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A SEROEPIDEMIOLOGICAL SURVEY OF HTLV-I/II CARRIERS IN THE PUNA JUJEÑA

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Abstract Human T-cell leukemia virus type I (HTLV-I) carriers are clustered in limited groups in the world. One of these groups is the Andean native population of South America. As part of an international collaborative study devoted to explore the clustering of HTVL-I carriers in different countries, the aim of this paper was to evaluate the seroprevalence of HTLV-I/II virus in the native population of Puna Argentina in Jujuy. Blood samples of individuals of three populations of Puna Jujeña (Susques, Rinconada, Cochinoca) were screened with particle agglutination (PA), immunofluorescence (IF) and western immunoblotting analysis (WB) tests. Two out 86 (2.32%) individuals examined in the Puna Jujeña showed positive results for HTLV-I antibodies. It is concluded that the Province of Jujuy, in particular its less miscegenated highest altitude areas, constitute the northern and southern Andean natural geographical clustering of HTLV-I. This distribution is probably linked both to a history of prehistoric human dispersal in the Andes and to high mother- to- child transmission of the virus under close conditions of each group.

Resumen ***Estudio seroepidemiológico de portadores de HTLV-I/II en la Puna Jujeña.*** Los portadores del virus de la leucemia humana a células T tipo I (HTLV-I) se agrupan en determinados grupos en el mundo. Uno de estos grupos en Sudamérica es la población nativa de los Andes. Como parte de un estudio colaborativo internacional orientado a explorar la distribución de portadores HTLV-I en diferentes países, el propósito de este trabajo fue evaluar la seroprevalencia del virus HTLV-I/II en la población nativa de la Puna Argentina en la Provincia de Jujuy. Las muestras sanguíneas de individuos de tres poblaciones de la Puna Jujeña (Susques, Rinconada, Cochinoca) fueron analizadas con las siguientes pruebas: aglutinación de partículas (PA), inmunofluorescencia (IF) y western-blot (WB). De los 86 individuos examinados 2 (2.32%) presentaron anticuerpos de HTLV-I. Se concluye que la Provincia de Jujuy, y en particular sus áreas de altura menos miscegenizadas, forman parte del agrupamiento geográfico natural norte y surandino del virus HTLV-I. Esta distribución probablemente se encuentra ligada tanto a la dispersión humana prehistórica en los Andes como a una elevada transmisión del virus de madre a hijo propia de las condiciones de aislamiento de estos grupos.

Key words: HTLV-I/II, Puna Jujeña, seroepidemiology

Human T-cell leukemia virus type I (HTVL-I) is the etiological agent for adult T-cell lymphoma/leukemia (ATL) and HTVL-I associated myelopathy (HAM)/tropical spastic paraparesis (TSP)[1, 2]. Human T-cell leukemia virus type I (HTVL-I) was found in an ATL cell line in the United States in 1980[3] and independently in Japan, in 1981[4]. A related virus to HTVL-I was isolated from the transformed T cell of a patient with hairy cell leukemia and consequently this virus has been called HTLV type II to distinguish it from HTLV-I[5].

The geographical distribution of HTLV-I and HTLV-II as well as the molecular epidemiological knowledge about this virus has been considered very useful in elucidating the present and past geographical distribution of various ethnic groups[6]. HTLV-I and HTLV-II carriers are clustered among limited groups in the world: Japanese and other minority groups in Asia, Blacks in Central Africa and the Caribbean basin, Melanesians in Papua New Guinea and Amerindians in Central and South America[6]. In America it was revealed that HTLV-I carriers are widely distributed among Amerindian people who live along the Andes range, from Colombia to Chile[7]. A recent report suggested that HTLV-II is naturally distributed among some American native groups living in the Atlantic coast, Gran Chaco and Amazonia[7, 8, 9].

As part of an international collaborative study between Japan and Chile devoted to explore the clustering of HTVL-I carriers in both countries the aim of this paper was to evaluate the seroprevalence of HTLV-I/II virus in the neighbouring native population of Puna Argentina in Jujuy.

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Populations and Methods

Four clearly defined geographic and ecological regions exist in Jujuy Province and collectively they constitute an altitudinal gradient with populations situated between 350 and 4 000 meters above sea level. One of these regions is Puna Jujeña, which comprises approximately 60% of the provincial territory, with an average altitude of 3 500 m. It is relatively sparsely settled where existing conditions are the most extreme within the high altitude environment. In its ethnic composition the contribution of the autochthonous predominates. In the prehispanic period these populations belonged to a set of ethnic groups: Atacama, Omaguacas, etc[10]. From a cultural point of view, these populations may be ascribed to the north-western cultural area of Argentina, a part of the Andean macro area[10].

The sample consisted of individuals of both sexes (32 males; 54 females), randomly selected, coming from three towns in the Puna Jujeña: Susques (N = 40), Rinconada (N = 28) and Cochinoca (N = 18). Total populations in these three towns are 671, 369 and 400 respectively. We screened for antibodies to HTLV-I in sera by the gelatin particle agglutination test (PA test: Serodia HTLV-I Fujirebio, Tokyo). Sera positive in the PA test (titer < 16) were re-tested for immunofluorescence on MT-1 cells (IF test) and antibody specificity was confirmed by western immunoblotting analysis (WB test; Fujirebio). To detect the provirus DNA of HTLV-I and II in peripherical blood, PCR was performed as described elsewhere[12]. The primer set amplified the R and U5 regions of the LTR of HTLV-I (452 bp) and II (498 bp).

Results and Discussion

Two out of 86 (2.32%) persons (Table 1) examined in the Puna Jujeña showed positive for HTLV-I antibodies in the PA test and with the confirmation test (Fig. 1).

TABLE 1.– *Reactivity of synthetic peptides derived from HTLV-I/II by PA and WB test in 2 out of 86 indigenous people in the Puna Jujeña*

Sample	Sex	Age	Serodia HTLV-I PA titers	HTLV-I HTLV-I/II western-blot HTLV-I	HTLV-II
ARG-009	F	30	X32	+	-
SA7-38	F	29	X256	+	-

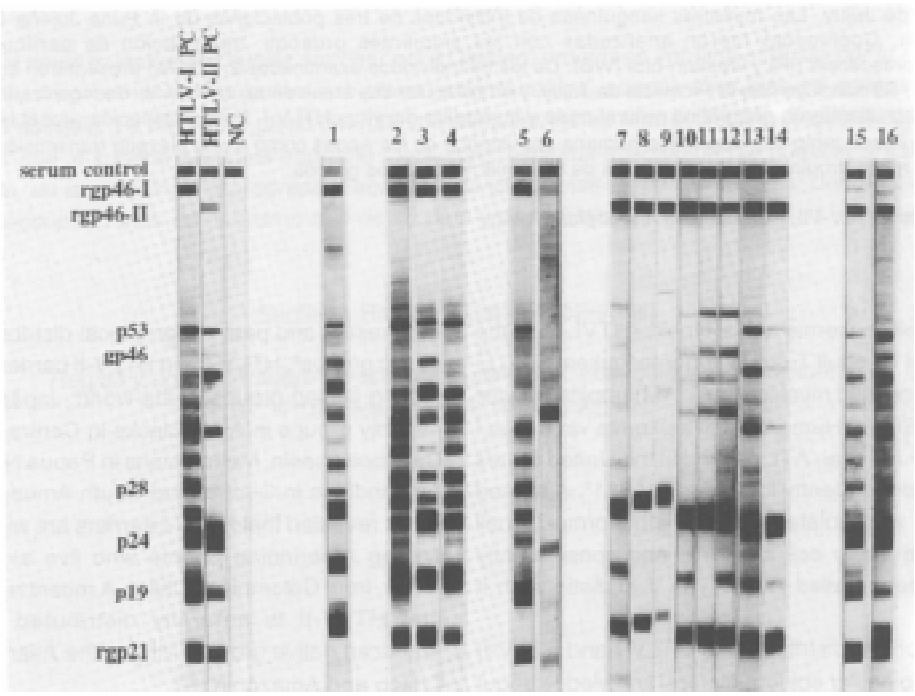

Fig. 1.– Western blot patterns of representative cases of HTLV-I and HTLV-II carriers in South America. HTLC-I PC and HTLV-II PC are HTLV-I and HTLV-II positive control, respectively. NC is negative control. Lanes 1-6 are HTLV-I positive samples: lane 1; Aymara (CRM-41) in Bolivia, lanes 2-4; Atacama in North Chile (CHI-399, CHI-413 and CHI-444), lanes 5-6; Puna in North Argentina (ARG-009 and SA7-38). Lanes 7-16 are HTLV-II positive samples: lanes 7-14 correspond to Alacalfes (PE-001, PE-004 and PE-015), Yaganes (NA-001), Guahibo (2C-013, 2C-032, 2C-036 and 2C-055) respectively and lanes 15-16; Kayapo (KY66 and KY74).

TABLE 2.– *HTLV-I/II seroprevalence in bank blood donors of different cities in Argentina*

City	Detection methods	N° subjects	Positives % HTLV-I	Positives % HTLV-II	Reference
Buenos Aires	IF/PCR	1 100	1 (0.09)	1 (0.09)	13
Buenos Aires	IF/PA/WB	12 891	6 (0.05)	3 (0.02)	14
Buenos Aires	IF/PA	13 481	9 (0.06)	3 (0.02)	15
S. S. de Jujuy	PA/ELISA	4 805	39 (0.81)	-	17
S. S. de Jujuy	PA/IF	16 668	221 (1.19)	-	18

There are antecedents at national level[13, 14, 15] of studies on seroprevalence of HTVL-I/II virus blood donation centers located in Buenos Aires, the capital city of the country (Table 2), the largest of which provided percentages of seropositive results below 0.5%. These percentages increase in patients under risk of horizontal or vertical transmission of HTLV-I/II virus: patients under hemodialisis, hemophiliacs, and intravenous hard drug consumers[16]. Studies on blood donors have also shown that the most prevalent virus was HTLV-I, and that most positive donors would come from the northern part of the country, with a strong Amerindian ethnic component, in particular from Jujuy and Formosa[15].

The first case of TSP/HTLV-I was detected in Jujuy in 1989[17]. Since then over 20 patients with this pathology have been studied. This information, added to serologic surveys made to date on blood donors (Table 1), suggest that the Province of Jujuy would be an endemic zone for virus HTLV-I[16, 17, 18]. However seroprevalence values in Jujenean blood donors are lower than that one found in this study (Table 1). The latter is similar to HTLV-I seropositivity rates found among highland populations of Jujuy Province[18]. These, in turn, are alike to those detected in amerindian people, biologically and culturally related to Jujenean populations, living along the Andes mountains from Colombia to Chile[19]: a) Aymara blood donors living in Bolivian altiplano (2.3%)[20]; b) north Chile Amerindians of San Pedro de Atacama (4.2%))[7]; c) Andean Amerindians from Colombia (3.9%)[21].

It is concluded that the Province of Jujuy and in particular its less miscegenated regions of high altitude, would integrate the northern and southern Andean natural geographical clustering of HTLV-I, and that this distribution is probably linked both to a history of prehistoric human dispersal in the Andes and to high mother-to-child transmission of the virus under close conditions of each groups.

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Le Discours de la Méthode *propose une épistémiologie normative, mais il faut le lire aussi et avant tout comme méditation morale, comme ascèse de l'esprit. Le discours authentique à son tour fonde la science, et remet aux mains des hommes les immenses pouvoirs qui, aujourd'hui l'enrichissent et le menacent, le libèrent mais pourrait aussi l'asservir. Les sociétés modernes, tissées par la science, vivant de ses produits, en sont devenues dépendantes comme un intoxiqué de sa drogue. Elles doivent leur puissance matérielle à cette éthique fondatrice de la connaissance et leur faiblesse morale aux systèmes de valeurs, ruinés par la connaissance elle même, auxquels elles tentent encore de se référer. Cette contradiction est mortelle. C'est elle qui creuse le gouffre que nous voyons s'ouvrir sous nos pas.* L'éthique de la connaissance, *créatrice du monde moderne, est la seule compatible avec lui, la seule capable, une fois comprise et acceptée, de guider son évolution.*

El *Discurso del Método* propone una epistemiología normativa, pero es preciso leerlo también y ante todo como meditación moral, como ascesis del espíritu. El discurso auténtico funda a su vez la ciencia, y entrega a las manos de los hombres los inmensos poderes que, hoy, le enriquecen y le amenazan, le liberan, pero podrían también esclavizarle. Las sociedades modernas, rejidas por la ciencia, viven de sus productos, han devenido dependientes como un toxicómano de su droga. Ellas deben su poderío material a esta ética fundadora del conocimiento y su debilidad moral a los sistemas de valores, arruinados por el mismo conocimiento, a los que intentan aún atenerse. Esta contradicción es mortal. Es ella la que excava el abismo que vemos abrirse a nuestro paso. La *ética del conocimiento* creadora del mundo moderno, es la única compatible con él, la única capaz, una vez comprendida y aceptada, de guiar su evolución.

Jacques Monod (1910-1976)

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