Increased secretion of adrenal progesterone explains the lack of response of oviductal embryo transport to a short intravenous infusion of estradiol in the rat

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Abstract

Administration of estradiol (E2) as a single subcutaneous injection, but not as a short intravenous infusion (less than 150 min), accelerates oviductal embryo transport in pregnant rats although the first mode determines lower E2 circulating levels. Since progesterone (P) can antagonize the effect of E2 on embryo transport we examined the circulating P levels under these two modes of E2 administration. Rats were treated on day 1 of pregnancy with 5 micrograms E2 given s.c. or i.v. (10 min infusion). Other groups were either hypophysectomized (HPX), adrenalectomized (ADX) or ovariectomized (OVX) prior to E2 treatment to prevent P rise, or were treated with E2 plus RU486 to block the action of P. Some groups were autopsied at short intervals following treatment to measure P levels and others 24 h later to assess the effect of treatments on embryo transport. P was increased several fold by i.v. infusions of E2 or vehicle alone in intact and OVX rats but not in HPX or ADX rats, whereas s.c. administration of E2 did not change P levels unless it was given concomitantly with i.v. infusion of vehicle. The short i.v. infusion of E2 accelerated embryo transport in HPX, ADX, or RU486 treated rats but not in intact rats. The s.c. injection of E2 accelerated embryo transport even when it was accompanied by an i.v. infusion of vehicle. The data does not exclude the participation of glucocorticoids in the above phenomena but agrees with the view that it is the transient increase in adrenal P secretion which blunts the oviductal response to a brief pulse of E2.