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Molecular cloning and expression analysis of a pearl oyster (*Pinctada martensii*) heat shock protein 90 (*HSP90*)

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ABSTRACT. Heat shock protein 90 (HSP90) is an important molecular chaperone required for proper folding of cellular proteins, and thus, it plays an essential role in protecting cells from damage during stress. In this study, an HSP90 cDNA designated *PmHSP90* was cloned from the mantle tissue of the pearl oyster *Pinctada martensii* using reverse transcription polymerase chain reaction (RT-PCR) coupled with the rapid amplification of cDNA ends (RACE) approach. *PmHSP90* cDNA was 2584 bp in length, including an open reading frame of 2160 bp, which encodes a polypeptide of 719 amino acid residues, with predicted molecular mass and isoelectric point of 83.0 kDa and 4.87, respectively. Multiple-sequence alignment indicated that HSP90 is highly conserved among species, and *PmHSP90* showed 89% sequence identity to *Crassostrea gigas HSP90*. Five conserved amino acid blocks defined as HSP90 protein family signatures were also observed in PmHSP90, indicating that PmHSP90 may be a cytosolic member of the HSP90 family. Expression levels of *PmHSP90* were detected in various tissues of *P. martensii* and in hemocytes under three different stress conditions using quantitative real-time PCR (qPCR). The results demonstrate that *PmHSP90* mRNA is constitutively expressed in

all the tested tissues and may be involved in the immune response against thermal stress, lipopolysaccharide stimulation, and nucleus insertion operations. Studies on PmHSP90 are a valuable source to further explore the immune system in pearl oysters during the production of pearls, and may enhance our knowledge of molluscan innate immunity.

Key words: Heat shock protein 90 (HSP90); *Pinctada martensii*; Cloning; Expression; Stress

