

## SEROEPIDEMIOLOGICAL STUDY OF ANTI-ADULT T-CELL LEUKEMIA/LYMPHOMA ASSOCIATED ANTIGEN ANTIBODIES IN LAE AND WEWAK OF PAPUA NEW GUINEA (1991)

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### Introduction

This seroepidemiological survey of a retrovirus induced human leukemia, named Adult T-cell Leukemia/Lymphoma (ATL), was started by TERASHI *et al.* (1986) in Papua New Guinea. Nearly all of the patients of ATL and many carriers of the HTLV-I (Human T-Lymphotropic Virus type-I) who are in a healthy condition will test positive for ATLA (anti-ATL associated antigen Antibodies) in their sera.

### Methods and Results

The human sera were collected from the out- and in-patients of Angau Memorial Hospital (Morobe Province) and Wewak General Hospital (East Sepik Province) in Papua New Guinea. A total of 138 sera were tested by a microtiter technique with a gelatin Particle Agglutination method using a Serodia-ATLA kit (FUJIREBIO Inc., Tokyo, Japan). The ATLA positive range was decided over 16 units of serum materials which were concentrated by this test.

Table 1. ATLA\* positive cases in Papua New Guinea (1991)

Name of Hospital (Province)	Male cases		Female cases		Total No.	
	No. Tested	No. Positive	No. Tested	No. Positive	No. Tested	No. Positive
Angau Memorial Hospital (Morobe)	44	10 (22.7%)	31	9 (29.0%)	75	19 (25.3%)
Wewak General Hospital (East Sepik)	30	10 (33.3%)	33	9 (27.3%)	63	19 (30.2%)
Total	74	20 (27.0%)	64	18 (28.1%)	138	38 (27.5%)

Human sera were tested by PA method (FUJIREBIO Inc.)

ATLA\* : anti-Adult T-cell Leukemia/Lymphoma associated antigen Antibodies

Table 2. Age related ATLA\* positive cases in Papua New Guinea (1991)  
(ANGAU Memorial Hospital : Morobe Province)

Age (Year old)	Male cases		Female cases		Total No.	
	No. Tested	No. Positive	No. Tested	No. Positive	No. Tested	No. Positive
~ 10	0	0	0	0	0	0
11 ~ 20	8	2	2	1	10	3(30.0%)
21 ~ 30	15	1 ( 6.7%)	4	1	19	2(10.5%)
31 ~ 40	2	0	2	1	4	1
41 ~ 50	3	1	1	0	4	1
51 ~ 60	2	1	1	1	3	2
Adult	14	5(35.7%)	21	5(23.8%)	35	10(28.6%)
Total	44	10(22.7%)	31	9(29.0%)	75	19(25.3%)

Human sera were tested by PA method (FUJIREBIO Inc.)

ATLA\* : anti-Adult T-cell Leukemia/Lymphoma associated antigen Antibodies

Table 3. Age related ATLA\* positive cases in Papua New Guinea (1991)  
(WEWAK General Hospital : East Sepik Province)

Age (Year old)	Male cases		Female cases		Total No.	
	No. Tested	No. Positive	No. Tested	No. Positive	No. Tested	No. Positive
~ 10	8	2	8	1	16	3(18.8%)
11 ~ 20	5	2	6	1	11	3(27.3%)
21 ~ 30	1	0	3	2	4	2
31 ~ 40	3	1	2	0	5	1
41 ~ 50	0	0	0	0	0	0
51 ~ 60	2	0	0	0	2	0
Adult	11	5(45.5%)	14	5(35.7%)	25	10(40.0%)
Total	30	10(33.3%)	33	9(27.3%)	63	19(30.2%)

Human sera were tested by PA method (FUJIREBIO Inc.)

ATLA\* : anti-Adult T-cell Leukemia/Lymphoma associated antigen Antibodies

The results of the serological study on ATLA in both hospitals are showed in Table 1. The incidences of ATLA positive are seen in 19 cases out of 75 (25.3%) in Angau Memorial Hospital and 19 cases out of 63 (30.2%) in Wewak General Hospital.

Finding the prevalence by age in both hospitals was too hard, because many inhabitants did not know their ages (Table 2. and 3.). The birth place of the patients of Angau

Table 4. Birth or dwelling place of ATLA\* positive cases in Papua New Guinea (1991)  
(ANGAU Memorial Hospital)

Name of Province	Male cases		Female cases		Total No.	
	No. Tested	No. Positive	No. Tested	No. Positive	No. Tested	No. Positive
Morobe	18	6 (33.3%)	20	4 (20.0%)	38	10 (26.3%)
East Sepik	5	1	4	3	9	4 (44.4%)
Chinbu	5	2	2	1	7	3 (42.9%)
Madang	3	0	1	0	4	0
Eastern Highlands	3	0	1	0	4	0
Western Highlands	3	0	1	0	4	0
Gulf	2	1	0	0	2	1
Milne Bay	1	0	1	0	2	0
Central	0	0	1	1	1	1
Northern	1	0	0	0	1	0
West New Britain	1	0	0	0	1	0
West Sepik	1	0	0	0	1	0
Western	1	0	0	0	1	0
New Ireland	0	0	0	0	0	0
East New Britain	0	0	0	0	0	0
Southern Highlands	0	0	0	0	0	0
Manus	0	0	0	0	0	0
Enga	0	0	0	0	0	0
North Solomons	0	0	0	0	0	0
Total	44	10 (22.7%)	31	9 (29.0%)	75	19 (25.3%)

Human sera were tested by PA method (FUJIREBIO Inc.)

ATLA\* : anti-Adult T-cell Leukemia/Lymphoma associated antigen Antibodies

Memorial Hospital is revealed by the name of the province in this series in Table 4. The research in a three year survey from 1986 to 1988 in Papua New Guinea is summarized by birth place in Table 5.

### Discussion

The Adult T-cell Leukemia/Lymphoma (ATL) is caused by an infection of a retrovirus of HTLV-I. Anti-ATL associated antigen Antibodies (ATLA) in human sera are detected in most ATL patients and in a relatively high percentage of the healthy individuals born in ATL-endemic areas (HINUMA *et al.*, 1981).

In Japan, ATL-endemic areas are found in the southwestern regions, where healthy carriers were found at a high rate of 6-37% (HINUMA *et al.*, 1982) and at 2.2-8.7% in Niigata prefecture (AOKI *et al.*, 1985). In Okinawa, the southernmost part of Japan, 51 cases are found in every 170 patients (30.0%), including 20 ATL patients who tested positive for ATLA (CLARK *et al.*, 1985).

Table 5. Birth place of ATLA\* positive cases in Papua New Guinea (1986~1988)  
 (Names of sampling places : Port Moresby, Lae, Mt. Hagen, Madang, Wewak, Rabaul & Arawa)

Name of Province	Male cases		Female cases		Total No.	
	No. Tested	No. Positive	No. Tested	No. Positive	No. Tested	No. Positive
Northern	33	9 (27.3%)	3	3	36	12 (33.3%)
Morobe	67	21 (31.3%)	29	10 (34.5%)	96	31 (32.3%)
East Sepik	107	21 (19.6%)	51	23 (45.1%)	158	44 (27.8%)
New Ireland	24	6 (25.0%)	5	2	29	8 (27.6%)
Gulf	72	19 (26.4%)	10	1 (10.0%)	82	20 (24.4%)
East New Britain	80	18 (22.5%)	47	12 (25.5%)	127	30 (23.6%)
West Sepik	14	4 (28.6%)	3	0	17	4 (23.5%)
Milne Bay	34	8 (23.5%)	3	0	37	8 (21.6%)
Southern Highlands	33	6 (18.2%)	9	3 (33.3%)	42	9 (21.4%)
Manus	27	5 (18.5%)	3	1	30	6 (20.0%)
Madang	41	8 (19.5%)	10	1 (10.0%)	51	9 (17.6%)
Central	199	24 (12.0%)	40	13 (32.5%)	239	37 (15.5%)
Eastern Highlands	60	8 (13.3%)	11	2 (18.2%)	71	10 (14.1%)
Western Highlands	33	6 (18.2%)	17	1 ( 5.9%)	50	7 (14.0%)
Enga	29	4 (13.8%)	7	1	36	5 (13.9%)
West New Britain	18	3 (16.7%)	4	0	22	3 (13.6%)
Chinbu	37	0	11	4 (36.4%)	48	4 ( 8.3%)
North Solomons	36	2 ( 5.5%)	17	1 ( 5.9%)	53	3 ( 5.7%)
Western	28	1 ( 3.6%)	2	0	30	1 ( 3.3%)
Total	972	173 (17.8%)	282	78 (27.7%)	1,254	251 (20.0%)

Human sera were tested by PA method (FUJIREBIO Inc.)

ATLA\* : anti-Adult T-cell Leukemia/Lymphoma associated antigen Antibodies

※ Transcribed data from TERASHI, TALONU, *et al.* 1990. South Pacific Study,  
 10 : 263-274.

In neighboring countries, only a few ATLA positive cases were reported in Taiwan (PAN *et al.*, 1985), Korea (LEE *et al.*, 1986) and China (ZENG *et al.*, 1984). Each population was composed of healthy persons and patients with various diseases.

The West Indies/Caribbean basin is also known as an HTLV-I invaded area, especially in areas with high concentrations of black people. (CATOVSKY *et al.*, 1982 ; BLATTNER *et al.*, 1982). Africa is also an HTLV-I endemic area (SAXINGER *et al.*, 1984).

Our surveies in Oceania were started in 1983. No positive cases were found in our survey on the Solomon Islands nor Viti Levu (Fiji) where we collected 72 and 156 sera, respectively (MATSUMOTO, TERASHI & PARKER 1983 ; TERASHI *et al.*, 1983).

In the Federated States of Micronesia, no positive cases out of 57 persons in Truk State though three tested positive out of 154 (1.95%) individuals in Pohnpei State (TERASHI *et*

*al.*, 1986), and nine positive reactions out of 133 (6.77%) inhabitants of Yap State (TERASHI *et al.*, 1987a) were detected for ATLA in the sera. In the Republic of Palau, nineteen positive cases out of 176 (10.8%) sera were found from inhabitants in our research work (TERASHI *et al.*, 1987b).

In Papua New Guinea (PNG), the research survey for ATLA was started by TERASHI *et al.* in 1986 and was also held by BABONA & NURSE (1988). It showed that PNG was a high incidental country for ATLA positivity.

A report for ATLA by TERASHI, ISHIDA & TALONU (1990) pointed out the positivity of 27.7% patients of Papua New Guinean but only 7.3% in the foreign residency of PNG. The data for three years from 1986 to 1988 in PNG was summarized by the birth place of residency in TERASHI, TALONU *et al.* (Table 5. : 1990. South Pacific Study, Vol. 10). It was indicated that the ATLA positive test was higher if their birth place was near the costal area of the Pacific Ocean than it was if they were born near the Coral Sea or highlands as shown in Table 5. In the survey of this time, the difference of ATLA positivity was not so clear because the sample tested was too small (Table 4.). In our report (1991), collected samples indicated 13.1% and 12.6% in the sera of Port Moresby and Lae, respectively. Furthermore mother to fetal infection by her umbilical cord was a less likely route, because the positive rate of ATLA was shown 6.9% and 0.02% in the samples of childbirth mother and her umbilical cord blood, respectively.

Immunoflorescence tests for the same sera collected from 1986 to 1988 indicated 33 positive cases out of 1,471 (2.2%) in Papua New Guinea (IMAI, TERASHI, TALONU *et al.* 1990).

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