

The foreign origin of HIV infection in the venezuelan population

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El origen foráneo de la infección por HIV en la población venezolana

El grado de exposición al virus de inmunodeficiencias humanas (HIV) en la población venezolana fue investigado en 2.131 individuos, con riesgos diferentes de sufrir la infección, mediante la detección de anticuerpos contra el virus. Las prevalencias más elevadas correspondieron a: *a*) el grupo de homosexuales masculinos, de estratos socioeconómicos elevados (37 %); *b*) pacientes hemofílicos (20 %) y *c*) pacientes con SIDA (96 %). A nivel de donantes voluntarios de sangre, se detectó una prevalencia confirmada de 0,07 %. Finalmente, el estudio de amerindios que viven en la Cuenca del Orinoco, demostró ausencia de anticuerpos específicos contra las proteínas aisladas del virus, a pesar de una baja reactividad contra el virus completo en 8 % de los individuos estudiados. Nosotros concluimos que la infección por HIV es foránea y muy probablemente fue introducida en Venezuela por homosexuales masculinos que se infectaron en el exterior.

In order to establish the nature and degree of exposure to human immunodeficiency virus (HIV) in the venezuelan population, the prevalence of antibodies to the virus was investigated in 2,131 individuals at different risk for acquired immunodeficiency syndrome (AIDS). We found the highest prevalence of antibodies (37 %) restricted only to the affluent homosexual group (social status, I, II, III), AIDS patients (96 %) and haemophiliacs (20 %). Among blood bank donors, 0,07 % of true positive individuals were detected. Finally, in Amerindians living in the Orinoco basin, no antibodies specific for HIV isolated proteins were found in spite of low reactivity against the whole HTLV-III virus identified in 8 % of individuals tested. We stressed the foreign nature of HIV infection in Venezuela.

INTRODUCTION

Human immunodeficiency virus (HIV) which includes human retroviruses (LAV/HTLV-III), has been identified as the etiologic agent of AIDS¹⁻³. One of the most significant aspects of HIV infection in humans is related to its probable origin. Serologic studies indicate that HIV may have been present in Africa since at least the mid-1970's⁴. In regard to the western hemisphere, little is known about the seroepidemiology of HIV in-

fection. As part of national policies outlined by the Secretary of Health to monitor AIDS in Venezuela, we designed a seroepidemiological protocol to assess prospectively the characteristics of HIV infection in Venezuela.

A unique opportunity was at hand; we were able to include groups of homosexuals, classified following their economical and social status, along with Amerindians of the Orinoco Basin.

METHODS

Subjects

Serum samples from 2,131 individuals at different risk for HIV infection were evaluated. They included 24 patients with AIDS, 407 homo or bisexual men, 50 haemophiliac patients, 1,508 blood bank donors and 146 Amerindians. Stored samples from AIDS cases (World Health Organization and Center for Disease Control criteria) 5, 6 were studied. A random group of homosexual men were analyzed taken from the Sexually Transmitted Disease (STD) clinic because of homosexuality or men seeking information about AIDS and willing to take the test, no stored samples were studied among this group. The homosexual group was further subdivided according to income and social status following the Graffar criteria, 7 modified by the "Venezuelan Project Commission" (on going governmental task force to study venezuelan anthropological and biological characteristics based on 60,000 surveyed healthy individuals).

Homosexuals with higher income and social levels (status I-III) reported to have travelled frequently overseas in the past 6 years, had sexual contact with gay persons, mainly from the East Coast of the United States and de Caribbean Islands. Those included in status IV-V (lowest income and social levels) never left Venezuela, lived on male prostitution and denied sexual contact with homosexuals from upper social classes.

Haemophiliac samples were referred from the National Center for Study of Haemophilia, while blood bank donor samples were randomly obtained from population at low risk, for AIDS, from six blood banks, located at important urban areas (Caracas, Puerto Ordaz, Ciudad Bolívar and Cumaná).

In order to appropriately investigate samples from the Amerindian tribes of the Venezuelan Amazonian Territory (fig. 1), two groups were selected and bled for the purpose of the present study during 1985; both groups were composed of Yanomami Amerindians, one living in Mavaca (near the Orinoco river) with frequent visits from different kinds of caucasoid or mestizo people; the other from Parima, a remote area near the border with Brasil rarely visited by people foreign to the area. In addition, 27 samples from the same

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area of Parima, collected in 1981, were also included; it is important to note that all samples (1985, 1981) were only thawed to perform HIV antibody screening.

Detection of antibodies to HIV (LAV/HTLV-III)

Antibodies to disrupted HTLV-III virus were studied by an enzyme-linked immunoabsorbent assay (ELISA) provided by Abbott Laboratories (Diagnostic Division, Caracas). All samples initially reactive, were tested again on a different run. Only those samples that were reactive in two occasions were classified as positive and the corresponding ratio was calculated (sample absorbance divided by the cut-off value); both confirmatory, EIA test (kindly supplied by Abbot Laboratories) and western blot (kindly performed in the AIDS Diagnostic Laboratory at the Center for Disease Control, Atlanta) were carried out in most positive samples when ratios were less than six. Ratios over six were considered as highly suggestive of HIV exposure and confirmatory tests were not done since the correlation between western blot and highly reactive ELISA has been shown to be 100 %⁸.

RESULTS

The seroprevalence of HIV antibodies in the studied groups is depicted in table I. When blood bank donors were studied, three out of 1,508 individuals were found to be reactive by ELISA screen test (0.2 %); only one of them (0.07 %), showed a high ratio, and reassessment of his clinical record demonstrated that he was a homosexual; the other two low reactive samples, were negative by both confirmatory tests. All AIDS patients showed antibodies to HTLV-III and ratios over six were present in 96 % of them. As far as the selected homosexuals, 37 % of class I-III male homosexuals were highly reactive with ratios over six, while only one of the class IV-V was found to be low reactive by ELISA and negative by both confirmatory tests. Among haemophiliacs, the prevalence of HTLV-III antibodies at high ratios was 20 %. Considering the Amerindian group as a whole (N = 146), results showed that 12 were low reactive by ELISA (R < 1.8), all of them from Parima and corresponded to 6 out of 27 individuals bled in 1981 and 6 of 58 taken in 1985 (table II). All 12 samples were consistently negative by both confirmatory tests; in addition, all sera from Mavaca were negative when screened by ELISA test.

DISCUSSION

Since the original reports linking LAV/HTLV-III (HIV) human retrovirus to AIDS, intense research has been focused on the origin of the virus. Initial serological investigations stressed that HIV may have been present in Africa in the mid 1970's⁴. The african green monkey (*genus cercopithecus*) is a frequently asymptomatic carrier of STLV-III_{AGM} a simian retrovirus closely related to the human T lymphotropic virus group. Kanki et al⁹ have recently suggested that STLV-III_{AGM} may have been transmitted to humans. In fact, in the

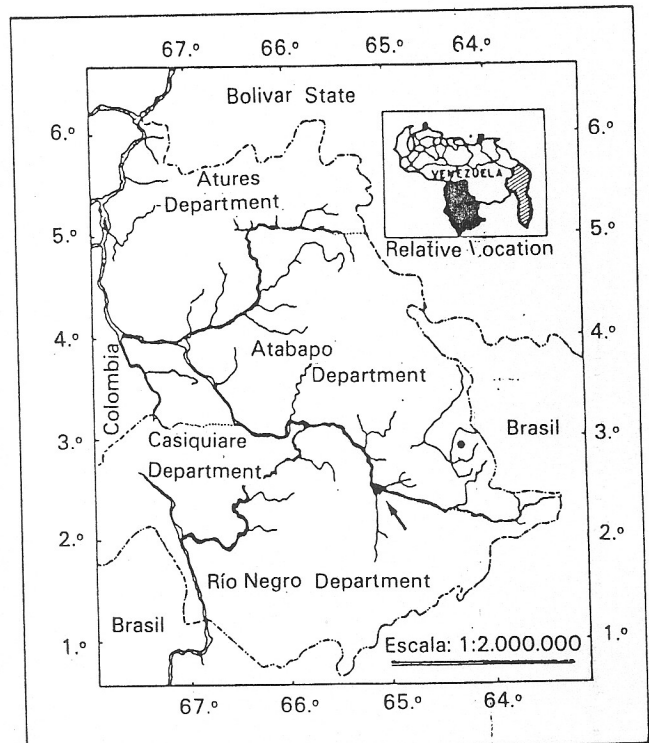


Fig. 1. The Venezuelan Amazonian Territory is shown in black in the right upper corner. The Mavaca and Parima villages are signaled by arrows.

Senegal and Dakar, to have antibodies reactive to STLV-III_{AGM} and to a closely related new human retrovirus (HTLV-IV). In regard to the western hemisphere, little is known on the seroepidemiology of HIV infection. Bartholomew et al¹⁰ showed that West Indies represent an HTLV-I endemic region and that their HIV positive AIDS cases were restricted to a single at risk population with strong African descent. Most countries in Central and South America have reported cases

TABLE I HIV infection in Venezuela. Antibody prevalence in groups at different risk for AIDS^a

Groups	N	Elisa +		R > 6		WB/EIA N
		N	(%)	N	(%)	
Blood bank donors	1508	3	(0.2)	1	(0.07)	2 Neg
AIDS	24	24	(100)	23	(96)	
Homo or Bisexual men						
^b Status I, II, III	225	84	(37)	84	(37)	
^b Status IV, V	182	1	(0.54)	0		1 Neg
Haemophiliacs	50	12	(24)	10	(20)	
Amerindians	146	12	(8)	0		12 Neg

^a Anti HTLV-III antibodies were investigated by ELISA (Abbott HTLV-III EIA). Sample absorbance was divided by cut off values to obtain ratio (R). Antibodies to isolated proteins were investigated by western blot (CDC, Atlanta), and/or by ELISA (Abbott HTLV-III confirmatory EIA), on every sample positive by ELISA with R values below 6.

TABLE II Prevalence of HIV antibodies among Amerindians from Venezuelan Amazonian Territory

Location	Date of bleeding	ELISA +	R	WB/EIA
Parima (N = 27) (N = 58)	1981	6	< 1.8	Neg
	1985	6	< 1.4	Neg
Mavaca (N = 61)	1985	0	-	
Total (N = 146)		12	< 1.8	Neg

* Antibodies to HTLV-III were investigated by ELISA (Abbott HTLV-III EIA). Ratios (sample absorbance/cut off) were below 1.8 in the 12 samples reactive by ELISA. Confirmatory tests were negative in all 12 samples by western blot (CDC, Atlanta) and ELISA (Abbott HTLV-III confirmatory EIA).

of AIDS¹¹; Brasil reported to have officially collected 520 AIDS cases by November 85¹²; among them, 245 were homo or bisexual (64 %); in Costa Rica, on the other hand, AIDS cases have been restricted to haemophiliacs with an HIV prevalence among blood bank donors of 0.3 %¹³. Although very few seroepidemiological studies have been concluded and reported, the caribbean basin seems to represent a highly endemic area for HIV infection. In Haiti, HIV prevalence is somewhat higher in the general population¹⁴ while in Martinique the prevalence of HIV is low, being basically restricted to high risk groups¹⁵. Our population survey provided us a unique opportunity, since we were able to classify the homosexual group according to their income and social status. This allowed us to demonstrate the probable foreign origin of the virus, and its introduction to our country by homosexual males who became injected through sex contact with gay individuals mainly from the east coast of USA (Florida, New York) and to a lesser extent from Europe (Belgium, France, Spain and England). It is very noticeable that homosexuals from low income groups, who had not traveled outside the country and with no sexual contact with foreigners or with the high income gay group, were not yet infected by HIV.

On the other hand, the Amazonian aboriginal individuals included in the investigation, are members of the Yanomami Amerindians, a linguistic subgroup of the Yanomama population. In the mid-19th century, this population came in contact with non-indians; this contact may be considered permanent and active at Mavaca and quite limited (missionaries, anthropologists and health personnel) at Parima. It was remarkable to find that all specimens were negative by ELISA (Mavaca) or by confirmatory tests (Parima). These results appear to be opposite to those reported by Rodríguez et al; since no precise description of either geographical location of the selected individuals or the handling of the specimens was outlined, the influence of those factors can not be ruled out from their observations.

Thus, our results suggest not only that the virus seems foreign to Venezuela but that male promis-

cuos homosexuality may not be the only condition for increased susceptibility to HIV infection. Up to date HIV sexuals (status I-III) frequent travelers to areas where the infection with HIV is highly prevalent.

It seems reasonable to predict that the present economical crisis abating the third world, may allow the spread of the virus among members of different social levels, since travelling overseas is becoming increasingly difficult.

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