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## Heat-Related Biomarkers: Focus on the Correlation of Troponin I and 70 Kda Heat Shock Protein

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**Introduction:** There is intensive research related to the forensic importance of biomarkers that would be the gold standard for postmortem damage to cardiomyocytes and the mechanism of the resulting damage. The aim of the research was to determine the forensic-medical significance of serum levels of biomarkers as detectors of terminal hyperthermic damage to the myocardium.

**Material and method:** The rats were divided into five groups: control group exposed to 37°C water temperature (CG), group exposed to 41°C water temperature in duration of exposure with 20 minutes (G41-hyperthermia), group exposed to 41°C water temperature with exposure time until death (G41-heat stroke), group exposed to 44°C water temperature in duration of exposure with 20 minutes (G44- hyperthermia), and group exposed to 44°C water temperature with exposure time until death (G44-heat stroke). A probe was used to measure the core temperature of rats, and the core temperature was read on a thermometer. The concentration of cardiac TnI and Hsp70 was determined in serum by immunochemical enzyme-labeled immunoabsorption method.

**Results:** In group G41°C, a positive correlation was found between serum cTnI values and body temperature measured at the time of death ( $p=0.02$ ), and Hsp70 values did not significantly correlate with the body temperature of rats in this group,  $p>0.005$ . A significant positive correlation between the concentration of Hsp 70 and the body temperature of rats in the group of rats with a fatal outcome was determined,  $p=0.03$ .

**Conclusion:** Changes in the concentration of cTnI and Hsp70 in rat serum may indicate hyperthermic damage to the myocardium in the Wistar rat model of heat stroke.

### Recent Publications

1. Emina Dervišević, Sabaheta Hasić, Lejla Dervišević, Zurifa Ajanović, Muhamed Katica and Adis Salihbegović. 2022. Impact of Temperature on Morphological Characteristics of Erythrocytes and Heart Weight: Experimental Study on Wistar Rats. Chapter 12. doi: 10.5772/intechopen.105101
2. Dervišević E, Katica M, Ajanović Z, Jogunčić A, Dervišević L, Dervišević M, Salihbegović A. Influence of hyperthermia on dimensions of erythrocytes: Experimental preliminary study on rats. *Veterinaria*, 2022 | 71(1)
3. Dervišević E, Hasić S, Katica M, Salihbegović A, Ajanović Z, Sarajlić N. Forensic significance of cTnI serum for the detection of terminal myocardial damage in rats (*Rattus norvegicus*) caused by hyperthermia. *J King Saud Univ Sci*, 2021; 34(2): 101753.

### Biography

Emina Dervišević currently works at the Forensic Medicine, Faculty of Medicine, University of Sarajevo. She did research's in forensic medicine, but also in primary care and general medicine. She has her expertise in evaluation and forensic importance in improving the causes of death. Scientific data on the role and association of hyperthermia as a cause of sudden cardiac death are scarce and further research is needed in this field. Current science suggests that hyperthermia and the cardiac response are causally related according to

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the very pathophysiological sequence of events in hyperthermia. In the forensic sense, there is scarce evidence of a pathophysiological mechanism leading to sudden cardiac death. This was exactly the PhD thesis to find an adequate model of hyperthermia. The aim of thesis was to prove that the cause of sudden cardiac death was caused by high temperature, and adequate methods of proving and comparing the condition in the body before and after death. Further evaluation is needed in the experimental sense but also on human material.

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