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FETAL THYMUS DEVELOPMENT IN VITAMIN D DEFICIENT RATS*

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SUMMARY: Yurdakök M, Hazıroğlu R, Topaloğlu H. (Department of Pediatrics, Hacettepe University Faculty of Medicine, and Department of Veterinary Pathology, Ankara University Faculty of Veterinary Medicine, Ankara, Turkey). Fetal thymus development in vitamin D-deficient rats. Turk J Pediatr 35: 197-199, 1993.

The morphological characteristics of the thymus in vitamin D-deficient rats were evaluated in utero. The thymus weight, thymus weight/body weight ratio and histological findings were found to be similar when the vitamin D-deficient rats were compared with the control animals. It is therefore concluded that vitamin D is not required for the morphological development of rat thymus. *fetus, vitamin D deficiency, rats, thymus.*

It has been demonstrated that 1.25-Dihydroxy-vitamin D_3 [1.25 $(OH)_2D_3$ inhibits the production of medullar thymocytes which mediate the maintenance of peripheral blood T lymphocytes, and that vitamin D prevents glucocorticoid-induced thymocyte death[1,2]. These findings suggest that vitamin D is involved in the maturation of the thymus, which prompted us to study the effect of vitamin D deficiency in the development of the thymus in animals.

Material and Methods

A vitamin D-deficient state was induced in pregnant rats and the thymus of the offspring were examined. There-week-old weaning female albino rats were maintained in the absence of ultraviolet light on a vitamin D-free diet containing 1% calcium and 0.8% phosphorus and deionized water for four weeks[3]. The female rats were then mated with normal males. After copulation, the pregnant rats were maintained on the same vitamin D-free diet under the same conditions. until delivery. The vitamin D-sufficient control rats were obtained by rearing rats on a similar protocol with a diet containing vitamin D. On the day of delivery, all the animals and their offspring were sacrificed. Neonates were weighed, and their thymuses were removed, weighed and submitted for histologic studies. In addition, the proximal tibiae of the mothers and their offsprings were examined histologically to confirm the presence of rickets.

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Results

There were 26 siblings in the control group, and ten in the study (vitamin D-deficient) group, with no deaths occuring in either group.

The birth weights (BW), thymus weights (TW) and TW/BW ratios were similar in both groups (Table I, $p > 0.05$).

Histological examinations of the thymus sections revealed that the shape of the lobuli, interlobular septae, cortices, medullar differentiation, number of cells and Hassall corpuscules were similar in both groups.

Table I: Thymus Weight and Body Weight in Study and Control Groups

(n: 26)	Control Group (n: 26)	Study Group (n: 10)	Statistical Significance
Body weight (g)	3.49 ± 0.33	3.53 ± 026	I
Thymus weight (mg)	2.41 ± 0.49	2.50 ± 0.53	I
BW / TW	0.69 ± 0.26	0.72 ± 0.18	I

BW / TW: Body weight / thymus weight.

I: Insignificant ($p > 0.05$).

Discussion

The biological action of 1.25-dihydroxy vitamin D_3 [1.25-$(OH)_2$ D_3] on bone and mineral metabolism is mediated via its binding to specific receptors in the intestinal bone and kidney cells. Specific intracellular receptors for 1.25 $(OH)_3$ D_3 are also found in cells from other normal and neoplastic tissues, indicating that this hormone may have biological effects[4,5]. The larger, dividing medullary thymocytes, but not the smaller, nondividing cortical thymocytes have intracellular receptors for 1.25 $(OH)_2$ D_3 and Provvedini et al[1] have shown that medullary thymocytes which mediate maintenance of peripheral blood T lymphocytes were inhibited by 1.25 $(OH)_2D_3$. In another study, Cohen and Duke[2] have shown that vitamin D prevented glucocorticoid-induced cell death of thymocytes.

The results of this study demonstrate that the thymus of vitamin D-deficient rats in utero had no defects. Thus vitamin D is probably not required for the morphological development of the thymus. However, further studies are needed to evaluate the thymic functions of vitamin D-deficient rats.

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