

Inhibition in the rat oviduct mediated by an unidentified transmitter

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After ovulation in mammals eggs travel rapidly through the ampulla of the oviduct to the junction between the ampulla and isthmus, where their progress is arrested for some time before they enter the isthmus and continue their journey to the uterus. The timing of this 'unlocking' of the isthmus coincides with the cyclic hormonal change from oestrogen (follicular) to progestagen (luteal) dominance. The once popular theory that this hormone-dependent unlocking was mediated through β -adrenoceptors (Brundin, 1969) has recently been challenged on the basis of pharmacological interference with adrenergic nerve function (Johns, Chlumecky, Cottle & Paton, 1975; Hodgson, Fremming & Daly, 1975).

In the rat, ova are held up at the ampullary-isthmic junction for some 36 h, but in this species, little is known of the role played by adrenergic systems in initiating the isthmic phase of transport.

Using an isolated, perfused, rat oviduct preparation, we have investigated the nature of responses to drugs and to field stimulation of intrinsic nerves (0.5 ms, 2–16 Hz for 30 s). The oviducts were perfused at a constant rate of 0.18 ml/min with Tyrode solution at 37°C and changes in the diameter of the lumen were measured as changes in perfusion pressure.

At no stage of the oestrous cycle did sympathomimetics produce responses, neither did α -nor β -adrenoceptor antagonists modify responses to nerve stimulation. Except at metoestrus, nerve stimulation caused a constriction, which was similar to that caused by acetylcholine. At metoestrus nerve stimulation caused an inhibition of spontaneous activity and a decrease in tone (Fig. 1) which were abolished by tetrodotoxin (0.31 μ M). These inhibitory responses could not be abolished by atropine 1.4×10^{-7} M, naloxone 10^{-5} M, phentolamine 10^{-7} M or propranolol 3.4×10^{-7} M.

We therefore suggest that the dilation of the isthmus which occurs in metoestrus and which allows the eggs to recommence their journey to the uterus may be due

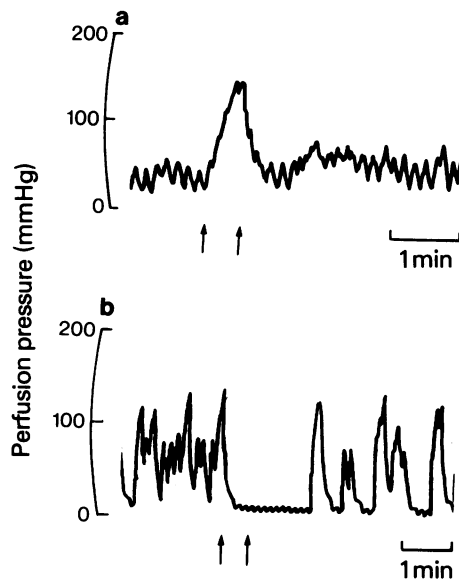


Figure 1 Responses to electrical stimulation.

Electrical stimulation was applied for the 30 s between the arrows.

- (a) proestrus, 4Hz
- (b) metoestrus, 8Hz

to the release of an unidentified inhibitory neurotransmitter.

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