Table 1. Amino acid sequences of the V3 region of HIV and antibody titers of HIV-infected subjects in Bangkok.

Patient no.	Amino acid sequence	Antibody titers by (ELISA) Thai A	Thai B	HGP-30	Route of infection
1	CTRPSNNTRTSITIGPGQVFYRTGDIIGDIRKAYC	>6400	<200	200	Heterosexual intercourse
2	----------	1600	800	800	Heterosexual intercourse
3	----------	>6400	<200	200	Drug injection
4	----------	6400	400	<200	Heterosexual intercourse
5	----------P----------	>6400	400	1600	Heterosexual intercourse
6	----------A----------	6400	800	1600	Heterosexual intercourse
7	----------P-----A----------	>6400	>6400	800	Heterosexual intercourse
8	----------P-----A----------	6400	1600	200	Heterosexual intercourse
9	----------A-----E---------	6400	3200	3200	Heterosexual intercourse
10	----------L------A-------T---------	6400	3200	800	Heterosexual intercourse
11	----------V------A-------T-N------	6400	200	200	Drug injection
12	----------M----A-V------T-N------	200	400	<200	Homosexual intercourse
13	----------LP-----A-------T---------	6400	400	400	Drug injection
14	--------M----------V-------N------	6400	800	200	Heterosexual intercourse
15	----------Q-M-------V-----T--------	3200	200	1600	Heterosexual intercourse
16	CTRPNNNTRKSIHLGPGQAWYTTGQIIGDIRQAHC	800	3200	800	Heterosexual intercourse
17	----------	3200	6400	400	Heterosexual intercourse
18	----------	1600	3200	800	Heterosexual intercourse
19	----------	3200	>6400	1600	Heterosexual intercourse
20	----------V-F-----D----------	1600	3200	800	Heterosexual intercourse
21	----------G----------V-----R----------	800	3200	800	Heterosexual intercourse

K. Okuda, H. Bukawa, S. Kawamoto, M. Imai, T. Saito, P. Phanuphak, and K. Hamajima

Department of Bacteriology, Yokohama City University, School of Medicine, and Kanagawa Prefectural Public Health Laboratories, Yokohama, Japan; Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

References

1. Weniger BG, Limpakarnjanarat K, Ungchusak K, et al. The epidemiology of HIV infection and AIDS in Thailand. AIDS **1991**;5:S71–85.
2. LaRosa GJ, Davide JP, Weinhold K, et al. Conserved sequence and structural elements in the HIV-1 principal neutralizing determinant. Science **1990**;249:932–5.
3. Inami S, Taniguchi N, Ishibashi K, et al. Serum antibody directed against synthetic peptides derived from HIV-1 protein sequence obtained from 26 Japanese HIV-1–infected individuals. AIDS **1991**;5:1140–1.
4. Okuda K. Strong synergistic effects of polyvalent vaccine using synthetic peptides for human immunodeficiency virus. AIDS Res Hum Retroviruses (in press).
5. Myers G, Korber B, Berzofsky JA, Smith RF, Database and Analysis Staff, eds. Human retroviruses and AIDS 1991: a compilation and analysis of nucleic acid and amino acid sequences. Los Alamos, NM: Los Alamos National Laboratory, Theoretical Division, **1991**.
6. Oram JD, Downing RG, Roff M, et al. Sequence analysis of the V3 loop regions of the *env* genes of Ugandan human immunodeficiency proviruses. AIDS Res Hum Retroviruses **1991**;7:605–14.
7. Achour A, Picard O, Zagury D, et al. HGP-30, a synthetic analogue of human immunodeficiency virus (HIV) p17, is a target for cytotoxic lymphocytes in HIV-infected individuals. Proc Nat Acad Sci USA **1990**;87:7045–9.
8. Ou CY, Takebe Y, Weniger B, et al. Independent introduction of two major HIV-1 genotypes into two distinct high-risk populations in Thailand. Lancet **1993**;341:1171–4.
9. Okuda K, Kaneko T, Yamakawa T, et al. Strong immunogenicity of a multicomponent peptide vaccine developed with the branched lysine oligopeptide (BLO) method for human immunodeficiency virus (HIV-1) infection. J Mol Recognit (in press).

Control of a Hepatitis A Outbreak by Active Immunization of High-Risk Susceptible Subjects

Colleagues—Hepatitis A is an enterically transmitted disease whose prevalence is related to economic development. In Thailand, which is rapidly developing into an industrialized nation, there has been a rapid decline in anti-hepatitis A virus (HAV) seroprevalence among persons <20 years old, rendering a substantial percentage susceptible to disease [1, 2]. This has resulted in numerous recent outbreaks of hepatitis A among young Thai adults. Control of such outbreaks has previously depended on the use of immune globulin, which provides only short-term protection and no public health benefit. Therefore, we investigated the feasibility of actively vaccinating seronegative susceptible subjects as a means to control hepatitis A. The vaccine selected for use was a novel "virosome" formulation that has previously been found to elicit rapid seroconversion (97%–100% by 14 days after immunization) after a single dose [3].

All subjects gave informed consent, and the study was approved by the ethical committee of Chulalongkorn University, Bangkok.

Reprints or correspondence: Dr. S. J. Cryz, Jr., Swiss Serum and Vaccine Institute, P.O. Box 2707, CH-3001 Berne, Switzerland.

The Journal of Infectious Diseases 1994;169:228–9

0022–1899/94/6901–0042$01.00

An outbreak of hepatitis A occurred among a class of 61 radiology students at Chulalongkorn Hospital. The index case became infected after exposure as part of her clinical duties to a child with acute disease. About 2 weeks later, two classmates presented with fever, anorexia, and jaundice. Both were diagnosed as having hepatitis A by a positive anti-HAV IgM antibody test (Abbott Laboratories, Abbott Park, IL). The remaining students were immediately tested for anti-HAV antibodies with 26 (13 male, 13 female; mean age, 19.5 years) found to be seronegative and therefore susceptible.

All 26 subjects received a single intramuscular dose of vaccine. Mild, transient local reactions, characterized by tenderness at the injection site, were reported by 42% of the vaccinees. The immune response was measured by an IgG-specific ELISA [3]. All subjects were seropositive (≥20 mIU/mL) at 1 and 6 months after vaccination, with geometric mean titers of 432 and 463 mIU/mL, respectively. There was no clinical evidence of active hepatitis A in this group. Liver function test results remained within normal ranges over the 6-month observation period. Therefore, the use of a hepatitis A vaccine in high-risk subjects appeared to be effective at preventing disease spread.

Hepatitis A vaccines have recently become commercially available in several countries. On the basis of these promising results, their use, either alone or in combination with immune globulin, should be considered as a means to control outbreaks or epidemics of hepatitis A.

Y. Poovorawan, A. Tieamboonlers, S. Chumdermpadetsuk, R. Glück, and S. J. Cryz, Jr.

Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand; Swiss Serum and Vaccine Institute, Berne, Switzerland

References

1. Innis B, Snitbhan JR, Hoke C, Munindhorn W, Laorakpongxe T. The declining transmission of hepatitis A in Thailand. J Infect Dis 1991;163:989–95.
2. Poovorawan Y, Tieamboonlers A, Chumdermpadetsuk S. Changing seroepidemiology of hepatitis A virus infection in Thailand. Southeast Asian Trop Med Public Health 1993;24:250–4.
3. Glück R, Mischler R, Brantschen S, Just M, Althaus B, Cryz SJ Jr. Immunopotentiating reconstituted influenza virus virosome vaccine delivery system for immunization against hepatitis A. J Clin Invest 1992;90:2491–5.

Hepatitis E Virus and Posttransfusion Hepatitis

Colleagues—Since the cloning of hepatitis E virus (HEV) and the development of an ELISA [1], many seroepidemiologic studies have been reported [2–4]. Recent studies of human volunteer and animal experiments have revealed viremic status [5, 6]. Therefore, the possibility of transfusion-related HEV infection has been considered [5]. In a prospective study of posttransfusion hepatitis (PTH) in Taiwan, we have encountered 6 patients with non-A, non-B, non-C hepatitis [7]. Accordingly, we used the HEV nested polymerase chain reaction (PCR) and an ELISA to study the role of HEV in these patients.

Six patients developed PTH in a prospective study [7]. They received blood or blood components from donors negative for hepatitis B virus (HBV) surface antigen and with serum alanine aminotransferase (ALT) <45 IU/L [7]. They were negative by serology for IgM antibodies to the following: hepatitis A virus, HBV core antigen, cytomegalovirus, Epstein-Barr virus, hepatitis C virus (HCV), and hepatitis D virus. Sera were also negative for HBV DNA and HCV RNA by PCR [7]. Subjects were natives of Taiwan and had no history of traveling abroad prior to disease onset. There were 4 men and 2 women with mean age of 42 years (range, 20–68), mean peak ALT of 286 IU/L (range, 102–537), and mean incubation period of 63 days (range, 15–126). All patients recovered within 3 months, and none had evidence of chronicity in 3–5 years of follow-up. Serial serum samples of these 6 patients were tested in duplicate for HEV antibodies by ELISA (Diagnostic Biotechnology, Singapore) [3] and for HEV RNA by PCR. RNA from 100 μL of serum was extracted [7], reverse-transcribed into cDNA, and amplified by nested PCR using primers as previously described [8].

All 6 patients were negative for HEV RNA by PCR. By ELISA, all the pretransfusion samples were negative. However, positive results were found in 2 sera of a patient (6 and 9 months after transfusion) and in 3 sera of another patient (3, 4, and 8 months after transfusion). The cutoff values of these 5 samples were between 1.8 and 3.4. The other serial specimens were negative.

Transmission of HEV has been documented by the fecal-oral route [8]. Although the possibility of HEV infection resulting from transfusion of HEV-containing blood has been raised, screening of ALT should reduce the possibility, as HEV viremia appears only at the acute stage of infection [5, 6]. Therefore, it was reasonable that none of our patients were infected with HEV. This might be another reason for ALT screening after antibodies to HCV have appeared. It is now well known that anti-HEV IgG is long-lasting once it appears [2, 5, 6]. In the 5 seropositive samples, because of the negative PCR results and because the appearance of HEV antibody was not consistent, these results were considered to be falsely positive. Therefore, the interpretation of current HEV ELISA results should be cautious as to clinical and seroepidemiologic diagnosis until confirmatory tests are available.

Reprints or correspondence: Dr. Jin-Town Wang, Dept. of Internal Medicine, National Taiwan University Hospital, 1 Chang-Te St., Taipei, Taiwan, Republic of China.

The Journal of Infectious Diseases 1994;169:229–30

0022–1899/94/6901–0043$01.00

Jin-Town Wang, Jaw-Town Lin, Jin-Chuan Sheu, Teh-Hong Wang, and Ding-Shinn Chen

Department of Internal Medicine, National Taiwan University Hospital, Taipei, Republic of China