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Mode of action of prostaglandins on the human non-pregnant myometrium

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AHLQVIST[1] postulated that uteri from most mammals contain adrenergic receptors of both α-(excitatory) and β-(inhibitory) types. These receptors should also be present in human myometrium. A β-stimulating drug such as isoxsuprine has an inhibitory action on the isolated strips of human myometrium[2, 3] and this effect can be inhibited by a β-blocking agent like propranolol [I.C.I. 45.520-1-isopropylamino-3-(1-naphtyloxi)propanol-(2)HCC] (Eliasson, unpublished).

It is well known that the prostaglandins E (PGE_1, PGE_2, PGE_3) usually have an inhibitory action on the isolated human myometrium.[4, 5] Since PGE_1 also has other effects that could suggest an action (stimulating or blocking) on β-receptors, e.g. increase of plasma FFA in man,[6] inhibition of the catechol-induced release of FFA from fat tissue *in vitro*,[7] it seemed to be of interest to study whether the effect on human myometrium was mediated by adrenergic receptors.

Twenty strips from five non-pregnant human uteri were suspended in an isolated organ bath containing aerated Tyrode solution (pH 7·4, 37°) and the motility was recorded by levers (amplification 1:25) on smoked drums. The method has been fully described elsewhere.[4, 5] Addition of the β-blocking agent proprandol in doses of 1–10 μg/ml bath fluid completely blocked the inhibitory action of isoxsuprine and another β-stimulating drug (Cc 25, Philips–Duphar) but did not modify the response to PGE_1 or to a total prostaglandin extract from human seminal fluid (HSF-PG) prepared according to Eliasson.[8]

Small amounts of prostaglandin sometimes caused stimulation of the isolated human myometrium. A few experiments (on eight strips from two uteri) were also performed in which the α- and β-blocking compound dehydroergotamine (DHE) was used. Doses that completely blocked the stimulatory action of adrenaline (1–10 μg/ml) did not modify the response to PGE_1.

These results show that the action of HSF-PG and prostaglandin E_1 on the isolated human non-pregnant myometrium is not mediated by these adrenergic receptors. The different responses of the myometrium after changes in the extracellular concentration of potassium also indicate that isoxsuprine and the prostaglandins (HSF-PG) have a different mode of action.[3] Whether the metabolic effects of prostaglandin E_1 as described above are due to interaction with the postulated β-receptors, has still to be determined.

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