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 30d of acclimation. The effects of the two modulators, both separately and combined, fit with the model of Millatt *et al.* 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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