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THE EFFECT OF EPIDERMAL GROWTH FACTOR ON SERUM ZINC LEVELS*

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SUMMARY: Demirsoy S, Erbaş D, Hasanoğlu E. (Departments of Pediatrics and Physiology, Gazi University Faculty of Medicine, Ankara, Turkey). The effect of epidermal growth factor on serum zinc levels. Turk J Pediatr. 33: 159-161, 1991.

Epidermal growth factor is a potent stimulator of the growth of epithelial and mesenchymal cells. In this study the effect of epidermal growth factor on the cells of developing mice intestine and on the serum zinc concentrations were assessed. Higher serum zinc concentrations (840.21 ± 187.82 mg/dl) were found in the mice given epidermal growth factor (n: 10) as compared to the values obtained in the controls (347.55 ± 108.88 mg/dl), (n: 12) ($p < 0.05$). *Key words: epidermal growth factor, serum zinc level.*

Epidermal growth factor (EGF), a small polypeptide hormone first isolated from mouse submandibular gland, is one of the most biologically potent and best characterized growth factors[1, 2]. It plays an important role in the growth of a wide variety of cultured cells, both epithelial and mesenchymal[3]. It affects cells by cell receptors which exhibit tyrosine kinase activity[4]. Thus EGF is an extremely essential polypeptide for growth and development[5].

Our study was designed to demonstrate the effect of EGF on the gastrointestinal tract and the serum zinc level of mice.

Material and Methods

This study was carried out on a total twenty-two newborn mice. Ten of the mice were injected with 10 mg/kg/day EGF subdermally for a period of ten days. The twelve controls were injected with 10 mg/kg/day physiologic serum subdermally also for a period of ten days following birth.

At the end of the tenth day, the mice were sacrificed by decapitation and blood samples were collected. Serum zinc levels were determined by using atomic absorption spectrophotometry. Statistical analysis was carried out by the Student's *t* test.

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Results

The body weights of the subjects and the controls at birth and on the tenth day, and the serum zinc levels of the mice who had been given EGF and the controls are shown in Tables I and II. The serum zinc levels of the mice given EGF were found to be significantly higher than those of the controls ($p < 0.05$).

TABLE I: Body Weight (g) and Serum Zinc Levels (mg/dl) of Mice Given EGF and Control Group

	Mice Given EGF			Control Group		
No.	Birth Weight	Body Weight 10th Day	Zinc Level	Birth Weight	Body weight 10th Day	Zinc Level
1	1.59	5.83	845.30	1.49	4.70	213.56
2	1.73	4.73	544.80	1.59	4.88	289.15
3	1.48	6.05	1011.30	1.77	4.99	595.79
4	1.35	5.50	547.39	1.69	5.56	459.36
5	1.69	5.35	1100.83	1.43	6.25	208.45
6	1.78	5.28	633.98	1.34	6.12	345.48
7	1.55	5.79	759.54	1.66	6.36	416.17
8	1.94	5.13	990.21	1.58	6.48	318.42
9	1.85	4.89	845.60	1.94	5.56	256.55
10	1.78	4.70	656.65	1.87	5.43	318.42
11				1.46	4.88	347.45
12				1.39	4.74	386.85

TABLE II: Comparison of the Mean Serum Zinc Levels of Mice Given EGF and Controls (mg/dl)

	Serum Zinc Level
Mice given EGF n: 10	840.21 ± 187.82
Control n:12	347.55 ± 108.88 $p < 0.05$

Discussion

Zinc is a constituent of several vitally important enzymes, and plays an important role in nucleic acid synthesis. It prevents the lipid depolarization of the cell membrane[7]. It has been reported that submandibular gland extract increases serum zinc levels and accelerates wound healing in adult mice[8].

The postnatal development of the small intestine of laboratory animals offers an interesting model to examine the possible role of EGF in the proliferation and differentiation of absorptive cells. EGF influences the maturation of the digestive function of absorptive cells by inducing a precocious appearance, sucrase activity and a premature increase of several brush border activities[9]. Intestinal mucosa has EGF receptors during the suckling period in neonate mice. EGF promotes the maturation of duodenal epithelial cells in cell culture[9]. According to our results, serum zinc levels of the mice given EGF were higher than the controls, which suggests that EGF may increase zinc absorption with increasing maturation and enzyme activity of the small intestine.

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