It may be concluded that catecholamines present in the circulation of denervated dogs, which have not received reserpine, stimulate the cardiac muscle and not the sinu-atrial node and that propranolol in such dogs is acting solely as a β-adrenoreceptor blocking agent.

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Inhibitory α-adrenoceptors in guinea-pig vas deferens

R. J. REIFFENSTEIN* and M. M. VOHRA (introduced by A. S. MILTON)

Pharmacology Department, University of Alberta, Edmonton, Canada

The response of the stripped guinea-pig vas deferens to noradrenaline (NA) consists of a rapid peak followed by a fade to a lower equilibrium level. At doses of NA giving a response greater than about 20% of maximal, an additional phase of the response appears: a relaxation phase which follows immediately after the peak and goes below the final equilibrium (Iijima & Reiffenstein, 1972). This relaxation phase appears to be due to active inhibition resulting from activation of α-adrenoceptors (Ambache & Zar, 1970). The peak responses of the tissue to both NA and methacholine are inhibited when these agonists are added during the relaxation phase due to a previous dose of NA. In contrast, if these agonists are added at the equivalent time during a methacholine-induced contraction, then only the response to methacholine and not that to NA is affected. Thus NA has a non-specific inhibitory effect, whereas the effect of methacholine is receptor-specific.

The effects of these inhibitory α-adrenoceptors also appear when excitatory α-adrenoceptors are maximally activated: if more NA ($2–20 \times 10^{-5}$M) is added during the equilibrium phase of a *maximal* contractile response to NA (2×10^{-5}M), then a transient but substantial relaxation occurs (without any initial contraction). Isoprenaline also causes a similar transient relaxaton but the latter appears to be due to β-adrenoceptor activation, since the relaxations caused by the two agonists can be selectively blocked by phentolamine (or tolazoline) and propranolol respectively. Thus the vas deferens of the guinea-pig appears to have three types of adrenergic receptors: excitatory α, inhibitory α, and inhibitory β. Rat vas deferens does not appear to possess the inhibitory α-adrenoceptors.

M.M.V. held a Fellowship of the National Research Council of Canada. Present address: Department of Pharmacology, Dalhousie University, Halifax, N.S., Canada. This work was supported by the Alberta Heart Foundation.

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