Vasopressor nerve responses in the pithed rat, previously identified as $\alpha_2$-adrenoceptor, may be $\alpha_{1D}$-adrenoceptor mediated.

James R Docherty

RCSI Physiology, Dublin 2, Ireland

Responses to pressor nerve stimulation in the pithed rat have been variously described as mediated, at least in part, by $\alpha_2$-adrenoceptors (Docherty & McGrath, 1980) and $\alpha_{1A}$- and $\alpha_{1D}$-adrenoceptors (Castillo et al., 1998). However, the evidence that neurally mediated pressor responses in the pithed rat involve $\alpha_2$-adrenoceptors has been obtained from studies with the $\alpha_2$-adrenoceptor antagonists yohimbine or rauwolscine. However, both yohimbine and rauwolscine have relatively high affinity for $\alpha_{1D}$-adrenoceptor ligand binding sites (McCafferty et al., 1999). It is clearly worth considering whether yohimbine blocks an $\alpha_2$-adrenoceptor or an $\alpha_{1D}$-adrenoceptor mediated component of pressor nerve responses. Rats were pithed by the method of Gillespie et al. (1970) and ventilated with 100% $O_2$ at a rate of 60 per min. The carotid artery was cannulated for measurement of blood pressure and drugs were injected into the jugular vein. The pithing rod was used as an electrode positioned at approximately T6 to stimulate the vasopressor nerves with 10 pulses at 1 Hz or 20 pulses at 5 Hz (0.5 ms, supramaximal voltage). Vasopressor nerve responses to 1 Hz stimulation were markedly inhibited by the $\alpha_{1A}$-adrenoceptor antagonist RS 100329 (0.1 mg/kg) and by the $\alpha_{1D}$-adrenoceptor antagonist BMY 7378 (0.1 mg/kg). The $\alpha_2$-adrenoceptor antagonist yohimbine (0.1 mg/kg) significantly increased pressor nerve responses to 1 Hz stimulation, but yohimbine (1 mg/kg) significantly reduced pressor nerve responses. However, following BMY 7378 (0.1 mg/kg), yohimbine (1 mg/kg) did not produce any further inhibition of pressor nerve responses to 1 Hz stimulation. The $\alpha_{2A}$-adrenoceptor antagonist BRL 44408 (1 mg/kg) did not reduce pressor responses to 1 Hz stimulation. BMY 7378 produced much less inhibition of pressor nerve responses to 5 Hz stimulation, whereas RS 100329 produced similar inhibition of 1 Hz and 5 Hz responses. Yohimbine (0.1 & 1 mg/kg) did not significantly affect pressor nerve responses to 5 Hz stimulation. In conclusion, pressor nerve responses in the pithed rat involve both $\alpha_{1A}$- and $\alpha_{1D}$-adrenoceptor, with no clear evidence for the involvement of $\alpha_2$-adrenoceptors.


