

NITRIC OXIDE AND ANGIOTENSIN II: NEUROMODULATORS IN THERMOREGULATION DURING EXPOSURE TO COMBINED HEAT AND HYPOHYDRATION STRESS

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In mammals, perturbation in body fluid homeostasis interferes with the ability to cope with thermal stress. With the hypothalamus representing the major integrative center, the knowledge of its osmo- and thermoregulatory interactions is still confined primarily to phenomenology manifested by whole body heat defense responses. Based on the involvement of the central renin-angiotensin (AngII) system and nitric oxide (NO), individually, in fluid balance and thermoregulation, the purpose of this work was to assess the involvement of NO in the integration between osmo- and thermoregulatory circuits, and to define the mutual effects of NO and AngII. For this purpose, heat defense responses - vasodilatation, evaporative cooling (salivation threshold), blood pressure and endurance - were measured in conscious heat stressed (39°C) rats (*Rattus norvegicus*, Sabra strain, albino var.) following administration of 7-nitroindazole (Ni; 100nm in a bolus), an antagonist of neuronal NO synthase, AngII (100pm), saline or both, into the cerebrolateral ventricle, in the following groups: heat acclimated (AC)-30d, 2d, and non-AC either euhydrated or hypohydrated (-10% of body weight). All drugs were dissolved in saline to final volume of 5µl. Body temperature (Tc), skin temperature (Tsk), and blood pressure were monitored on-line using a computerized data acquisition system. Our data support a role played by NO during exposure to individual as well as combined thermal and osmotic stress, in a biphasic manner, compared to the acclimation state, and in opposite directions in the different hydration states. The role of AngII is proven particularly following 30 d of acclimation. The effects of the two modulators, both separately and combined, fit with the model of Millatt *et al.* (1999) explaining AngII-NO interactions by differential activation/inhibition of AT1-AngII receptors, and a direct NO effect.

		Ni (100nmol)	AngII (100pmol)	Ni+AngII
Control	endurance	-	-	↓
	VTsh	↑	↓	-
	STsh	-	↓	↓
STHA	endurance	↑	↓	-
	VTsh	-	-	-
	STsh	-	-	↑
LTHA	endurance	-	↓	-
	VTsh	-	↓	↓
	STsh	-	↓	↓

Millat, L.J., Abdel-Rahman, H.M. & Siragy, H.M. (1999) Angiotensin II and nitric oxide: a question of balance. *Regul-Pept.* 81(1-3),1-10.

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