

The Significance of Oestrogen During Luteal Phase Of Pseudopregnant Rabbits

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PLASMA OESTROGEN and progesterone levels were measured in untreated (control), estradiol and Nolvadex (antioestrogen) treated pseudopregnant rabbits. Oestrogen and progesterone were measured by radioimmunoassay method. Three equal groups each of 6 Newzealand white rabbits (body weights 3.22 ± 0.35 kg) were used. The animals were injected with 0.5 ml HCG I.V. so to induce pseudopregnancy. The results obtained showed that progesterone and oestrogen levels after estradiol benzoate injection were increased while both steroid levels decreased after antioestrogen injections.

It may be concluded that oestrogen supports corpora lutea activities and protect their regression.

In the rabbit there is evidence that oestrogen derived from the ovarian follicles, forms part of the corpus luteum (CL) of pseudopregnancy (Hilliard et al, 1973). The mechanism by which the growth of C.L. is maintained varies from species to species (Greenwald and Rothchild 1968). The integrity of C.L. can be maintained by oestrogen in hypophysectomized rabbits (Robson, 1937) and also in rats (Bogdanove, 1966).

Hitherto, few results have been obtained concern with the functional relationship between oestrogen and progesterone during the luteal phase of the pseudopregnant rabbits. So, in the present work, oestradiol benzoate, which is luteotrophic in rabbits, was administered during pseudopregnancy to determine in plasma the effects on both oestrogen and progesterone concentrations. It was of special interest to examine the effects of an antioestrogen on C.L. activities, thus, pseudopregnant rabbits were treated with Nolvadex (Tamoxifen citrate ICI 46, 476) (antioestrogen) and plasma oestrogen and progesterone were assayed.

Material and Methods

Animals : Eighteen Newzealand white rabbits (body weights B.W. 3.22 ± 0.35 kg) were used. The animals distributed randomly to three equal groups. All the animals were injected intravenously (I.V.) with 0.5 ml. human chorionic gonadotrophins (HCG) to induce pseudopregnancy. The day

of injection was assigned as 0 day. Group I received no further treatment and were considered, control animals. Each rabbit in group II received on day 5 and every second day thereafter 0.2 ml Menformen (A mg estradiol benzoate). In group III each rabbit received Nolvadex (anti-oestrogen) capsule in dose of 2 mg/kg B.W. every day from 7 to 11 days of pseudopregnancy in rabbits. The rabbits were bled from the lateral vein at 6 days intervals during pseudopregnancy. The blood was collected in heparinized tubes, centrifuged immediately at 4° and the plasma was stored at -18° until assay. Hormones assay: Progesterone was assayed in 0.25 ml plasma using a radioimmunoassay method as described by Abraham, Swerdloff, Tulchinsky and Odell (1971). Oestrogen was assayed in 0.1 ml plasma using a radioimmunoassay procedure as described by Agthe and Kolm (1975).

Results

Table 1 shows that mean plasma progesterone concentration in pseudopregnant rabbits was 1.16 ± 0.90 ng/ml on day 0, then increased and reached a top of 10.70 ± 0.50 ng/ml on day 12. Thereafter, a noticeable decrease in the plasma progesterone concentration was continued until day 30 of pseudopregnancy. Estradiol benzoate injection on day 7 led to increase the progesterone concentration until day 18, then followed by a gradual decrease. Nolvadex administration resulted in pseudopregnancy.

The plasma oestrogen concentrations increased gradually from 0 day with mean value of 143 ± 28 pg/ml plasma and reached a maximum value of 197 ± 62 pg/ml plasma on day 30 of pseudopregnancy. Estradiol benzoate injection led to a gradual increase in the oestrogen concentrations and the highest values were noticed on day 24 of pseudopregnancy. Nolvadex administration decreased the assayed oestrogen concentration throughout the pseudopregnancy period.

Discussion

Comparing pregnant and pseudopregnant rabbits (Hashmat, 1977) shows that progesterone concentration rises during the luteal activity of the pregnant rabbits and the role of the relatively low concentration of oestrogen during this phase has not clarified and is under interpretation here. In contrast to the pregnant rabbits, the C.I. of the pseudopregnant rabbits diminished and concurrently progesterone levels decreased suddenly at about day 16. The sustained parallel high levels of progesterone and oestrogen of the estradiol benzoate injected pseudopregnant rabbits of this work emerge the significance of oestrogen. The results agree with Spies *et al.* (1966) and Hilliard *et al.*, (1968) who indicated that oestrogen is necessary for prolonged luteal activity *i.e.* progesterone synthesis and release. The contemporary low levels of both steroids after masking oestrogen molecules on the binding sites of its antibodies, assure the importance of oestrogen for progesterone high levels. The results coincide with work carried out by Holt *et al.* (1975) who noticed an immediate dramatic decline in both luteal function and serum progesterone after removal

the implanted 17 estradiol capsule. Thus, oestrogen is necessary for maintenance of rabbit C.I. activity may be via its action directly on its receptors in C.I. tissues (Scott and Rennie, 1971 and Lee *et al.*, 1972) or through positive feed back effect (M ptt, Piva, Tima, Zanisi and Martini, 1970) provide that the hormone level is near to the physiological concentrations (Holt *et al.*, 1975).

TABLE 1. Progesterone and oestrogen levels in blood plasma of pseudopregnant rabbits (mean \pm s.e.).

Day	No. of animals per group	Mean values of progesterone (ng/ml)		
		I	II	III
0	6	1.16 \pm 0.90	1.80 \pm 1.20	1.72 \pm 0.24
6	6	8.95 \pm 1.20	8.57 \pm 1.66	99.60 \pm 1.00
12	6	10.70 \pm 0.50	9.52 \pm 2.14	1.87 \pm 0.44
18	6	2.18 \pm 0.90	14.29 \pm 2.31	1.70 \pm 1.06
24	6	1.71 \pm 1.00	8.18 \pm 1.87	1.76 \pm 1.00
30	6	1.77 \pm 1.00	6.36 \pm 1.50	1.40 \pm 0.90
		Mean values of oestrogen (pg/ml)		
0	6	143 \pm 28	133 \pm 45	140 \pm 36
6	6	160 \pm 60	148 \pm 44	170 \pm 12
12	6	173 \pm 63	273 \pm 56	123 \pm 12
18	6	184 \pm 64	271 \pm 127	122 \pm 24
24	6	190 \pm 68	573 \pm 115	116 \pm 22
30	6	197 \pm 62	379 \pm 130	118 \pm 18

Where I A Group of pseudopregnant rabbits.
 II A Group of pseudopregnant rabbits after estradiol benzoate injection.
 III A Group of pseudopregnant rabbits after Nolvadex administration.

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اهمية هرمون الايستروجين أثناء مرحلة تكوين الجسم الأصفر في أرانب حامله حملا كاذبا

حسين حشمت ، ي. شحاته ومحمود عبد النبي عبد الرزاق
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قيس كل من هرمون الايستروجين والبروجستيرون بطريقة المناعة الاشعاعية في ثلاثة مجاميع متماثلة من الأرانب التامة النضج عوملت كالاتى :

- ١ - مجموعة حقنت بهرمون HCG لاحداث الحمل الكاذب واستعملت للمقارنة .
- ٢ - مجموعة حقنت بهرمون HCG لاحداث الحمل الكاذب ثم حقنت بهرمون الايستروجين .
- ٣ - مجموعة حقنت بهرمون HCG لاحداث الحمل الكاذب ثم حقنت بمضاد الهرمون الايستروجين .

وجد أن مستوى هرمون الايستروجين والبروجستيرون ارتفأها نتيجة الحقن بهرمون الايستروجين بينما انخفض مستواها بعد الحقن بمضاد هرمون الايستروجين . يمكن استنباط أن لهرمون الايستروجين عمل مضاد لبقاء واستمرار وعمل الجسم الأصفر .