

NEUROCHEMICAL CORRELATES OF HYPERTHERMIA-INDUCED BEHAVIOURAL CHANGES

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Extremes of environmental conditions such as cold, heat act like typical stresses that bring into play in the homeothermic animal a complex of biochemical, behavioural and physiological changes. Heat stroke is a common occurrence in certain parts of India, and in some other countries where the elevated temperature reaches the peak during the summer months. Heat stroke is characterised by disturbances of the central nervous system. Hyperpyrexia typically occurs when the environmental temperature is very high. Therefore the effect of exposure to elevated temperature of 44°C for 120 minutes in the rats on alterations in RNA, DNA, Total protein, transaminases of the brain and behavioural alterations is studied in the albinorats, since the central nervous system is vulnerable to heat stroke with associated dysfunction. The animals whose rectal temperature (Tr) reached above 42°C only were included in this study. Thermal-stress affected animals showed a reduction of nucleic acids with alterations in the transaminases. These changes were correlated with hyperthermia induced cerebral derangement, and the characteristic behavioural changes. Sensitivity of brain tissue to hyperthermia is higher than that of other tissues. Changes in personality and behaviour such as aggressive behaviour, apathy and impaired arousal occur during heat exhaustion above 39-39.5°C, and several workers emphasised the existence of temperature gradients within the body. Thermal stress-induced neurochemical alterations reported in this study indicate cellular degeneration. Thermal stress also induced elevation of rectal temperature and the animals exhibited decreased locomotor activity and assumed sleeping posture. This is synonymous with heat stroke effects in humans, who showed characteristic behavioural changes, including reduced movement, a vivid interest in the environment and marked loquacity.

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