

HIGH LEVELS OF IgE IN APPARENTLY NORMAL  
VENEZUELAN POPULATIONS

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ABSTRACT

Levels of IgE for Venezuelan normal subjects were determined in 25 blood donors residing in Caracas, 12 donors from a northwestern city (Coro), and 12 apparently healthy subjects from a rural population near Caracas (Tapipa) with African background. Results obtained indicate levels of IgE (Tapipa > Coro > Caracas) higher than European and U.S. population. Even though these results are preliminary because of the smallness of the sample, correlation with the degree of development of these populations, and possibly with the frequency of intestinal parasitosis and eosinophilia, seems to be operating.

INTRODUCTION

Previous results from this laboratory demonstrated high levels of serum immunoglobulins G and M, with the corresponding electrophoretic increase of the gamma globulin levels, in apparently normal Venezuelan populations(2,15). In following these studies we found important to determine if the concentration of IgE was also increased, and if populations living under different environment, but geographically close, could have differences in their IgE levels, as detected by radioimmunoassay.

The present paper reports the IgE values found in subjects from three apparently normal Venezuelan populations that show higher levels than those reported for European and US populations(4,8). It is believed that intestinal parasites might be the antigenic stimulus responsible for this increase.

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## MATERIAL AND METHODS

The following populations were studied: 25 donors of the Hospital Universitario de Caracas Blood Bank, 12 donors to the Blood Bank of Coro (Falcón State) and 12 subjects from Tapipa (Miranda State), a small rural population near Caracas. The donors from the Hospital Universitario (21 males and 4 females) were Venezuelan native stemming from the various regions of the country and ranging in age between 18 and 50 years, all in apparent good health. The subjects (6 males and 6 females) from Tapipa ranged in age from 10 to 61, without clinical symptoms. The donors from the Coro Hospital were all males ranging in age between 20 and 50 years.

Serum protein electrophoresis was performed in cellulose acetate membranes (Sepraphore III, Gelman Instruments, Ann Arbor, Michigan) in microzonal chamber (Beckman Instruments Inc., Palo Alto, Cal.) using pH 8.6 barbital buffer. IgG, IgA, IgM and IgD were determined by quantitative radial immunodiffusion after Mancini et al<sup>(12)</sup>, in commercial agar plates (Hyland Laboratories, Cal.; Meloy Laboratories Inc., Springfield, Va). IgE levels were estimated by solid phase radioimmunoassay using a commercial kit (Phadebas IgE test, Pharmacia, Uppsala).

## RESULTS

Levels obtained for the five immunoglobulins are represented in Fig. 1. Quantitative immunoglobulin values are in Table II as well as the electrophoretic results in Table I. There is a significant difference in the three populations for gammaglobulins and IgE. IgA levels were higher in Coro than in the other two populations and alpha 1, IgG and IgD were lower in the donors from Caracas. IgM levels were significantly higher in Coro and Tapipa. Lower values were seen for alpha 2 and beta in Coro, and for albumin in Tapipa.

## DISCUSSION

Even though the data obtained in this study, are only preliminary results —because of the smallness of the sample— it is interesting to comment on the possible significance and the need to correlate them with some of the more prominent features or characteristics of these populations.

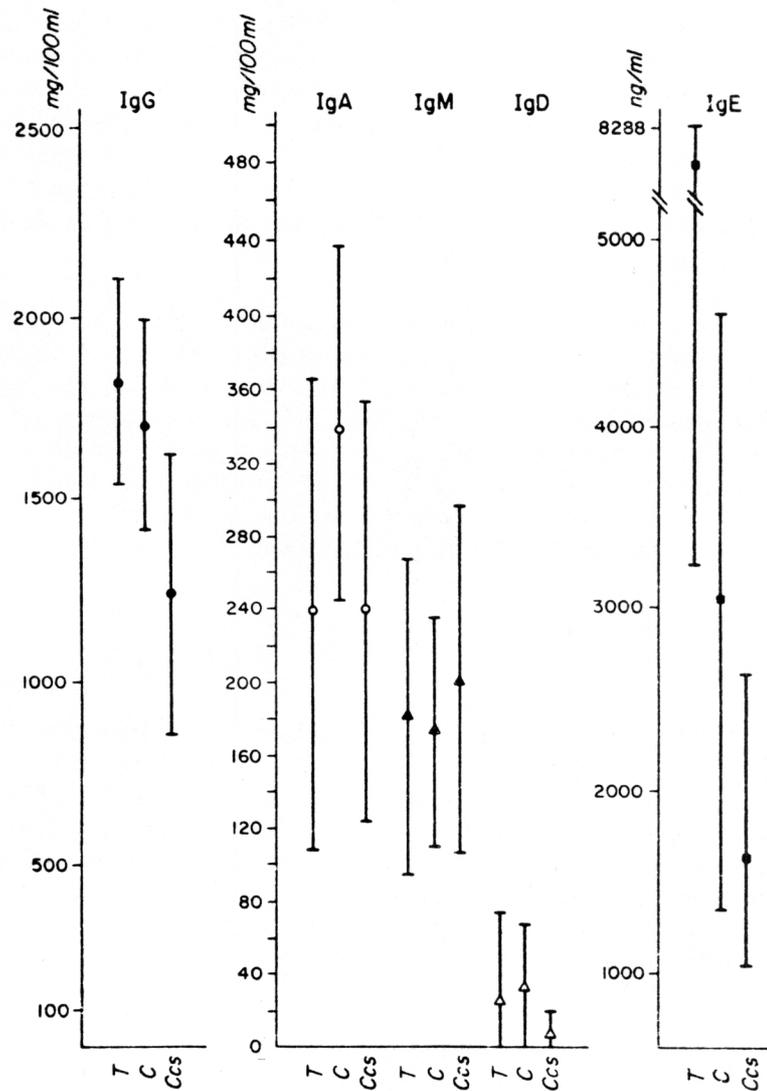


Fig. 1.—Graphic representation of the different immunoglobulin levels in the Venezuelan populations of Tapipa (T), Coro (C), and Caracas (Ccs).

TABLE I  
ELECTROPHORETIC VALUES OBTAINED IN THE POPULATIONS STUDIED  
(PERCENTAGE  $\pm$  ONE STANDARD DEVIATION)

Protein fraction	Tapipa (N = 12)	t test	Coro (N = 12)	t test	Caracas (N = 25)	t test
Albumin	52.75 $\pm$ 5.7	P < 0.01	63.50 $\pm$ 2.7	P < 0.1	62.15 $\pm$ 3.3	P < 0.01
Alpha-1	3.41 $\pm$ 0.9	P < 0.5	3.29 $\pm$ 1.2	P < 0.05	2.64 $\pm$ 0.5	P < 0.01
Alpha-2	10.72 $\pm$ 2.3	P < 0.1	9.10 $\pm$ 1.4	P > 0.1	9.91 $\pm$ 2.1	P < 0.5
Beta	9.85 $\pm$ 1.6	P < 0.02	8.33 $\pm$ 1.0	P < 0.01	9.81 $\pm$ 1.85	P > 0.5
Gamma	23.31 $\pm$ 5.2	P < 0.01	15.74 $\pm$ 2.6	P < 0.01	12.60 $\pm$ 2.60	P < 0.01

TABLE II  
SERUM IMMUNOGLOBULIN LEVELS OBTAINED IN THE VENEZUELAN POPULATIONS STUDIED  
(MEAN  $\pm$  STANDARD DEVIATION)

Immunoglobulin	Tapipa (N = 12)	t test*	Coro (N = 12)	t test**	Caracas (N = 25)	t test***
IgG mg/100ml	1.824 $\pm$ 282.9	P > 0.1	1.711 $\pm$ 278.7	P < 0.01	1.244 $\pm$ 384.5	P < 0.01
IgA mg/100ml	241 $\pm$ 127.0	P < 0.05	340 $\pm$ 98.8	P < 0.02	240 $\pm$ 116.0	P > 0.5
IgM mg/100ml	197 $\pm$ 70.6	P > 0.5	174 $\pm$ 61	P < 0.01	104 $\pm$ 41	P < 0.01
IgD mg/100ml	26 (0-174)#	P > 0.5	32 (0-101)#	P < 0.01	8.8 (0-35)#	P < 0.5
IgE ng/ml	5.433 $\pm$ 2.795	P < 0.01	2.461 $\pm$ 1.699	P < 0.01	1.288 $\pm$ 787	P < 0.01

\* Difference between Tapipa and Coro

\*\* Difference between Coro and Caracas

\*\*\* Difference between Caracas and Tapipa

# Mean and range values

**TABLE III**  
**FREQUENCY OF INTESTINAL PARASITES INFECTIONS IN**  
**TAPIPA**

Parasite	%
Trichuris trichiura	77
Ascaris lumbricoides	66
Necator americanus	20
Lambliia intestinalis	20
Entamoeba coli	17
Strongyloides stercoralis	4
Endolimax nana	2
Negative findings	11

Comparative study of three populations from the same country but with differences in their stage of development: rural (Tapipa), urban (Coro), and great urban development (Caracas), revealed differences in G, A, D, and E immunoglobulin levels. IgG and IgE values were higher in the rural populations being worth noting the progressive and proportional decrease in Caracas, Coro having intermediate values. IgD levels were found increased among the least developed populations, but the meaning of this finding is unknown. Results obtained in the population of Gambia indicate a probable relationship between malnutrition and the increase of IgD levels<sup>(17)</sup>, but the amount of albumin found in our populations does not confirm this finding (the correlation coefficient Alb/IgD is 0.28 for Caracas).

High IgE serum values have been described as being due to allergic<sup>(7, 10)</sup> or parasitic processes<sup>(3,5,9,14,16)</sup>. The increase found in apparently healthy Venezuelan populations could be ascribed mainly to the frequent contact with environmental factors, basically the persistency of parasitary infections, especially since in the populations of Tapipa no alarming frequencies are observed of allergic processes as asthma, different to what could be found in Caracas. This idea finds support in the fact that stool examinations of this population revealed a high percentage of subjects with intestinal parasites (**Necator americanus**, **Ascaris lumbricoides**, **Trichuris trichura**, **Strongyloides stercoralis**), and in many subjects more than two types were found (Table III). Moreover, peripheral blood differential count revealed an increase in the number of eosinophils when compared with the other two populations. Immunoglobulin E levels were increased in comparison with those previously described for other populations (60-1000 ng/ml for Swedish and 6-780 ng/ml for U.S. populations<sup>(4,8)</sup>).

Nevertheless, high levels have been previously described in tropical populations(1,14). The increase of IgG can also be attributed to the persistent exposure to environmental agents described in Venezuelan populations(2), although the serum immunoglobulin levels in less developed countries to vary from population to population according to their stage of development.

The ethiological agent determining this increased production of immunoglobulins (antibodies) —through a persistent stimulus of the immunological system— might favor the immunosurveillance mechanism against the development of neoplasias. Several reports have indicated the possible significance of IgE and allergic processes in cancer(6,13) and furthermore, the effect of parasitic infections in the growth of neoplasias(11,18) has been demonstrated in experimental animals. Current experiments are being carried out in order to determine the levels of IgE in patients with various types of parasitosis in our populations, and in addition experiments are being designed to test the hypothesis that chronic parasitic infection provide a better immunosurveillance mechanism.

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