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Molecular characterization of Minichromosome maintenance protein (MCM7) in *Scylla paramamosain* and its role in white spot syndrome virus and *Vibrio alginolyticus* infection

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Abstract

The minichromosome maintenance protein (MCM7) is a member of the MCM protein family which participates in the MCM complex by playing a role in the cell replication cycle and chromosome initiation in eukaryotes. The 2270 bp cDNA sequence of *MCM7*, including a 2127-bp open reading frame (ORF) encoding a 709-aa protein, was cloned from *Scylla paramamosain* using RT-PCR and RACE. Data showed that *MCM7* was highly expressed in the digestive organ and hepatopancreas of *S. paramamosain*. Furthermore, *MCM7* expression was down-regulated by infection with white spot syndrome virus (WSSV) or *Vibrio alginolyticus*. When *MCM7* was knocked down, immune genes such as Janus kinase (JAK) and crustin antimicrobial peptide (CAP) were down-regulated, and C-type-lectin (CTL) was up-regulated in hemocytes. The mortality of WSSV-infected or *V. alginolyticus*-infected crabs was enhanced following *MCM7* knockdown. It was demonstrated that *MCM7* is very important in the progression of WSSV and *V. alginolyticus* infection. We also investigated the effect of *MCM7* on apoptosis rate and phagocytic rate in *S. paramamosain*. *MCM7* knockdown caused higher levels of apoptosis in the hemocytes of the control, WSSV, and *V. alginolyticus* groups. *MCM7* knockdown influenced the activity of phenoloxidase (PO) and superoxide dismutase

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