# The effects of the α-adrenoceptor antagonist phentolamine on the responses of the nasal vasculature and nictitating membrane of the cat to cervical sympathetic stimulation

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The nasal vasculature of the dog contains α-adrenoceptors (Hall & Jackson, 1968) and receptors of this type have been shown to be present in the nictitating membrane of the cat (Ahlquist, 1948, 1962).

A study was therefore made of the effects of phentolamine on the response of the nasal vasculature and nictitating membrane of 11 cats anaesthetized with pentobarbitone sodium intraperitoneally, to supramaximal preganglionic cervical sympathetic stimulation at frequencies ranging from 0.1 to 25 Hz. A difference in the effect of phentolamine on these tissues was indicated by the unpublished studies of Eccles & Wilson.

Vasoconstriction in the nose was recorded as a reduction of pressure in the sealed nasal cavity (Wilson & Yates, 1975) and contractions of the nictitating membrane were recorded by means of a Statham strain gauge.

Previous experiments had shown that vasoconstriction in the nasal cavity occurred with frequencies as low as 0.1 Hz, the responses increasing with increasing stimulation frequency to reach 80% of the maximum value at approximately 4 Hz and the maximum value at 15 Hz (Eccles & Wilson, 1974). In contrast the contractions of the nictitating membrane increased more slowly. The minimum effective frequency was 0.1 Hz but at 4 Hz the contraction had only attained 45% of the response at 25 Hz, a frequency at which the membrane had still not reached a maximum value. Similar findings were reported by Eccles & Wallis (1976).

Phentolamine was given intravenously in doses of 0.5, 1.0 and 2.0 mg/kg over a period of 1 min to minimize the fall in arterial blood pressure. The responses of both preparations were recorded at 0.2, 1.0, 4.0, 10.0 and 15.0 Hz, frequencies selected to give a representation of the full frequency/response curves. The responses of both preparations were recorded using these frequencies on three occasions before and after phentolamine. Each of the doses of phentolamine reduced the vasoconstriction produced at 15 Hz by approximately 7, 15 and 35% respectively and the contractions of the nictitating membrane by 25, 40 and 70%. Similar reductions in response were also recorded at other frequencies.

Some evidence was obtained to show that the nasal vascular responses recovered from the effects of phentolamine 75 min after the injection of the drug, compared with the nictitating membrane, the responses of which were unchanged at this time.

The smaller reductions in the vasoconstrictor responses compared with the reductions of the nictitating membrane contractions produced by phentolamine may be due to differences in the type of smooth muscle or in the population of α receptors. They may also be due to the sympathomimetic activity of phentolamine (Goodman & Gilman, 1970) which may be more effective on the nasal blood vessels particularly since they are believed to be the most sensitive tissues in the body to adrenaline (Malcomson, 1959).

This work was undertaken with the aid of a Medical Research Council project grant to Dr H. Wilson.

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