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SEROLOGICAL ASPECT OF HUMAN T—CELL LEUKEMIA VIRUS TYPE—1 AND EPSTEIN—BARR VIRUS IN PAPUA NEW GUINEA

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Introduction

One of the human T–lymphotropic retroviruses (HTLV), HTLV–1, associated with adult T–cell leukemia (ATL) has been extensively studied in the recent years. The initial seroepidemiologic study of HTLV–1 demonstrated virus endemic areas in southwestern parts of Japan (HINUMA et al., 1982), however, successive seroepidemiologic surveys found the virus carriers in several parts of the world (reviewed in WONG-STAAL & GALLO, 1985; HINUMA, 1985). In the South Pacific area, Papua New Guinea was shown to be endemic for HTLV–1, recently (KAZURA et al., 1987; BABONA & NURSE, 1988; BRABIN et al., 1989). These seroepidemiologic studies demonstrated distribution of HTLV–1, however, the relationship among virus isolates is still unknown without a knowledge of viral genomes.

Epstein–Barr virus (EBV), the first candidate for the human oncogenic virus, has tight relation with cell proliferative diseases, Burkitt's lymphoma (BL), nasopharyngeal carcinoma (NPC) and infectious mononucleosis (IM). EBV was initially found in african BL biopsy cultures (EPSTEIN et al., 1964), but later the seroepidemiologic studies revealed EBV is a common gamma-herpes virus in humans distributed widely in the world (reviewed in HENLE & HENLE, 1979). Papua New Guinea has been pointed out as one of the BL endemic areas.

In this study, aiming to isolate new HTLV–1 strain and to identify EBV genome type in Papua New Guinea we carried out a serologic examination for both of these viruses and collected lymphocytes for further experiments.

Material and Methods

Plasma and Lymphocyte

A total of 47 blood specimens were collected from Papua New Guineans with various origins at Angau Memorial Hospital in Lae (Table 1). Plasmas and lymphocytes were isolated by centrifugation using Conray–ficoll solution and then were stored in liquid nitrogen within two days.

Detection of antibody to HTLV–1

Plasmas were first screened for the presence of antibodies to HTLV–1 with the standard particle agglutination test (Serodia, Fiji Rebio, Japan). In the immunofluorescence test, 5-iodo-2'-deoxyuridine treated MT–1 cell smears were used as target antigens.

Table 1. List of blood specimens collected in Lae.

Code	Age	Sex	Place of birth	Code	Age	Sex	Place of birth
1. R S	20	F	East Highland	25. Y K	Ad	M	Morobe
2. O T	23	F	East Highland	26. K E	Ad	M	Morobe
3. N J	24	F	Morobe	27. R A	Ad	F	East Sepik
4. E R	Ad	F	Morobe	28. F Y	Ad	F	Morobe
5. M H	25	F	Manus Island	29. A E	Ad	F	Morobe
6. M A	27	F	Morobe	30. Z B	Ad	F	Morobe
7. Y S	18	F	Morobe	31. E P	Ad	F	Morobe
8. C F	Ad	F	Morobe	32. F A	Ad	F	East Sepik
9. M G	Ad	F	Morobe	33. C M	Ad	F	Madang
10. M R	29	F	East New Britain	34. A M	Ad	F	Madang
11. L M	Ad	F	New Ireland	35. S T	Ad	M	Morobe
12. P A	19	F	Central	36. W W	Ad	M	Southern Highland
13. K L	Ad	F	Morobe	37. M M	27	F	Manus Island
14. E G	Ad	F	Morobe	38. K M	18	F	Morobe
15. M D	23	F	Morobe	39. V L	29	F	East New Britain
16. Y W	Ad	F	Western highland	40. R D	16	F	South Highland
17. R I	21	F	Morobe	41. N N	Ad	F	Morobe
18. R B	Ad	F	Manus Island	42. G K	13	F	Gulf
19. V N	Ad	F	Madang	43. N E	Ad	F	Madang
20. E J	32	F	East Sepik	44. A J	21	F	Gulf
21. W B	20	F	Morobe	45. R F	Ad	F	Morobe
22. K G	27	F	Morobe	46. N I	20	M	Morobe
23. J R	Ad	F	East New Britain	47. T D	24	F	?
24. L A	30	F	Morobe				

Detection of antibodies to EBV

Immunofluorescence tests were performed to detect antibodies to EBV−VCA (viral capsid antigen) and EBV−EA (early antigen). P3HR1 cells treated with sodium butylate and 12-tetradecanoylphorbol-13-acetate were used in EBV−VCA test. In EBV−EA test, P3HR1 virus and cytosine arabinoside treated Raji cells were used.

Result and Discussion

Ten samples showed positive reaction in PA test at a dilution of ×16 (Table 2). The antibody titer of six positive sample showed × 16. Others showed higher titers and one young female sample reached up to ×512, however, none of them showed positive in the confirmatory IF test. We found one IF positive sample (Table 2) of which antibody titer was low. There are several inconsistent reports on the prevalence of HTLV−1 in Papua New Guinea (Kazura et al., 1987; Babona & Nurse, 1988; Currie et al., 1989; Brabin et al., 1989; Wiber et al., 1989) and the use of confirmatory test after PA test is recommended (Brabin et al., 1989). Our result shows a rather low prevalence of HTLV−1 infection in Papua New Guinea, however, trial for virus isolation would be possible using these frozen lymphocyte samples.

In the EBV serological test (Table 2), it was readily conceivable that all the samples

Table 2. Result of antibody detection tests.

HTLV−1		EBV	
PA (>×16)	IF	VCA	EA
10 (4)	1	46	14

Figures indicate number of positives among 46 samples.

showed anti−EBV−VCA positive but it was not that fourteen out of 46 showed positive for anti−EBV−EA. The EA positivity in Papua New Guinea compares favorably with that in other tropical country where the frequency is about ten percent (ISHIDA et al., unpublished data). Since the EA antibody is one of the marker for EBV associated cell proliferative diseases, further examination is required. This serologic feature should be discussed in the presence of environmental data, such as climate, flora, life style, because certain factors influence latent infected EBV expression (ITO, 1986).

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