

## **Expression of Zhsp70, Zhsf1 and Zhsf2 in Developing Embryo and Adult Brain in Zebrafish (*Danio Renio*)**

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While the heat shock response has been exhaustively studied in various taxonomic groups and model systems, less is known about the expression of heat shock genes in developing central nervous system and brain of teleosts. In particular, know heat shock transcription factors, zhsf1 and zhsf2 are not known how zhsp70 is associated with them upon heat shock. We examined zebrafish *zhsp70*, *zhsf1*, *zhsf2* gene expressions in developing embryos and brains, and the regulation of the gene expression by heat induction. Heat shock was performed by using a heated beaker in water bath in 37°C for 1 and 2h at various embryos stages respectively. For adult was a exposure of heat shock for 1, 2 and 3h. After heat shock, the embryos were not recovered to normal temperature directed sampling at each developmental stages. No significant morphological interruption was found in embryos and adult exposed to the heat stress. The RT-PCR analysis showed that *zhsp70* was induced in adult brain tissues exposed to the heat, in particular, distinct upregulation was found from 6hpf embryos. whole mount in situ hybridization results also demonstrated similar upregulation of the *zhsp70* in the stage-specific manner. The spatial expression was distinctly strong in the regions of the hindbrain, notochord, tectum and retina. The spatial and temporal expressions was found in normal and heat-shocked embryo suggested that zebrafish *zhsp70* may actively be involved in early neurodevelopmental event, and that heat-induced upregulation may occur in a tissue-specific manner. Expression of *zhsf1* was ubiquitous in embryos. Overall expressions of hsf1 and hsf2 were similar and their expression levels were not altered during and after heat shock. The profiling of the three genes under heat shock should provide a roadmap for further studying regulated gene expression of them in physiologically responding whole organism.