Association of Hsp60 expression with damage to rat myocardial cells exposed to heat stress in vivo and in vitro

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Received September 24, 2013
Accepted January 13, 2014
Published November 11, 2014
DOI http://dx.doi.org/10.4238/2014.November.11.3

ABSTRACT. To investigate the protective role of Hsp60 against stress damage and its role in the sudden death of stressed animals, changes in the levels of Hsp60 protein and hsp60 mRNA of myocardial cells in vivo and in vitro were studied. In addition, the relationship between Hsp60 expression and heat-induced damage was also studied. Rats were exposed to a temperature of 42° ± 1°C for 0, 20, 40, 60, 80, or 100 min. More than 50% of the rats died suddenly within 100 min. With increasing heat stress duration, hsp60 mRNA levels significantly increased in both in vivo and in vitro rat myocardial cells; however, a similar trend was not observed for Hsp60 protein levels. Although the changes observed in Hsp60 expression in myocardial cells in vitro were inconsistent with those of rat heart tissues in vivo, Hsp60 expression levels were consistent with the histopathological damage observed in myocardial cells both in vivo and in vitro. Differences in Hsp60 expression may reflect the degree of injury sustained by myocardial cells in vivo and in vitro. As a mitochondrial protein, Hsp60
represents a potential biomarker of heat stress, and may protect against heat stress induced myocardial cellular damage both \textit{in vivo} and \textit{in vitro}.

\textbf{Key words:} Hsp60; Myocardial cell; Heat stress; Rat; \textit{In vivo} and \textit{in vitro} cell culture