

A COMPARATIVE STATEMENT ON MOLECULAR APPROACH OF LARGE HSPS FROM *MACROBRACHIUM ROSENBERGII*

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ABSTRACT

This study reported a comparative account of large heat shock proteins (HSPs) namely HSP60, 70 and 90 from freshwater prawn *Macrobrachium rosenbergii* (*Mr*) at molecular level. The *Mr*HSP60, 70 and 90 was 2158, 1998 and 2220 base pairs (bp) long that contain an open reading frame (ORF) of 1722, 1995 and 2157 bp, respectively. These *Mr*HSP60, 70 and 90 ORFs encoded a polypeptide of 574, 665 and 719 amino acids and their respective molecular mass was 60.75, 71.40 and 82.65 kDa. *Mr*HSP60 and 70 are mitochondrial, whereas *Mr*HSP90 is cytoplasmic in nature. The bioinformatics analysis showed that *Mr*HSP60 possess a chaperonin (cpn) 60 domain at 46-547 and a cpn 60 signature motif between 427 and 438. Similarly, *Mr*HSP70 possessed a HSP70 domain at 21-624, whereas *Mr*HSP90 contained a HSP90 domain at 188-719 along with a HSP90 family signature between 30 and 39. *Mr*HSP60 and 70 are rich in hydrophobic (glycine) residues at C-terminal ends, whereas 90 is rich in hydrophilic (aspartate) residues. Homology and evolutionary analysis revealed that these three *Mr*HSP60, 70 and 90 are very close to *Macrobrachium nipponense*, *Cherax cainii* and *Palaemon carinicauda*, respectively. The structural analysis showed that *Mr*HSP60 carried maximum amino acids (52%) in helices and it carries cpn 60 signature in helical and coil regions. In *Mr*HSP70, the nucleotide binding domain was distributed throughout the helices, sheets and coils, whereas in *Mr*HSP90, the HSP90 family signature is present in the helical region. Tissue distribution results revealed that significantly ($P < 0.05$) highest expression of *Mr*HSP60, 70 and 90 was observed in haemocyte, gill and hepatopancreas, respectively. Moreover, their mRNA regulation upon exposure to microbial pathogens significantly ($P < 0.05$) increased their expression. Overall, the study showed the potential involvement of large HSPs against microbial stress in immune function of *M. rosenbergii*.

KEYWORDS

M. rosenbergii; HSP; Tissue distribution; Pathogens; Gene expression

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