



Expression patterns of two heat-shock cognate 70 genes during immune responses and larval development of the Chinese mitten crab *Eriocheir sinensis*

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ABSTRACT. Two heat-shock protein (HSP) 70 family transcripts, heat-shock protein 70 cognate 5 and heat-shock protein 70 cognate 3 (designated as *EsHSC70-5* and *EsHSC70-3*, respectively), were isolated from the Chinese mitten crab *Eriocheir sinensis* and their expression profiles were evaluated for their responsiveness to larval development and immune challenge in adult crabs. The HSPs exhibited 45-89% identity with other heat-shock proteins, and they shared similar structural features. *EsHSC70* mRNA expression was detected not only during infection but also during the developmental larval stages. The *EsHSC70s* were enriched, and their expression fluctuated during early development. *EsHSC70* mRNA expression was significantly induced by *Vibrio parahaemolyticus* challenge in all of the tissues studied ($P <$

0.05). Expression of *EsHSC70* mRNA in the hepatopancreas and at the early zoeal stages was particularly pronounced, and the two *EsHSC70s* exhibited differential expression patterns both chronologically and spatially. The *EsHSC70-5* mRNA level was significantly downregulated in the intestine and gills compared to that in controls at nearly all time points, and was expressed at a lower level after the bacterial challenge, indicating that *EsHSC70-5* and *EsHSC70-3* respond to immune challenges. The stage-specific enrichment of *EsHSC70* transcripts in crabs suggests that these stress proteins play an essential role during brachyurization events.

Key words: *Eriocheir sinensis*; Heat-shock cognate protein 70; mRNA expression; Brachyurization development; Immune challenge