The *in vitro* rat cervix

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It has been suggested on the basis of histological studies in the human (Danforth, 1947) and mechanical studies in the rat (Harkness & Harkness, 1959) that the physical properties of the cervix are determined more by the connective tissue than by the smooth muscle. However, the isolated human cervix has been shown to exhibit spontaneous contractility and to respond to drugs (Najak, Hillier & Karim, 1970).

Isolated rat cervices or uterine horns (from ovariectomized animals pre-treated daily for seven days with 17β oestradiol, 5 μg/kg s.c.) were perfused intraluminally with Krebs solution at $37 \pm 0.5^{\circ}$C at constant flow (1.5 ml/minute). Drugs were either injected into the perfusing Krebs or added to the reservoir. Contractions were recorded as increases in perfusion pressure. The magnitude of responses were measured as either the maximum pressure produced or the integrated pressure, above atmospheric, in the 5 min period after drug injection.

Methacholine (5×10^{-9} to 1.2×10^{-6} mol; $n = 8$) and oxytocin (5×10^{-2} to 4×10^{-4} i.u.; $n = 5$) produced cervical contractions. Oxytocin (1×10^{-2}: i.u./ml), added to the Krebs, produced regular contractions which were inhibited by isoprenaline (1×10^{-12} to 7.2×10^{-10} mol; $n = 6$) and phenylephrine (1×10^{-8} to 2.7×10^{-7} mol; $n = 6$). Phenylephrine (up to 2.7×10^{-7} mol; $n = 6$) did not contract the cervix.

Transmural stimulation of the cervix produced single contractions; the magnitude of which were frequency related between 1 and 64 Hz. These contractions were markedly reduced by hyoscine hydrobromide (2.5×10^{-8} M; $n = 6$) and tetrodotoxin (3.1×10^{-7} M; $n = 6$). The former abolished responses to methacholine (4.5×10^{-8} mol). The responses to oxytocin (4×10^{-2} i.u.) were unaffected by either agent.

Histochemical studies showed the presence of a denser network of acetylcholinesterase-staining fibres in the cranial end of the cervix than in the uterine born and a sparse cervical nor-adrenergic innervation.

In most qualitative and quantitative aspects the cervix responded in a similar manner to the uterine horn. These studies therefore provide no evidence for any cervical sphincteric function. The cervix possesses a cholinergic and nor-adrenergic innervation. The rat cervix can respond to drugs and so has smooth muscle with possible functional roles.

References

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Effects of quazodine on cat fast- and slow-contracting skeletal muscles

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Quazodine (6,7-dimethoxy-4-ethylquinazoline) relaxes smooth muscle and enhances the contractility of cardiac muscle (Lish, Cox, Dungan & Robbins, 1964; Aviado, Folle & Pisanty, 1967; Parratt & Winslow, 1972). In isolated skeletal muscle preparations quazodine enhances indirectly- and directly-evoked contractions (Nott & Winslow, 1973). The effects of quazodine on fast- and slow-contracting skeletal muscles in chloralose anaesthetized cats are now reported.

Quazodine (0.5-4 mg/kg i.a.) enhanced the tension of maximal twitches of the fast-contracting flexor hallucis longus (FHL) muscle. The highest dose produced increases in peak tension ranging from 10 to 16%. Onset of action occurred within 10 s; peak effect occurred within 30 s and the effect lasted from 2 to 6 minutes. The increase in tension was associated with an increase in the time to peak tension and overall duration of this twitch. Quazodine enhanced the tension of incomplete (24-32 Hz) and maximal (120 Hz) tetanic contractions of the FHL, the effect upon incomplete tetani (up to 114%) being more marked as a consequence of prolongation of the units of contractions.

The initial effects of quazodine (0.5-4 mg/kg i.a.) in the slow-contracting soleus muscle were