Public Abstract
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Title:CNS EFFECTS OF BLOOD-BORNE RELAXIN ON THE PARAVENTRICULAR NUCLEUS OF THE HYPOTHALAMUS

Pregnancy is characterized by increased blood volume and baseline sympathetic nerve activity, and profound cardiovascular adaptations. Relaxin (RLX), an ovarian hormone which is elevated in pregnancy, activates the subfomical organ (SFO) and hypothalamic regions associated with control of blood volume and sympathetic nerve activity. The current experiments phenotyped cells in the hypothalamic paraventricular (PVN) and supraoptic nuclei (SON) which were activated by RLX. Spinally projecting cells in the PVN were labeled by prior microinjection of retrogradely transported fluorescent tracers (90nl) into the intermediolateral column of the spinal cord of pregnant (P) and nonpregnant (NP) female rats. After 5 days, human RLX 2 (1 µg/hr) or saline (SAL, 1 ml/hr) was infused (1.5 hr) into the forebrain circulation (intracarotid artery) of conscious rats. RLX significantly increased heart rate (+50 ± 5) and transiently increased mean arterial pressure (+13 ± 1 mmHg) in NP rats, while SAL had no effect (+0.5 ± 2 mmHg). There were no significant hemodynamic effects in P rats with either RLX or SAL. Rats were euthanized, brains sectioned, and Fos-(index of neuronal activation), vasopressin (AVP-), and spinally-projecting neurons were evaluated. Following RLX in NP rats, cells in the lateral margins of the SFO expressed Fos-IR, consistent with activation of PVN-projecting neurons. Twenty-one ± 5% of AVP-IR cells and 19 ± 2% of spinally-projecting cells were activated (Fos-IR) by intracarotid RLX in NP rats. Fos-IR was not significantly increased in SAL treated rats, or in pregnant rats after either treatment. These data provide an anatomical substrate for a role of RLX in adaptations in regulation of blood volume (activation of AVP cells) and sympathetic nerve activity (activation of spinally projecting cells). In P rats, lack of response to exogenous RLX, might be due to pre-existing maximum activation by elevated endogenous levels of RLX.