

in large numbers unless cytoplasmic volume of polyploid cells increased at a rate faster than in normal cells. To extent that polyploidy does occur, total DNA/100 g would not represent true cell multiplication but rather nuclear multiplication. Since extremely great variations in placentoma reaction were observed in all groups, large number of animals will be required if this technic should be used to develop an assay method. It should be noted that in a few animals given P no reaction occurred whereas increases up to 47% in total DNA occurred in traumatized horn over control horn when no P was given during post-trauma period.

Summary. Sprague-Dawley-Rolfsmeyer rats were ovariectomized in estrus, then administered progesterone (P) at rate of 1.5 mg/day for 5 days (pretrauma period). Endometrium of one uterine horn of each animal was scratched throughout its entire length by sharp needle. During post-trauma period, days 6 to 9, P at levels of 1, 2, 3, and 6 mg was injected daily. On day 10 each uterus was separated into control and trau-

matized horn, weighed and processed for DNA determination. The traumatized horns showed a graded increase in wet weight, DFFT, and DNA/100 g B.W. over control horns when 1, 2, and 3 mg/day of P were administered during post-trauma period. Six mg/day did not increase reaction further. Considerable variation in reaction occurred in each group requiring a considerable number of animals for use as assay method.

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Influence of Progesterone, Estradiol Benzoate, and Thyroxine in Ovariectomized Rats upon Placentomata Formation Measured by Total DNA.* (26660)

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A procedure was previously described by which a quantitative estimation of placentomata reaction might be made using DNA as an index(1). During posttrauma period increasing levels of progesterone (P) (1 to 6 mg) were injected. The DNA of traumatized horn was then compared with control

horn. It was shown that 3 mg/day of P had optimal effect. In a study of growth of mammary gland of rat, it was shown that estradiol benzoate (EB) at level of 1 μ g/day synergized with P at level of 3 mg/day to promote optimal growth as measured by DNA (2). The present study was conducted to determine if this level would synergize with P to promote placentomata reaction.

In the strain of rats used, the thyroxine secretion rate (TSR) has been determined. TSR varies from 0.25 μ g to 2.0 μ g/100 g BW with mean of about 1.0 μ g. When 3.0 μ g/100 g BW of L, thyroxine (T_4) was administered with 1 μ g EB + 3 mg P, T_4 was with-

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out synergistic effect on mammary gland growth but when ovarian hormone levels were doubled, T_4 stimulated a significant increase of 26% in total DNA of mammary glands(3). It was considered of interest to determine whether these levels of hormones would promote the placentomata reaction as well.

Material and methods. During the pre-trauma period, rats of Sprague-Dawley-Rolfsmeyer strain were treated exactly as described previously(1). During the post-trauma period, groups of rats received 1 μ g EB + 3 mg P, 3 mg P + T_4 ; 3 μ g/100 g BW, 6 mg P + 1 or 2 μ g EB, and finally, 6 mg P + 2 μ g EB + T_4 ; 3 μ g/100 g BW for 4 days and sacrificed on day 5. Uteri were divided and control and traumatized horns separated, weighed and processed for determination of DNA(4).

Results. Injection of 1 μ g EB with 3 mg P stimulated an increase in wet and dry fat-free (DFFT) weight of both control and traumatized horns of uterus in comparison with P alone. However, the % increase in DFFT/100 g BW of traumatized *vs* control was not significant. The same is true of DNA/100 g BW. When T_4 was injected with 3 mg P, wet and DFFT, and DNA/100 g BW were quite similar to results observed with estrogen.

Increasing levels of EB and P were without significant effect upon any of the indices of placentomata production; however, injection of 2 μ g EB + 6 mg P + 3 μ g/100 g BW thyroxine stimulated a highly significant increase in all indices.

Administration of estrogen stimulated significant increases in pituitary weight but adrenal weights were not influenced.

Discussion. The value of DNA technic in quantitative study of hormones influencing placentomata growth has been reported. It was shown that EB added to P at levels of 1 or 2 μ g increased both wet and dry, fat free tissue of the control horn as would be expected(5). It was unexpected to observe that T_4 had a similar effect.

EB also increased markedly wet and DFFT tissue of traumatized horns. However, % increase of traumatized horns over

control horns was unchanged in comparison to P alone. The DNA/100 mg BW in control horns with addition of either EB or T_4 was quite similar to P alone. However, in traumatized horns EB and T_4 induced a slight but not significant increase in total DNA/100 g BW.

While EB 2 μ g + P 6 mg was without marked effect, when T_4 , 3 μ g/100 g was added there was a significant increase in all indices of placentomata stimulation. A similar increase in mammary gland growth, as measured by total DNA, has been observed by same levels of these 3 hormones(3). Observation that 2 separate tissues (uterus and mammary glands) of reproductive system of rat have shown a significant growth response to same levels of these 3 hormones is of interest.

It was pointed out(1) that great variability in response to P was observed. It will be noted that variability in DNA/100 g BW in traumatized horns under 3 hormones was reduced. It is suggested that variability due to thyroxine secretion rate was reduced by use of optimal level of T_4 .

Summary. Progesterone (P) has been shown to stimulate placentomata formation in traumatized horns of rat uteri. Influence of estradiol benzoate (EB) and thyroxine (T_4) as possible synergists in this reaction using DNA as an index was studied. Slight, but not significant, increases in various indices of placentomata growth were observed when EB or T_4 were administered separately with P. Highly significant increases were observed, however, when 2 μ g EB + 6 mg P + 3 μ g T_4 /100 g BW were administered. The same level of these 3 hormones stimulated a significant increase in mammary gland growth, indicating similar response in 2 tissues of reproductive system.

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