Estrous cycle-dependent differences in responsiveness to prostaglandins and contractile agents in sheep (Ovis aries) cervical smooth muscle


We investigated the influence of the phase of the estrous cycle on mechanical responses elicited in sheep cervix by potassium chloride (KCl), acetylcholine chloride (ACh), prostaglandin F2a (PGF2a) and prostaglandin E1 (PGE1). The cervix of adult ewes (n = 48) were classified according to the presence or absence of corpora lutea (luteal or follicular phase, respectively). Muscle strips of the circular and longitudinal layers were prepared in an organ bath and coupled to an isometric force transducer. Concentration–response curves were obtained noncumulatively. KCl and ACh produced concentration-dependent contractions in all preparations in both phases of the estrous cycle. However, maximum effect, EC50 and slope values of KCl and ACh were not significantly different between muscle layers, as well as between the phases of the estrous cycle. The prostanoid, PGF2a, produced a significant reduction in the amplitude of spontaneous contractions for all preparations. The depressant effect of PGF2a on spontaneous contractions of circular smooth muscle was significantly greater during the follicular than the luteal phase, whilst the depressant effect of PGF2a on the longitudinal layer did not differ between phases of the estrous cycle. PGE1 significantly reduced the amplitude of spontaneous contractions on circular but not on longitudinal preparations. In conclusion, we have characterized with in vitro preparations of circular and longitudinal muscle layers of ewes during the follicular and luteal phases of the estrous cycle, the parameters of the K- and ACh-induced contractions on cervix and the efficacy of PGF2a and PGE1 on inhibition spontaneous contractile activity.