Molecular Cloning, Characterization, and Expression Analysis of HSP60 in Mandarin Fish Siniperca chuatsi

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Key words: Siniperca chuatsi; HSP60; heat shock; hypoxia; Aeromonas hydrophila

Abstract

HSP60 protein plays an important role in stress response, protein folding, and cell signaling. In this study, mitochondrial HSP60 from Siniperca chuatsi was identified, and its cDNA and gDNA structures, amino acid sequence features, and phylogenetic analysis, were described. Expression profiles during embryonic development, in different tissues and under stressful conditions were analyzed using RT-PCR. During embryogenesis, low levels of transcripts of ScHSP60 were detected during early developmental stages and were upregulated at blastopore closure stages to 1 dpf. ScHSP60 showed tissue-specific variation, highly expressed in ovaries under non-stressed conditions. Acute heat shock at 34°C resulted in strong upregulation of ScHSP60 in heart, liver, and head kidney in a time-dependent manner. However rapid and gradual elevated heat shock did not affect ScHSP60 expression when temperature reached 34°C, although it was dramatically induced when temperature reached 38.8°C. ScHSP60 was also markedly induced in the liver in a stage-dependent manner under hypoxia. Additionally, Aeromonas hydrophila infection augmented ScHSP60 in head kidney and spleen. Results showed that ScHSP60 expression is significantly modified under different environmental conditions including high temperatures, hypoxia, and bacterial infection. This study will further clarify the role of fish HSP60 in embryogenesis and under stressful conditions, and contribute to further investigation to understand stress tolerance and disease resistance of mandarin fish.

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