

## **ROLE OF DOPAMINE IN THE PREOPTIC AREA AND ANTERIOR HYPOTHALAMUS ON THERMOREGULATION IN FREELY MOVING RATS**

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The preoptic area and anterior hypothalamus (PO/AH) are the crucial brain regions involved in thermoregulation. Due to the fact that thermoregulatory responses were induced by microinjection of norepinephrine, dopamine, 5-hydroxytryptamine, and amino acids into the PO/AH, these neurotransmitters have been considered to be involved in thermoregulation in resting rats. Microdialysis can collect virtually any substance from the brain in combination with on-going behavioral changes such as exercise. We attempted to assess the role of monoamines and amino acids in the PO/AH in relation to exercise-induced changes in Tb, using an in vivo microdialysis technique. Wistar male rats (body weight, 300-350 g) were used. Body temperature (Tb) was monitored using a telemetry system (Hasegawa, H. *et al.*, 2000). The microdialysis-HPLC methods that we used have been described previously (Yasumatsu *et al.*, 1998). A microdialysis probe was stereotaxically implanted into the left lateral PO/AH under pentobarbital sodium anesthesia (40 mg/kg i.p.). Tb increase by about 1.0°C in the first 15 min of treadmill exercise (10 m/min, for 60 min), and was maintained thereafter at a steady high level possibly due to activation of the heat loss system. The levels of dopamine metabolites (3,4-dihydroxyphenylacetic acid and homovanillic acid) in the PO/AH significantly increased during exercise. However, exercise did not induce an increase in the level of either serotonergic substances or amino acids. Our data indicate that dopamine breakdown processes in the PO/AH are activated during exercise. Dopamine in the PO/AH may be involved in the heat loss mechanisms for thermoregulation when Tb rises during exercise. We further examined to clarify the effects of dopaminergic neural mechanisms on thermoregulation, by perfusion of dopamine uptake inhibitor, GBR-12935, in the PO/AH using a microdialysis technique.

Hasegawa, H. *et al.*, 2000. *Neurosci. Lett.* 288, 17-20.

Yasumatsu, M., *et al.*, 1998. *Comp. Biochem. Physiol. A* 121, 13-23.

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