Dev Reprod Vol 9, No 1, 2005(Suppl) pp 36

Intracellular Behavior of HSF1 upon Different Strengths of Heat Shock in Zebrafish (*Danio rerio*) Brain

Chang Nam Hwang and Sang Ho Lee
School of Life Sciences and Biotechnology, Korea University, Seoul 136-701, Korea

HSF1 regulates the stress-inducible expression of HSPs and other molecular chaperones that are involved in high-order structure and assembly. The physiological function of HSF1 has been clarified from the examination of their intracellular shuttling in mammals. Although HSF1 has been studied in other eukaryotic cells and vertebrates, whether a similar behavior of HSF1 in zebrafish is present remains unknown. To investigate the intracellular behavior of zebrafish HSF1 (zHSF1), heat shock was carried out at temperatures ranging from 28 to 37℃ in zebrafish and from 37 to 42℃ in CHO cells, and the subsequent recovery culture at 28℃ was performed up to 2 h. HSF1 increased as a function of temperature (28, 33, 35, 37℃) to reach maximal expression, without loss of cell viability, at 37℃ for 1h. The expression of HSF1 was found maximal by 37℃ for 1h heat shock and showed gradual activation of phosphorylated HSF1 in the nucleus. HSP70 increased from 35℃ with 1h heat shock. HSF1 appeared phosphorylated in 1h heat shock and rapidly disappeared at 1 and 2h recovery in the cells nuclei of the brain. HSF1 rapidly phosphorylated at 15min and gradually diminished at 30, 45 and 60min of heat shock, while HSP70 showed gradual increases. Using stable CHO cell lines harboring zHSF1-GFP, a similar result was obtained in nuclear accumulation and the appearance of phosphorylated forms of zHSF1. Furthermore, in zebrafish brain, it was found that HSF1 and HSP70 interact *in vivo*. Therefore, zebrafish HSF1 regulates the rapid response to heat shock as in mammalian systems with some different mechanism.

Keywords: Brain, Cytoplasm, Heat shock, HSF1, Nucleus, Phosphorlyation, Zebrafish.