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Absence of Prolongation of Pseudopregnancy by Induction of Deciduomata in the Mouse.*

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The similarity of the deciduomal reaction to the maternal placenta has prompted several investigations of the possibility that phenomena associated with pregnancy might be found in animals bearing deciduomata. Hammond[1] observed that the mammary development of the pseudopregnant rabbit was not enhanced by the presence of the reaction. Similar results were obtained by Nelson[2] who found also that surgical removal of the deciduomata did not initiate lactation. More recently, however, Ershoff and Deuel[3] have reported that although the presence of deciduomata did not effect the mammary development of the pseudopregnant rat, their presence was associated with a marked delay in the recurrence of estrous vaginal smear. In the normal untreated rat the duration of pseudopregnancy averaged 13.7 days; if deciduomata were induced by traumatizing the uterus on the fourth day, estrus did not recur before the twenty-second day.

The present experiment was performed to determine whether the induction of deciduomata in the mouse would prolong the duration of pseudopregnancy as has been reported in the rat.

Experimental. Twenty young adult female mice of the Swiss albino strain were mated with vasectomized males. Vaginal smears were made on the day following copulation and were taken daily until the appearance of a completely cornified smear indicated the recurrence of estrus. A control group of 10 mice received no further treatment. In the remaining 10 animals deciduomata were induced by placing longitudinal sutures in the lumina of each uterine horn on the third day after mating. At the end of the experiment these animals were autopsied and the uteri examined grossly to ascertain the presence of deciduomal responses.

In the untreated pseudopregnant mice estrus recurred 11.3 ± 0.68 days after mating; in the group of animals in which deciduomata had been induced, estrus recurred 10.7 ± 0.46 days after mating.

Discussion. The present results show that the presence of deciduomata has no significant effect on the duration of pseudopregnancy in the mouse. The marked prolongation of pseudopregnancy in the rat under similar circumstances[3] indicates a decided species difference. The nature of the physiological processes involved is not clear, since in most respects the two species exhibit very similar reproductive phenomena. A clue may be provided, however, in the report of Atkinson[4] that in the mouse deciduomata induced on the third day of pseudopregnancy persist intact only until the seventh day and then rapidly degenerate. In the rat, on the other hand, Ershoff and Deuel[3] report that the deciduomata persist intact until the fourteenth day. Since it has been shown that the persistence of the deciduomal reaction is dependent on the presence of a high level of progesterone,[4] we may assume that the prolongation of pseudopregnancy in the rat is the result of prolonged luteal activity. The mechanism by which this is effected in the

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1 Hammond, J., *Proc. Royal Soc. B*, 1917, **89**, 534.

2 Nelson, W. O., *Anat. Rec.*, 1932, **54** (suppl.), 50.

3 Ershoff, B. H., and Deuel, H. J., PROC. SOC. EXP. BIOL. AND MED., 1943, **54**, 167.

4 Atkinson, W. B., *Anat. Rec.*, 1944, **88**, 271.

rat but not in the mouse must remain unexplained at the present time.

Summary. Unlike the rat, the induction of deciduomata does not prolong pseudopregnancy in the mouse. The mechanism responsible for this marked species difference in response to apparently identical physiological conditions is obscure.

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Circulating Antibodies in Vitamin Deficiency States: II. Thiamin and Biotin Deficiencies.

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Introduction. In the first paper of this series,[1] we presented data concerning the effects of pyridoxin, pantothenic acid, and riboflavin deficiencies upon antibody production by the rat in response to human red blood cells as antigenic stimulus. The present paper deals with the effects of thiamin and biotin deficiencies upon antibody production under similar experimental conditions.

Experimental. Male weanling albino rats of the Sprague-Dawley strain were distributed as indicated in Table I. The animals were housed individually in wide-mesh, screen-bottom cages and weighed weekly. Both the thiamin-deficient rats and their controls received a basal diet with the following percentage composition: sucrose, 56.76; Labco "vitamin-free" casein, 25.00; salts,[2] 4.00; cod liver oil, 2.00; hydrogenated vegetable oil, 10.00; corn oil, 2.00; choline chloride, 0.20; *i*-inositol, 0.03; and 2-methyl-1, 4-naphthoquinone, 0.001. For the biotin-deficient rats and their controls, this diet was modified by replacing 60% of the casein with dried egg white. All rats received additional vitamins in the form of a daily pill. Each of the pills given to the 2 control groups supplied the following vitamins: thiamin, 40γ; riboflavin, 60γ; calcium pantothenate, 200γ; pyridoxin, 50γ; biotin, 4γ; folic acid, 1γ; nicotinic acid, 100γ; and *p*-aminobenzoic acid, 1mg. For the thiamin- and biotin-deficient groups, the appropriate vitamin was omitted from the pill. The basal diets were fed *ad libitum* to the 2 deficient groups, while the daily food intake of each rat in the control groups was restricted to that consumed during the previous day by its paired member in the corresponding deficiency group.

In Series I, immunization of the thiamin-deficient rats and their controls was begun after 3 weeks on experiment. At this time, the animals were progressively losing weight. Three of the controls and 2 of the deficient rats died during the immunization period. Because of this high mortality, this experiment was repeated exactly in Series II and immunization was instituted after 2 weeks. Although a similar weight loss occurred, no mortality was noted. The biotin-deficient rats and their controls of Series I were immunized after 6 weeks on experiment. At this time, the deficient animals had plateaued in weight and exhibited the typical symptoms of biotin deficiency, *i.e.*, alopecia, dermatitis, blepharitis, and cheilosis.

A 10% suspension of washed, Group O, Rh positive human erythrocytes in normal saline was given intraperitoneally as antigen. An initial dosage of 0.5 ml of the red cell suspension was followed by 2 one cc injections. Inoculations were made on alternate days. Five days after the final injection the

[1] Axelrod, A. E., Carter, B. B., McCoy, R. H., and Geisinger, R., PROC. SOC. EXP. BIOL. AND MED., 1947, **66**, 137.

[2] Jones, J. H., and Foster, C. J., *J. Nutrition*, 1942, **24**, 245.