

## INFLUENCE OF THE OESTROUS CYCLE UPON PRESSOR RESPONSES IN THE PITHED RAT

Joan Munby and Keith A Wilson<sup>1</sup>, Department of Pharmacology, Sunderland Polytechnic, Sunderland SR2 7EE and <sup>1</sup>Pharmaceutical Sciences Institute, Aston University, Birmingham B4 7ET

It has been reported that the pressor responses to oxytocin and vasopressin in the anaesthetised rat are greater in oestrous than in dioestrous animals (Lloyd, 1959) and these changes have been attributed to an effect of ovarian hormones upon sympathetic function (Pickford and Lloyd, 1966). We have investigated the influence of the oestrous cycle upon pressor responses to oxytocin and vasopressin in the pithed rat preparation in an attempt to determine whether there are any changes in vascular reactivity which are independent of sympathetic tone. We have also extended the study to include pressor responses to noradrenaline, angiotensin II and to stimulation of the spinal sympathetic outflow by the method of Gillespie and Muir (1967). Female rats (200-250g) were taken at oestrus or dioestrus, as determined by vaginal smears, and anaesthetised with sodium pentobarbitone (60mg/Kg). After pithing, pressor responses were obtained to oxytocin (200-800miu/Kg), noradrenaline (25-200ng/Kg), angiotensin II (6.25-50ng/Kg), stimulation of the spinal outflow (10/s, 200 s, 20-60v) and vasopressin (1.25-10miu/Kg). There was a 5 minute interval between each successive response and all responses were measured as the increase in diastolic pressure. There was no significant difference between the resting systolic pressure, diastolic pressure or heart rate measured after pithing in oestrous compared with dioestrous rats. Oxytocin caused similar dose-dependent pressor responses ( $p > 0.05$ ) in oestrous and dioestrous rats. There was also no significant difference between pressor responses to noradrenaline, angiotensin II or stimulation of the spinal outflow in oestrous compared with dioestrous rats. However, pressor responses to vasopressin (2.5-10miu/Kg) were significantly greater in oestrous compared with dioestrous rats ( $p < 0.05$  throughout). These findings are exemplified in Table 1.

Table 1. Pressor responses (mmHg, mean  $\pm$  sem.) of the pithed rat to oxytocin (OXY), vasopressin (VP), angiotensin II (AII), noradrenaline (NA) and stimulation of sympathetic outflow (NS) at oestrus (O) and at dioestrus (DI):\*  
P < 0.01 oestrus compared with dioestrus.

	OXY (n=7) 800miu kg <sup>-1</sup>	VP (n=7) 10miu kg <sup>-1</sup>	AII (n=7) 50ng kg <sup>-1</sup>	NA (n=7) 200ng kg <sup>-1</sup>	NS (n=6) 60v 10Hz
O.	38.3 $\pm$ 3.5	53.1 $\pm$ 3.6*	42.8 $\pm$ 2.5	45.4 $\pm$ 5.8	39.4 $\pm$ 3.4
DI.	39.6 $\pm$ 2.6	36.3 $\pm$ 2.2	36.4 $\pm$ 5.5	31.8 $\pm$ 5.2	39.9 $\pm$ 7.9

All the stimulation treatments produced small positive chronotropic responses which were not significantly different in oestrous compared with dioestrous rats. Thus pressor responses to vasopressin but not to noradrenaline, angiotensin II, oxytocin or stimulation of the sympathetic outflow were significantly greater in oestrous rats than in dioestrous rats. These findings suggest that changes in circulating ovarian hormones during the oestrous cycle modify the pressor effects of vasopressin through a change in vascular reactivity which is independent of any change in the function of peripheral sympathetic nerves.

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Lloyd, S (1959). J Physiol. 148: 625-632.

Pickford, M & Lloyd, S (1966). In: Memoirs of the Society for Endocrinology, V.14, Cambridge Press.