

## HTLV-1, HIV-1, hepatitis B and hepatitis delta in the Pacific and South-East Asia: a serological survey

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### SUMMARY

Blood samples from 13 locations in the Pacific and South-East Asia were tested for evidence of infection with human T-cell lymphotropic virus type-1 (HTLV-1), human immunodeficiency virus (HIV-1), hepatitis B virus (HBV) and hepatitis delta virus (HDV). No samples were positive for antibody to HIV-1. Antibodies to HTLV-1 were found in samples from five locations, the maximum prevalence being 19%, in Vanuatu. Serological markers of HBV infection were found in all locations, the maximal prevalence being 88%, in Majuro, Micronesia. Antibodies to HDV in HBsAg positive sera were found in six locations with a maximum prevalence of 81% in Kiribati.

Blood samples from a collection taken for studies into haemoglobinopathies in the Pacific and South-East Asia, undertaken by the MRC Molecular Haematology Unit at the John Radcliffe Hospital, were tested for evidence of infection with HTLV-1, HIV-1, HBV and HDV. A total of 652 serum and plasma samples were collected between May 1985 and February 1986 from the Philippines, Papua New Guinea, Vanuatu, French Polynesia, Palau, the Federated States of Micronesia, Kiribata, and Nauru (Fig. 1). The samples from the Philippines were collected in Manila, those from Papua New Guinea were from Port Moresby and a highland community and in Vanuatu from all four districts. They were collected mainly from healthy adult volunteers, blood donors and ante-natal clinic attenders. Samples were also collected from a Tuvaluan community of immigrant workers on Nauru and from the community originally from Kapingamarangi which is now settled on Ponape. The samples were separated, chilled during transport and then frozen at  $-20^{\circ}\text{C}$  until tested.

The methods used for testing the samples were: HIV-1, a competitive ELISA (Wellcome); HTLV-1, an ELISA (Dupont) and indirect immunofluorescence using two different cell lines infected with HTLV-1; HBsAg, radioimmunoassay (RIA) except the sera from Vanuatu which were tested using reverse passive haemagglutination (Wellcome) with confirmation by RIA; anti-HBc (IgG), an ELISA (Abbott). The sera from Vanuatu were tested for anti-HBs by passive haemagglutination (Sero-dia) and those sera negative for either HBsAg and anti-HBs were tested for anti-HBc using a complement fixation test.

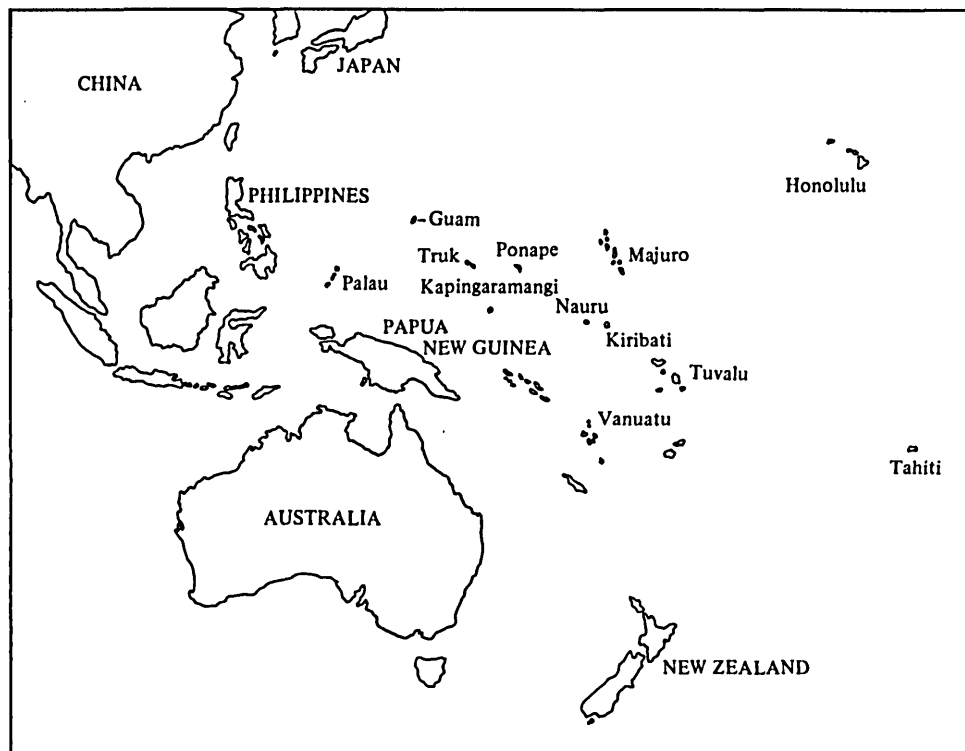


Fig. 1. Map of the Western Pacific and South-East Asia showing the locations from which blood samples were taken.

Samples positive for HBsAg were then tested for anti-HDV using an ELISA (Abbott). Because of the high seropositivity of the samples from Kiribati the remaining sera from there were also tested for anti-HDV.

None of the samples tested were positive for antibodies to HIV-1. The results of the tests for anti-HTLV-1, HBsAg and HBV markers and anti-HDV are presented in Table 1. Samples from Kiribati which had any HBV marker were tested for anti-HDV. Thirteen (81%) of the HBsAg-positive sera were positive for anti-HDV whilst of those which were only anti-HBc positive eight (26%) were positive for anti-HDV.

It is recognized that the number of samples collected from each island group is small but these samples were taken from people apparently in good general health.

HTLV-1 antibodies were present in two groups. A low level of seropositivity was present in the samples from Micronesia with three samples positive out of a total of 364 (0.8%) which is similar to the prevalence in Taiwan (Kuo *et al.* 1985) and central Japan (Ishida *et al.* 1985). A considerably higher prevalence was found in the samples from Papua New Guinea and Vanuatu with 22 positive samples from 143 tested (15.4%) which is comparable with prevalence rates in Colombia (Zaninovic, 1986) and the Caribbean (Gessain *et al.* 1985; Rodgers-Johnson *et al.* 1985). It should be noted that all recorded positives were positive both by

Table 1. Frequency of positive results for the stated serological markers of virus infection. Entries are number positive/number tested (%)

Location	Anti-HTLV-1	HBsAg	Any HB marker	Anti-HDV
S. E. Asia				
Philippines	0/62	2/62 (3)	31/62 (50)	1/2 (50)
Micronesia				
Palau	1/34 (3)	1/34 (3)	30/34 (88)	0/1
Guam	0/50	2/50 (4)	18/50 (36)	0/2
Truk	0/30	2/30 (7)	24/30 (80)	0/2
Ponape	0/50	1/50 (2)	34/50 (68)	0/1
Kapingamarangi	1/50 (2)	0/50	11/50 (22)	0/0
Majuro	1/50 (2)	8/50 (16)	44/50 (88)	2/8 (25)
Nauru	0/50	8/50 (16)	37/50 (74)	1/8 (13)
Kiribati	0/50	16/50 (32)	41/50 (82)	13/16 (81)
Polynesia				
Tuvalu	0/28	2/28 (7)	23/28 (82)	1/2 (50)
Tahiti	0/50	1/50 (2)	27/50 (54)	0/1
Melanesia				
Papua N. G.	4/50 (8)	3/50 (6)	43/50 (86)	1/3 (33)
Vanuatu	18/93 (19)	37/92 (40)	64/92 (70)	0/12
Total	25/647 (4)	83/646 (13)	427/646 (66)	19/58 (33)

immunofluorescence (IF) and ELISA. It has been shown that the IF and ELISA tests detect antibodies to different antigens and in general IF will produce more antibody positives than ELISA (Aoki *et al.* 1985). A survey in 1983 which looked at 182 sera from the Solomons found only two positive, at low titre, for antibodies to HTLV-1 (Hinuma *et al.* 1983).

The seroepidemiology of hepatitis B virus infection has been studied in detail throughout South-East Asia and the Pacific. The prevalence rates determined in this report are comparable with recent findings in the Philippines (Lingao *et al.* 1986), Micronesia (Wong, Purcell & Rosen, 1979), Polynesia (Gust, Lehmann & Dimitrakakis, 1979) and Papua New Guinea (Hawkes *et al.* 1981).

Only recently has the pattern of hepatitis delta infection in the Pacific and South-East Asia been studied. A seroepidemiological study of HBV infection in a rural population in the Philippines found only 4% of HBsAg individuals to be HDV antibody positive (Lingao *et al.* 1986). HDV infection has been recorded in Nauru, Niue and Western Samoa (Gust, 1984) and Fiji (Dimitrakakis, Crowe & Gust, 1986). It is however surprising to find the high prevalence of infection with HDV in Micronesia and particularly in Kiribati. Over 80% of the HBsAg-positive samples from Kiribati and nearly 48% of the population tested were anti-HDV positive. These are levels of infection rarely seen outside groups of very high risk individuals (Ponzetto *et al.* 1985). Comparable levels of HDV infection have frequently been associated with outbreaks of hepatitis often with a high mortality (Hadler *et al.* 1984) but this does not seem to be the pattern in Kiribati. More detailed studies of this unusual population are being undertaken.

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