

demonstrated that the dog brain maintains this activity for several hours after complete decapitation.

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Functional Location of Adrenergic Receptors on Blood Vessels in Muscle

THE functional location of α - and β -adrenergic receptors in muscle vessels is uncertain¹; they might be situated on resistances in series, in parallel or at the same point.

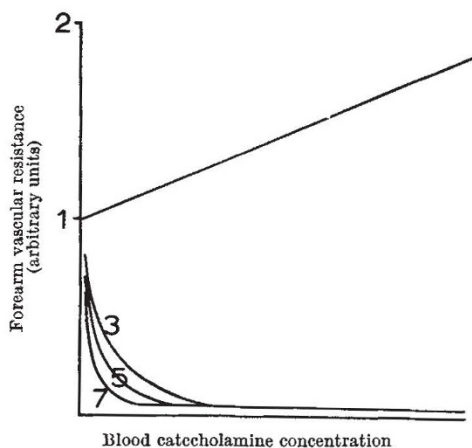


Fig. 1. Relationship between calculated blood concentration of catecholamines and forearm vascular resistance. The upper straight line is obtained during intra-arterial infusion of noradrenaline or of adrenaline after blockade of the β -receptors. The lower family of curves is obtained with isoprenaline or adrenaline after blockade of the α -receptors; the figures on these curves show the duration of the infusion in minutes

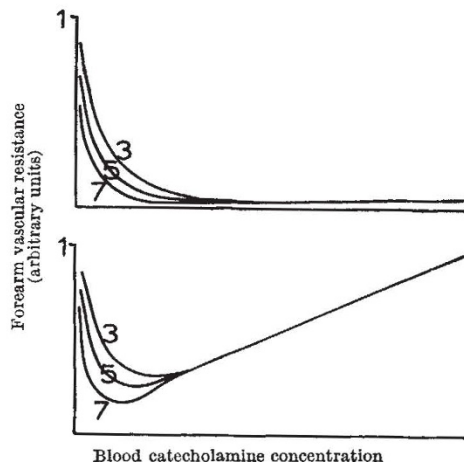


Fig. 2. Theoretical dose response curves obtained from the curves shown in Fig. 1 if the α - and β -receptors were stimulated simultaneously by infusion² of adrenaline, and were located on resistance in parallel (above) or in series (below)

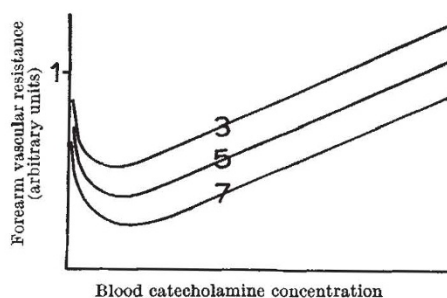


Fig. 3. Actual shape of dose response curves for adrenaline or for a mixture of noradrenaline and isoprenaline in suitable proportions to mimic the response to adrenaline

In the human forearm the effect of α -adrenergic stimulation is a square wave constrictor response which does not change with time². The effect of β -adrenergic stimulation is more complex, with a sustained dilatation which increases progressively with time. Dose response curves for the separate α - and β -adrenergic effects are illustrated in Fig. 1.

Using these separate dose response curves it is possible to construct models of the dose response curves which should be obtained if the α - and β -receptors were stimulated simultaneously, and were situated on resistances in series or in parallel (Fig. 2). The assumptions made in deriving these curves are: (1) That the shape of dose response curve for α -adrenergic effects in forearm muscle does not differ substantially from the curve for the forearm as a whole. (2) That the parallel resistances in muscle behave in a homogeneous way. These theoretical curves in Fig. 2 differ from the actual dose response curves obtained experimentally (Fig. 3). A curve of the type shown in Fig. 3 can only be explained on the assumption that the α - and β -receptors in muscle are situated neither in series nor in parallel, but on the same resistance.

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Effects of Sugars on Intestinal Transfer of Amino-acids

It is well established that there are specific processes for the active transfer of both sugars and amino-acids by the small intestine. Since these substances can be transferred against a concentration gradient and since this transfer is prevented by metabolic inhibitors, energy derived from metabolism is presumably utilized in the transfer mechanisms. It would seem, therefore, that the mechanisms for sugar and amino-acid transfers might share some step in the overall absorption process even if it was only the linkage with a common energy source. Experiments were carried out to investigate this possibility.

Everted sacs (approximately 17 cm long) of intestine were made from the middle fifth of the combined jejunum and ileum of the rat. The sacs were filled with 1 ml. bicarbonate saline and were suspended in 50 ml. bicarbonate saline to which various sugars and amino-acids were added. At the end of a 30-min incubation period at 38° C, the amount of amino-acid (glycine or methionine) transferred from the mucosal fluid was determined.

The results obtained with glycine are shown in Table 1. The two actively transferred sugars had quite different effects on glycine transfer, glucose causing stimulation and galactose causing inhibition. Both these effects were abolished by phlorrhizin, which in the absence of