The resulting deficits can thus be attributed to the centrifugal pathway which has been affected, and the selective pharmacological approach to this problem would seem to be the method of choice.

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REFERENCES

COMIS, S. D. (1970). Centrifugal inhibitory processes affecting neurones in the cat cochlear nucleus. *J. Physiol. Lond.*, **210**, 751–760.

COMIS, S. D. & WHITFIELD, I. C. (1968). Influence of centrifugal pathways on unit activity in the cochlear nucleus. *J. Neurophysiol.*, **31**, 62–68.

RAMUSSEN, G. L. (1964). Anatomic relationships of the ascending and descending auditory systems. In: *Neurological Aspects of Auditory and Vestibular Disorders*, ed. FIELDS, W. S. & ALFORD, R. R., pp. 1–19. Springfield: Thomas.

RASMUSSEN, G. L. (1967). Efferent connections of the cochlear nucleus. In *Sensorineural Hearing Processes and Disorders*, ed. GRAHAM, A. B., pp. 61–75. Boston: Little Brown.

WHITFIELD, I. C. (1968). The pharmacological behaviour of the cochlear nucleus. In *Drugs and Sensory Functions*, ed. HERXHEIMER, A., pp. 167–174. London: Churchill.

Direct observation of the effects of nerve stimulation and of exogenous catecholamines on the rat mesenteric vasculature

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An *in vivo* preparation of the rat mesentery has been used to investigate the effects of nerve stimulation and exogenous catecholamines on small blood vessels. The exteriorized mesentery of the anaesthetized rats was viewed using transmitted light and long working distance objectives of 10 and 32 times magnification. The stage of the microscope was modified so that the mesentery and intestine lay in a warmed bath which was circulated with oxygenated, modified Krebs' solution. The area to be observed was arranged over a transparent plate set into the bath. The microscope had binocular eyepieces and was fitted with a beam splitter so that the field could be viewed and filmed simultaneously. Vessel diameters were measured using a calibrated eyepiece.

Small holes were cut in the mesentery on either side of the artery and vein supplying the area to be examined. Paravascular nerves were stimulated by a pair of parallel silver wire electrodes which were inserted through these holes, below the vessels and accompanying nerves. The electrodes were raised so that the vessels were held slightly above the level of the solution in the bath. The nerves were generally stimulated by square pulses of 0·5 ms duration at frequencies between 0·5 and 6 Hz and a strength insufficient to directly stimulate the smooth muscle of the blood vessels. To study the reactions of the vessels to catecholamines the level of solution in the bath was lowered and the catecholamine, dissolved in 0·1 ml of carrier solution, was applied from a syringe. The bath was flushed with fresh solution and the vessels allowed to recover between applications of catecholamine. The actions of antagonists of the nerve-mediated response and of directly applied catecholamines were examined by replacing the solution in the bath by one containing the blocking agent.

Arteries from 10 to 350 μ, capillaries from 3–7 μ and veins from 10–560 μ in diameter have been examined. Nerve stimulation constricted arteries above 20 μ and veins above 30 μ in diameter, but there was no constriction of smaller arteries

or veins or of capillaries. Arteries were often constricted to less than 50% of their original diameter but the maximum venous constriction was only about 20% when the paravascular nerves were stimulated under these conditions. The constrictor effect of nerve stimulation was blocked by guanethidine (10^{-6} g/ml) or by phentolamine (10^{-6} g/ml). The response was restored after the wash out of guanethidine by the inclusion of D-amphetamine (2×10^{-6} g/ml) in the bathing solution. All arteries and veins, including those not responsive to nerve stimulation, were constricted by noradrenaline and this constriction was blocked by phentolamine (5×10^{-6} g/ml). Noradrenaline in concentrations up to 10^{-5} g/ml had no effect on capillary diameter. A gradient in the sensitivities in the arteries was found; the smaller arteries being more responsive to noradrenaline. Veins were significantly less sensitive than arteries of comparable size.

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The influence of some centrally acting drugs on sympathetic nerve activity

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Pharmacological agents have been used to investigate the possible involvement of descending monoaminergic pathways in the regulation of sympathetic outflow, since such pathways have been shown, by fluorescent histochemical studies, to terminate in the region of the lateral horn cells of the thoracic spinal cord (Dahlstrom & Fuxe, 1965).

In unanaesthetized, decerebrate cats with a spinal section at C1, L-dopa, 100 mg/kg I.V., administered with a peripheral dopa decarboxylase inhibitor, MK486 (1-α-hydrazino-α-methyl dopa) 50 mg/kg I.V. had little apparent effect on spontaneous activity but depressed reflex activity recorded from preganglionic (white rami communicantes) and post-ganglionic (renal) sympathetic nerves in response to stimulation of spinal afferent nerves.

In another series of experiments, reserpine, 1 mg/kg, was administered intraperitoneally on each of four consecutive days before the experiment was carried out. The animals were anaesthetized with a mixture of chloralose, 35 mg/kg, and urethane, 700 mg/kg. Spontaneous activity in pre- and postganglionic sympathetic nerves was indistinguishable from that in the normal animal.

However, following the administration of reserpine, 5 mg/kg, intraperitoneally, four hours prior to the initiation of anaesthesia (chloralose and urethane as above), the spontaneous activity recorded from preganglionic (splanchnic) and postganglionic (renal) sympathetic nerves had increased considerably, compared with the untreated animal. In addition, the effectiveness of baroreceptor stimulation in inhibiting sympathetic nerve activity was decreased, tested by means of a carotid sinus blind sac preparation. When reserpine, 5 mg/kg I.V., was given acutely during an experiment, similar changes were seen, the onset of the effect being approximately four hours after injection.

In the anaesthetized preparation, α-methyl dopa, 30 mg/kg, infused slowly into a vertebral artery was found to have little effect on spontaneous activity recorded from pre- and postganglionic nerves.