EFFECT OF VITAMIN-E (a-tocopherol) ON THE MORPHOLOGY OF CAECAL MUCOSA OF ALBINO RATS

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ABSTRACT:

A study was carried out in Department of Anatomy Institute of Basic Medical Science, JPMC, Karachi, to evaluate the effect of vitamin-E on caecal mucosa of albino rats. These animal were sacrificed. Their shape, size and any possible shrinkage or dilatation and hyperemia were recorded. The histomorphological feature of caecal mucosa, were compared with those of control animals and annealed statistically. The study revealed that vitamin-E produced anabolic changes in caecal mucosa.

KEY WORD:
Vitamin-E, Caecum, Albino rat

INTRODUCTION

Vitamin-E, isolated from wheat-germ oil1,2,3, a-tocopherol, is considered to be most important since it constitutes about 90% of tocopherols in animal tissues. Optical isomerism affects the activity and “d” forms are more active than ‘L’ forms. Chemically it is dl-a-tocopheryl acetate, all-rac-d-tocopheryl acetate (+)-d-tocopheryl acetate: C31 H52 O3-472.84. It appears colourless, clear, yellow or greenish yellow, viscous oil, insoluble in water; freely soluble in dehydrated alcohol, acetone, chloroform, ether, vegetable oils, and is unstable to alkali. It is stored in air tight container and protected from light.

Vitamin-E is one of the most widely distributed vitamins in most foods, corn oil, cotton seed oil, margarine, peanut oil, soybean oil and sunflower oil. These foods contain the highest concentration of tocopherol. Good sources of tocopherol include milk, eggs, muscle, meat, fish, cereals and leafy vegetables.5,6

The biological membranes have polyunsaturated fatty acids (PUFA) as part of membrane phospholipids. Vitamin-E is distributed in lipid phase of membranes contributing to their structure and stability. The tocopherols act as antioxidant, breaking free radical chain reaction. This is effective at sites of high oxygen concentration, i.e. the erythrocyte membranes and membranes of respiratory tree7.

MATERIALS AND METHODS

Thirty-two albino rats were used in this study. They were 20 weeks old, male, weighing 180-200 gms, looking active and healthy. Originally obtained from Charles River Breeding Laboratories, Brooklyn, Massachusetts, U.S.A., they were cross breed at animal House of Basic Medical Sciences centre JPMC, Karachi. These animals were housed in the Animal House and maintained on balanced laboratory diet and water ad libitum with 12 hours light and dark cycle.

These animals were divided into two equal groups; A and B, each comprising 16 animals. Animals of group-A were given vitamin E developed at Merck Laboratories (pvt) Ltd at a dose of 2 mg / kg / body weight as an anti-oxidant 4, orally once daily, for two weeks, while group-B were given normal saline (equal to the volume of dose given to group-A) orally, once daily for two weeks.

All the animals were sacrificed at the end of experiment on by giving deep ether anesthesia and were operated to obtain their caeca. They were fixed in 10% formalin, embedded in paraplast and 4 um thick sections were cut on rotary microtome. The sections were stained with H&E. The histomorphological features of caecal mucosa in both groups were observed. Micrometry was done and the data was subjected to statistical analysis. Student ‘t’ test was employed to see the significance of the results8.

RESULTS

The animals in group A remained healthy and active throughout the study period and no abnormality in their behavior was observed. Their general condition and behavioral responses were in every respect comparable to that in group B animals.

The mean value in gain / loss of the body weight of animals in groups A and B was recorded as 42.63±1.43 gm and
30.4±3.20 gm respectively, (Table-1) A highly significant increase in body weight in group-A was observed when the difference of mean was compared with control group-B (P<0.001).

The mean value of total epithelial cell count per unit area group A and B was recorded as 551.9±1.34 and 523.1±2.20 respectively (Table). A highly significant in total epithelial cell count per unit area in group A was observed when difference of mean was compared with control group B (p<0.001)

DISCUSSION

In the present study, we observed the effects of vitamin-E (a-tocopherol) when administered as an anti-oxidant on morphology of caecal mucosa in albino rats.

The study was carried out by observing and recording the anabolic changes in caecal mucosa, i.e. mucosal thickness and total epithelial cell count per unit area. The body weight was markedly increased.

Vitamin-E treated rats were healthy and active throughout the experimental period and no abnormality in their behaviour was observed. A highly significant increase in body weight was observed which may be attributed to nutritional status and general well being of animals, The diet provided to albino rats was probably deficient in vitamin-E and when these rats received supplemental vitamin-E, they showed a greater increase in body weight as compared to group-B. These observations are in agreement with Martin and Emerson and Evans who found that vitamin-E permits an improvement in growth.

On microscopic examination, the architecture of caecal mucosa showed anabolic changes. A highly significant increase in mucosal thickness and total epithelial cell count per unit area was observed, which may be attributed to improved nutritional status by vitamin-E, which when administered produced miraculous improvement in growth rate. These observations are in accordance with Martin and Olcott and Mattill, who found that the addition of vitamin-E permits an improvement in growth rate.

CONCLUSION The results suggest that vitamin-E produced anabolic role in caecal mucosa of albino rat.

### Table

Comparison of Body weight (gm), Mucosal Thickness (um) and Total epithelial cell count per unit area between Groups-A and B during Experimental Period

<table>
<thead>
<tr>
<th>Group</th>
<th>Body Weight (gm)</th>
<th>Mucosal Thickness (um)</th>
<th>Total Epithelial Cell Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D-1</td>
<td>D-7</td>
<td>G/L</td>
</tr>
<tr>
<td>A (n=16)</td>
<td>191.0±10.27</td>
<td>200.3±10.22</td>
<td>233.08±1.25</td>
</tr>
<tr>
<td>B (n=16)</td>
<td>188.0±1.59</td>
<td>195.5±0.80</td>
<td>218.4±3.87</td>
</tr>
</tbody>
</table>

### REFERENCES


