridization performed on intact virus particle and separated viral components showed that the VP51A is an envelope protein. Furthermore, Western blot analysis of WSSV virion also demonstrated that except the expected 53 kDa band, there were another protein bands such as an obvious signal around 72 kDa and some other small molecular weight proteins exist. Similar result was found in the Western blot results performed on WSSV infect shrimp tissues and recombinant VP51A expressed insect cells. But when using the in vitro transcription and translation system to express the recombinant VP51A it demonstrated a 72 kDa protein only. This result showed that the VP51A gene might expresses a large molecular weight protein first and it will then be processed into another lower molecular weight ones. Other experiments, including the predict protein cutting site mutation of VP51A and Western blot hybridization by VP51A different region fragments derived antibadies suggested that most of the cutting sites of VP51A might distribute closer to the N-terminal region. The is processed and what are the biological meanings of there different types of VP51A proteins, still left to be elocudate.

Keywords : WSSV ; structural protein ; envelope protein

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