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β-tocopherol and its impact on GALT

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This study was aimed to evaluate the effect of β-tocopherol (vitamin E) intake on GALT (gut associated lymphoid tissues). An experimental model of secondary allergy to protein malnutrition was used. The effects on IgA+ and IgE+ B cells as well as on CD4 and CD5 T cells in Lamina Propria of intestinal villi were evaluated by Indirect Immuno-Fluorescence. The cytokines IFN-β and IL-4 in intestinal fluid were measured by ELISA (BD OptEIA™). Weanling rats of *Wistar* strain were fed a protein-free diet until they lost 25% of their initial body weight. This diet led to an allergic state(1). Re-feeding was performed by the administration of an experimental diet containing 20% casein as the only source of protein (Re-nourished group = **R**). Other groups received this same diet plus oral administration of: *a*) β-tocopherol (**R + aT**) in an amount equivalent to a supplement of 4% or *b*) β-tocopherol (**R + aTx10**) equivalent to 42% above the nutritional requirement that was adequately covered by the diet. All compounds were added to drinking water during 35 days. The animal protocol was approved by the Ethical Committee of the University of Buenos Aires. The small intestine was removed and further processed by Saint-Marie's technique(2).

Results showed that the number of IgA+ B cells in Lamina Propria of intestinal villi from the three groups were not significantly different. Instead, **R + aT** and **R + aTx10** groups presented lower level of IgE+ B cells compared to those from the **R** group (92±5 and 90±1 *vs* 134±4; mean±SE, $p<0.05$) (Figure 1). CD4+ T cells, however, showed no significant difference but CD5+ showed higher values in the β-tocopherol supplemented groups (Figure 2).

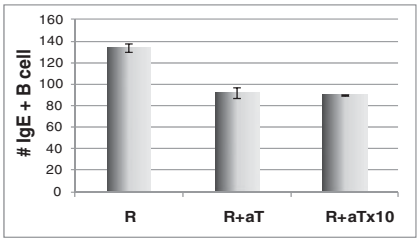

Figure 1. IgE+ B cells in intestinal villi.

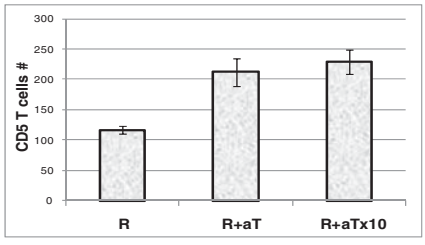

Figure 2. CD5+ T cells in intestinal villi.

Table 1. IFNγ in Intestinal fluid. Mean±SE Different letters show significant difference ($p<0.05$)

Group	IFNg (pg/ml)
R	10.7±1.3 B
R + aT	42.9±10.2 A
R + aT × 10	27.6±5.0 AB

Table 2. IFNγ/IL4 ratio for the three groups

R = 7
R + aT = 23
R + aT × 14

Table 3. IL4 in Intestinal fluid. Mean±SE No significant different ($p>0.05$)

Group	IL4 (pg/ml)
R	1.6±0.3
R + aT	1.9±0.3
R + aT × 10	2.0±0.8

TH1/TH2 cytokines ratio, evaluated throughout IFN-γ/IL-4 denoted a polarization towards IFN-γ, a pro-inflammatory cytokine, for those receiving α-tocopherol supplements. Moreover, β-tocopherol intake alleviated the allergic state present in this model. However, only a poor mucosal immune response was observed for the supplemented groups, with the analyzed parameters.

1. Insani, EM (2010) Estudio del efecto de la Quercetina, FOS y *Allium cepa* L. sobre el estado oxidativo e inmunológico en un modelo de inmunodeficiencia secundaria a malnutrición proteica. PhD Thesis, University of Buenos Aires.
2. Saint Marie G (1962) *J Histochem Cytochem* **10**, 250–256.