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Involution of Thymus During Pregnancy in Young Mice.

EDWARD C. PERSIKE, JR. (Introduced by C. H. Danforth.)

From the Department of Anatomy, Stanford University.

By injecting Antuitrin S, Butcher and Persike[1] caused an arrest in growth of the thymi of young albino rats of both sexes. This effect was apparently mediated through the gonads, since the injections were ineffective in arresting the growth of the thymi of gonadectomized animals. Pregnancy urine was used by Klein[2] to obtain an involution of the thymus in guinea pigs.

Jolly and Lieure[3] reported that with 4 exceptions, the thymi of 20 pregnant guinea pigs weighed one-third to one-half as much as did those of their non-pregnant controls. Since 20% of the animals used by Jolly and Lieure apparently showed no reduction in the size of their thymi during pregnancy, and since it was thought to be worth while to test the effect of pregnancy on the thymus of the mouse, another experimental animal, the following experiments were performed.

Only healthy litter-mate virgin mice were used, each group being kept in a separate cage in which there was an excess of food and water at all times, since it has been shown that malnutrition may be an important factor in causing thymic involution.[4, 5] Each group consisted of 2 litter-mate female mice with identical body weights at the beginning of the experiment. One was utilized as a control, and the other was mated as soon as it became sexually mature, thus avoiding as much of the normal age-involution as possible. Both mice in each of the 20 groups were killed on the day the pregnant mouse gave birth to young. Body weights and the number of young were recorded. At autopsy, the thymi were dissected free from the surrounding tissues and weighed on a quantitative balance, weights of postpartum thymi being recorded as percentages of their respective controls (Table I). The majority of the specimens were examined for histological changes.

In the postpartum mice there was found to be a thinning out of the thymocytes in both cortex and medulla, resulting in a less dis-

1 Butcher, E., and Persike, E., *Endocrinology*, 1938, **23**, 501.

2 Klein, F., *Klin. Wchnschr.*, 1936, **15**, 371.

3 Jolly, J., and Lieure, C., *Compt. rend. Soc. de Biol.*, 1930, **114**, 451.

4 Hammar, J., *Z. f. mikr.-anat. Forschung*, 1926, **6**, 670.

5 Capper, A., and Schless, R., *J. Pediatrics*, 1934, **4**, 573.

tinct differentiation between these two zones, and accompanied by an invasion and replacement of the normal thymic substance by connective and adipose tissues. Similar changes have been observed by other investigators, who obtained an involution of the thymus by administration of Antuitrin S,[1] pregnancy urine,[2] and androgenic and estrogenic substances.[6, 7]

The data indicate that the thymi did undergo involution during pregnancy. Assuming that the thymic weights in the 2 members of each group were the same at the beginning of the experiment, this involution varied between 45% and 80%, except in one pair, where the thymus of the postpartum mouse was heavier than that of its control. These data on the mouse accord with those of Jolly and Lieure[3] for the guinea pigs, indicating that pregnancy does cause definite involution of the thymus. The greater consistency of results in these experiments over those of Jolly and Lieure, is probably due to the use of litter-mates of the same body weight at the time of mating. There appears to be no correlation between the number of young born and the degree of thymic involution. Although each mated mouse and its control were initially of the same body weight, the majority of the postpartum mice weighed more than their controls at the time of autopsy.

TABLE I.
Data Taken at Autopsy on Day of Littering by the Test Animals.

Body wt, g			Thymus wt, mg		
Control	Postpartum	No. of young	Control	Postpartum	% Decrease
24	27	2	40	9	78
21	25	2	32	18	44
21	21	3	37	18	51
20	24	4	20	24	0
21	26	4	50	21	58
29	32	4	47	22	53
19	25	4	39	12	69
30	34	5	38	19	50
22	27	5	38	10	74
29	27	5	55	19	66
26	28	6	36	21	42
23	26	7	30	11	63
26	28	7	35	18	49
20	29	7	37	6	84
21	24	7	37	15	60
20	25	8	32	12	63
21	18	8	37	6	84
19	23	8	33	13	61
23	25	8	31	13	58
37	33	10	58	20	66

6 Chiodi, H., *Rev. Soc. Argent. de Biol.*, 1938, **14**, 309.

7 Persike, E., *Am. J. Physiol.*, 1940, **130**, 384.

Summary. Pregnancy caused the thymi of young mice to undergo involution, both grossly and microscopically. With one exception out of 20, the degree of thymic involution varied between 45% and 80% as measured by gland weights. At parturition, the postpartum mice generally weighed more than their litter-mate controls.

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Permeability of Red Blood Cells to Sulfathiazole.*

JOHN G. REINHOLD, LEON SCHWARTZ, HARRISON F. FLIPPIN, AND SHLOMITH BETHLAHMY. (Introduced by D. Wright Wilson.)
From the Committee for the Study of Pneumonia, Philadelphia General Hospital.

Differences in permeability of cells to sulfanilamide and its derivatives promise to be of some importance in the investigation and application of these compounds. Sulfanilamide has been shown to penetrate red blood cells and tissue cells readily.[1] Sulfapyridine, according to Hansen,[2] is found in higher concentrations in plasma than in blood cells to an extent greater than could be explained by differences in water content. We have found that sulfathiazole shows a similar though more marked disproportion between concentrations in cells and plasma when analyzed by the method of Bratton and Marshall.[3] In 13 convalescent patients the mean ratio of whole blood-free sulfathiazole to serum-free sulfathiazole was 0.74 ± 0.09 standard deviation. Ten patients treated with sulfapyridine showed a ratio of 0.89 ± 0.07. Comparison of the means by the method of Student for small samples indicates that this difference between the drugs is highly significant.

When the concentration of sulfathiazole in the blood cells was calculated, the ratio to the concentration in blood plasma was 0.437 ± 0.19 as compared with 0.645 ± 0.18 for sulfapyridine, likewise a significant difference. Individual variations in the distribution of both drugs between cells and plasma were marked. Ad-

* Supported in part by the Pennsylvania State Department of Health, Pneumonia Control. We are indebted to Dr. George A. Harrop, Squibb Institute for Medical Research, New Brunswick, N. J., for the sulfathiazole used in this study.

1 Marshall, E. K., Jr., Emerson, K., Jr., and Cutting, W. C., *J. Pharm. and Exp. Therap.*, 1937, **61**, 196.

2 Hansen, L., *J. Lab. Clin. Med.*, 1940, **25**, 669.

3 Bratton, A. C., and Marshall, E. K., Jr., *J. Biol. Chem.*, 1939, **128**, 537.