

REFERENCES

- 1 Brockelman WY. Recent events. Thai gibbon PHVA workshop. Nat Hist Bull Siam Soc 1994;42 :23-26.
- 2 Tunhikorn S, Brockelman W, Tilson R, Nimmanheminda U, Ratanakorn P, Cook R. *et al.* Population and Habitat Viability Analysis Report for Thai Gibbons : *Hylobates lar* and *H. pileatus*. IUCN/SSC Conservation Breeding Specialist Group 1994. Minnesota : Apple Valley.
- 3 Mimms LT, Solomon LR, Ebert JW, Fields H. Unique preS sequence in a gibbon-derived hepatitis B virus variant. Biochem Biophys Res Commun 1993;195 : 186-191.
- 4 Kalter SS, Heberling RL, Cooke AW, Barry JD, Tian PY, Northam WJ. Viral infections of nonhuman primates. Lab Anim Sci 1997;47:461-467.
- 5 Lanford RE, Chavez D, Rico-Hesse R, Mootnick A. Hepadnavirus infection in captive gibbons. J Virol 2000;74 :2955-2959.
- 6 White DO, Fenner FJ. Medical Virology 1994. New York : Academic Press.
- 7 Lee WM. Hepatitis B virus infection. N Engl J Med 1997;337:1733-1745.
- 8 Ganem D. *Hepadnaviridae*. In B.N. Fields, D.M. Knipe and P.M. Howley (ed). Fields Virology 1996:pp 2703-2737. Philadelphia : Lippincott-Raven.
- 9 Neurath AR, Kent SBH, Strick N, Parker K. Identification and chemical synthesis of a host cell receptor binding site on hepatitis B virus. Cell 1986;46:429-436.
- 10 Pontisso P, Petit MA, Bankowski MJ, Peeples ME. Human liver plasma membranes contain receptor for the Hepatitis B virus Pre-S1 region and, via polymerized human serum albumin, for the Pre-S2 region. J Virol 1989;63:1981-1988.
- 11 Gripon P, Diot C, Theze N, Fourel I, Loreal O, Brechot C. *et al.* Hepatitis B virus infection of adult human hepatocytes cultured in the presence of dimethyl sulfoxide. J Virol 1988;62:4136-4143.
- 12 Galle PR, Hagelstein J, Kommerell B, Volkman M, Schranz P, Zentgraf H. *In vitro* experimental infection of primary human hepatocytes. Gastroenterology 1994;106:664-673.

- 13 Vaudin M, Wolstenholme AJ, Tsiquaye KN, Zuckerman AJ, Harrison TJ. The complete nucleotide sequence of the genome of a hepatitis B virus isolated from a naturally infected chimpanzee. J Gen Virol 1988;69:1383-1389.
- 14 Grethe S, Heckel JO, Rietschel W, Hufert FT. Molecular epidemiology of hepatitis B virus variants in nonhuman primates. J Virol 2000;74: 5377-5381.
- 15 Warren KS, Heeney JL, Swan RA, Heriyanto and Verschoor EJ. A new group of hepadnaviruses naturally infecting orangutans (*Pongo pygmaeus*). J Virol 1999;73:7860-7865.
- 16 Mahoney FJ, Mark K. Hepatitis B Vaccine. In Stanley A. Plotnick and Walter A. Orenstein (eds). Vaccines 1999: pp 159-182. Philadelphia : W.B. Saunders Company.
- 17 Scott RM, Snitbhan R, Bancroft WH, Alter HJ, Tingpalapong M. Experimental transmission of hepatitis B virus by semen and saliva. Infect Dis 1980;142:67-71.
- 18 Lurman A. Eine icterus Epidemic. Berlin Klin. Wochenschr. 1885;22:20-23.
- 19 MacCallum FO, Bauer DJ. Homologous serum hepatitis. Lancet 1947;ii:691-692.
- 20 Blumberg BS, Alter HJ, Visnich S. A new antigen in leukemia sera. JAMA 1965;191:541-546.
- 21 Prince AM. An antigen detected in the blood during the incubation period of serum hepatitis. Proc Natl Acad Sci USA 1968;60:814-821.
- 22 Magnus LO, Espmark JA. New specificities in Australian antigen-positive sera distinct from Le Bouvier determinations. J Immunol 1972;109:1017-1021.
- 23 Hoofnagle JH, Gerety RJ, Backer LF. Antibody to hepatitis B virus core in man. Lancet 1973;20:869-873.
- 24 Dane DS, Cameron CH, Briggs M. Virus-like particles in serum of patients with Australian-antigen associated hepatitis. Lancet 1970;i:695-698.
- 25 Tiollais P, Pourcel C, Dejean A. The hepatitis B virus. Nature 1985;317:489-495.
- 26 Kaan M, Gerlich WH. Replication of hepatitis B virus, In T.J. Harrison and A.J.Zuckerman (ed.). The molecular medicine of viral hepatitis. 1997:pp 63-116. New York : John Wiley& Sons.

- 27 Buendia MA, Paterlini P, Tiollais P, Brechot C. In: Zuckerman A., Thomas H. (eds). Viral Hepatitis 1993. London :Churchill Livingstone
- 28 Sattler F, Robinson WS. Hepatitis B viral DNA molecules have cohesive ends. J Virol 1979;32:226-233.
- 29 Molnar-Kimber KL, Summers JW, Mason WS. Mapping of the cohesive overlap of duck hepatitis B virus DNA and of the site of initiation of reverse transcription. J Virol 1984;51:181-191.
- 30 Lau JYN, Wright TL. Molecular virology and pathogenesis of hepatitis B. Lancet 1993;342:1335-1340.
- 31 Summers J, Mason WS. Replication of the genome of a hepatitis B-like virus by reverse transcription of an RNA intermediate. Cell 1982;29:403-415.
- 32 Tuttleman JS, Pugh JC, Summers JW. In vitro experiment infection of primary duck hepatocyte cultures with duck hepatitis B virus. J Virol 1986;58:17-25.
- 33 Gong ZJ, De Meyer S, Roskams T, van Pelt JF, Soumillion A, Crabbe T, *et al.* Hepatitis B virus infection in microcarrier-attached immortalized human hepatocytes cultured in molecularporous membrane bags; a model for long-term episomal replication of HBV. J Viral Hepat 1998;5:377-387.
- 34 Pollack JR, Ganem D. An RNA stem-loop structure directs hepatitis B virus genomic RNA encapsidation. J Virol 1993;67:3254-3263.
- 35 Hirsch RC, Loeb DD, Pollack JR, Ganem D. Cis-acting sequences required for encapsidation of duck hepatitis B virus pregenomic RNA. J Virol 1991;65: 3309-3316.
- 36 Miller RH, Tran CT, Robinson WS. Hepatitis B virus particles of plasma and liver contain viral DNA-RNA hybrid molecules. Virology 1984;39:53-63.
- 37 McMahon BJ, Alward WL, Hall DB, Heyward WL, Bender TR, Francis DP, *et al.* Acute hepatitis B virus infection : relation of age to the clinical expression of disease and subsequent development of the carrier state. J Infect Dis 1985;151:599-603.
- 38 CDC. "The Pink Book" Epidemiology and Prevention of Vaccine-Preventable Diseases 1999.

- 39 Farber E, Phillips FT, Kaufman WA. Pathogenesis of Liver Disease 1987. Los Angeles: Williams and Wilkins.
- 40 Alter HJ, Purcell RH, Gerin JL, London WT, Kaplan PM, McAuliffe VJ. *et al.* Transmission of Hepatitis B Surface Antigen-Positive Saliva and Semen. Infect Immun 1977;16:928-933.
- 41 Davison F, Alexander GJ, Trowbridge R, Fagan EA, Williams R. Detection of Hepatitis B Virus DNA in Spermatozoa, Urine, Saliva and Leucocytes of Chronic HBsAg Carriers. J Hepatol 1987;4:37-44.
- 42 Grabow WO, Prozesky OW, Applebaum PC, Lecatsas G. Absence of Hepatitis B Antigens from Feces and Sewage as a Result of Enzymatic Destruction. J Infect Dis 1975;131: 658-664.
- 43 Bond WW, Favero MS, Petersen NJ, Gravelle CR, Ebert JW, Maynard JE. Survival of Hepatitis B Virus After Drying and Storage for One Week. Lancet 1981;1:550-551.
- 44 Lok AS, Lai CL, Wu PC, Wong VC, Yeoh EK, Lin HJ. Hepatitis B virus infection in Chinese families in Hong Kong. Am J Epidemiol 1987;126:492-499.
- 45 Steven CE, Neurath RA, Beasley RP, Szmuness W. HBeAg and anti-HBe detection with radioimmunoassay: correlation with vertical transmission of hepatitis B virus in Taiwan. J Med Virol 1979;3:237-241.
- 46 Beasley RP, Hwang LY. Postnatal infectivity of hepatitis B surface antigen-carrier mothers. J Infect Dis 1983;147:185-190.
- 47 Mosley JW. The Epidemiology of Viral Hepatitis: An Overview. Am J Med Sci. 1975;270 : 253-270.
- 48 Mahoney FJ. Update on diagnosis, management, and prevention of hepatitis B virus infection. Clin Microbiol Rev 1999;12 :351-366.
- 49 Hadler SC, Margolis HS. Epidemiology of hepatitis B virus infection 1993. New York : Marcel Dekker Inc.
- 50 Sung JL. Hepatitis B eradication strategy for Asia. Vaccine 1990;8 Suppl:S95-99.
- 51 Gust ID. Epidemiology of hepatitis B infection in the Western Pacific and South East Asia. Gut 1996;38(suppl 2): S18-S23.

- 52 Le Bouvier GL. The heterogeneity of Australian antigen. J Infect Dis 1971;123: 671-675.
- 53 Courouce AM, Holland PV, Muller JY, Soulier JP. HBsAg subtypes 1976; vol 42 Bibl Hematol, Basel, Karger.
- 54 Magnus L, Kaplan L, Vyas GN, Perkins HA. A new virus-specified determinant of hepatitis B surface antigen. Acta Pathol Microbiol Scand 1975;83B:295-297.
- 55 Courouce-Pauty AM, Lemaire JM, Roux JF. New hepatitis B surface antigen subtypes inside the *ad* category. Vox Sang 1978;35:304-308.
- 56 Magnus LO, Norder H. Subtypes, genotypes and molecular epidemiology of hepatitis B virus AS reflected by sequence variability of the S-gene. Intervirology 1995;38:24-34.
- 57 Stuyver L, Gendt SD, Geyt CV, Zoulim F, Fried M, Schinazi RF, *et al.* A new genotype of hepatitis B virus : complete genome and phylogenetic relatedness. J Gen Virol 2000;81:67-74.
- 58 Merican I, Guan R, Amarapukar D, Alexander MJ, Chutaputti A, Chien RN, *et al.* Chronic hepatitis B virus infection in Asian countries. J Gastroenterol Hepatol 2000;15:1356-1361.
- 59 Theamboonlers A, Tangkijvanich P, Pramoolsinsap C, Poovorawan Y. Genotypes and subtypes of hepatitis B virus in Thailand. Southeast Asian J Trop Med Public Health 1998;29:786-91.
- 60 Andre F. Hepatitis B epidemiology in Asia, the Middle East and Africa. Vaccine. 2000;18: S20-22.
- 61 Tyler KL, Fields BN. Pathogenesis of viral infection. In Fields BN, Knipe DM (eds). Fields Virology 1990 :pp 469-502. New York : Raven Press Inc.
- 62 Leenders WP, Hertogs K, Moshage H, Yap SH. Host and tissue tropism of hepatitis B virus. Liver 1992;12: 51-55.
- 63 De meyer S , Gong Z , Depla E , Maertens G, Yap SH. Involvement of phosphatidylserine and non-phospholipid components of the hepatitis B virus envelope in human Annexin V binding and in HBV infection in vitro. J Hepatol 1999;31: 783-790.

- 64 Guidotti LG, Matzke B, Schaller H, Chisari FV. High level hepatitis B virus replication in transgenic mice. J virol 1995;69: 6158-6169.
- 65 Imai M, Yanase Y, Nojiri T, Miyakawa Y, Mayumi MA. A receptor for polymerized human and chimpanzee albumin on hepatitis B virus particles co-occurs with HBeAg. Gastroenterology 1979;76:242-247.
- 66 Ishihara K, Waters JA, Pignatelli M, Thomas HC. Characterization of the polymerized and monomeric human serum albumin binding sites on hepatitis B surface antigen. J Med Virol 1987;21: 89-95.
- 67 Machida A, Kishimoto S, Ohnuwa H, Miyamoto H, Baba K, Oda K. *et al.* A hepatitis B surface antigen polypeptide (P31) with the receptor for polymerized human as well as chimpanzee albumins. Gastroenterology 1983;85:268-274.
- 68 Trevisan A, Gudat F, Guggenheim R, Krey G, Durmuller U, Luond G. *et al.* Demonstration of albumin receptors on isolated human hepatocytes by light and scanning electron microscopy. Hepatology 1982;2 : 832-835.
- 69 Neurath AR, Kent SB, Parker K, Prince AM, Strick N, Brotman B. *et al.* Antibodies to a synthetic peptide from the PreS 120-145 region of the hepatitis B virus envelope are virus neutralizing. Vaccine 1986;4 : 35-37.
- 70 Yu MW, Finlayson JS, Shih JW. Interaction between various polymerized human albumins and hepatitis B surface antigen. J Virol 1985;55:736-743.
- 71 Thung SN, Wang DF, Fasy TM, Hood A, Gerber MA. Hepatitis B surface antigen binds to human serum albumin cross-linked by transglutaminase. Hepatology 1989;9:726-730.
- 72 Pontisso P, Ruvoletto MG, Gennaro R, Tiribelli C, Alberti A. Functional and immunological similarities between hepatitis B virus envelope protein and human IgA. Hepatology 1991;14:117A-277 (Abstract)
- 73 Pontisso P, Morsica G, Ruvoletto MG, Zambello R, Colletta C, Chemello L. *et al.* Hepatitis B virus binds to peripheral blood mononuclear cells via the PreS1 proteins. J Hepatol 1991;12: 203-206.
- 74 Neurath AR, Strick N, Kent SB, Parker K, Seto B, Girard M. Design of synthetic peptides mimicking the immunological and biologic functions of the PreS1

- sequence of the hepatitis B virus envelope protein. In: Ginsberg H, Brown F, Lerner RA, Chanak RM (eds). Vaccine 88 1988:pp 229-234. New York : Cold Spring Harbor.
- 75 Thorn ton GB, Moriarty AM, Millich DR, Eichberg JW, Purcell RH, Gerin JL. Protection of chimpanzees from hepatitis B virus infection after immunization with synthetic peptides : identification of protective epitopes in the PreS region. In: Lerner RA, Ginsberg H, Chanak RM, Brown F (eds.) Vaccine 89 1989:pp 467-472. New York : Cold Spring Harbor.
- 76 Leenders WP, Glandbeek HL, de Bruin WC, Yap SH. Binding of the major and large HBsAg to human hepatocytes and liver plasma membrane : putative external and internal receptors for infection and secretion of hepatitis B virus. Hepatology 1990;12:141-147.
- 77 Hertogs K, Leenders WP, Depla E, de Bruin WC, Meheus L, Raymackers J, *et al.* Endonexin (II), present on human liver plasma membranes, is a specific binding protein of small hepatitis B virus (HBV) envelope protein. Virology 1993;197:549-557.
- 78 Paran N, Geiger B, Shaul Y. HBV infection of cell culture : evidence for multivalent and cooperative attachment. EMBO. 2001;20: 4443-4453.
- 79 Prince AM, Ikram H, Hopp TP. Hepatitis B virus vaccine: identification of HBsAg/a and HBsAg/d but not HBsAg/y subtype antigenic determinants on a synthetic immunogenic peptide. Proc Natl Acad Sci USA 1982;79:579-582.
- 80 Bhatnagar PK, Papas E, Blum HE, Milich DR, Nitecki D, Karels MJ. *et al.* Immune response to synthetic peptide analogues of hepatitis B surface antigen specific for the a determinant. Proc Natl Acad Sci USA. 1982;79:4400-4404.
- 81 Howard C, Smith Stinh HJ, Brown SE, Steward MW. In Zuckerman A (ed). Toward the development of a synthetic hepatitis B virus. Viral Hepatitis and liver disease 1988. New York : Alan R Liss.
- 82 Plotkin SA, Orenstein WA. Vaccines 3rd edition. 1994. Philadelphia : W.B. Saunders Company.

- 83 Valenzuela P, Medina A, Rutter WJ, Ammerer G, Hall BD. Synthesis and Assembly of Hepatitis B Virus Surface Antigen Particles in Yeast. Nature 1982;298:347-50.
- 84 Da Villa G, Piccinino F, Scolastico C, Fusco M, Piccinino R, Sepe A. Long-Term epidemiological survey of hepatitis B virus infection in a Hyperendemic area (Afragola, southern Italy): Results of a pilot vaccination program. Res Virology 1998;149: 263-270.
- 85 Hallauer J. VHPB: summary of strategies and recommendations. Vaccine 1995;13: S61-63.
- 86 Michel ML, Pontisso P, Sobczak E, Malpiece Y, Streeck RE, Tiollais P. Synthesis in animal cells of hepatitis B surface antigen particles carrying a receptor for polymerized human serum albumin. Proc Natl Acad Sci USA 1984;81:7708-7712.
- 87 Pride MW, Bailey CR, Muchmore E, Thanavala Y. Evaluation of B and T-cell responses in chimpanzees immunized with Hepagene, a hepatitis B vaccine containing pre-S1, pre-S2 gene products. Vaccine 1998;16:543-550.
- 88 Waters JA, Bailey C, Love C, Thomas HC. A study of the antigenicity and immunogenicity of a new hepatitis B vaccine using a panel of monoclonal antibodies. J Med Virol 1998;54:1-6.
- 89 Couillin I, Pol S, Mancini M, Driss F, Brechot C, Tiollais P, *et. al.* Specific vaccine therapy in chronic hepatitis B: Induction of T cell proliferative responses specific for envelope antigens. J Inf Dis 1999;180:15-26.
- 90 CDC. Hepatitis B virus: a comprehensive strategy for eliminating transmission in the United States through universal childhood vaccination. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1991;40:1-25.
- 91 CDC. Immunization of adolescents. Recommendations of the Advisory Committee on Immunization Practices, the American Academy of Pediatrics, the American Academy of Family Physicians, and the American Medical Association. MMWR 1996;45:1-16.

- 92 Peter G (ed.) Red Book: Report of the Committee on Infectious Diseases 24th ed. 1997. Elk Grove Village, IL: American Academy of Pediatrics.
- 93 Summers J, Smolec JM, Snyder R. A virus similar to human hepatitis virus associated with hepatitis and hepatoma in woodchucks. Proc Natl Acad Sci USA. 1978;75: 4533-4537.
- 94 Marion PL, Oshiro LS, Regnery DC, Scullard GH, Robinson WS. A virus in Beechey ground squirrels that is related to hepatitis B virus of humans. Proc Natl Acad Sci USA 1980;77:2941-2945.
- 95 Mason WS, Seal G, Summers J. Virus of Pekin ducks with structural and biological relatedness to human hepatitis B virus. J Virol 1980;36:829-836.
- 96 Lanford RE, Chavez D, Brasky KM, Burns RB 3rd, Rico-Hesse R. Isolation of a hepadnavirus from the woolly monkey, a New World primate. Proc Natl Acad Sci USA 1998;95:5757-5761.
- 97 Norder H, Ebert JW, Fields HA, Mushahwar IK, Magnius LO. Complete sequencing of a gibbon hepatitis B virus genome reveals a unique genotype distantly related to the chimpanzee hepatitis B virus. Virology 1996; 218:214-223.
- 98 Ryu CJ, Cho DY, Gripon P, Kim HS, Guguen-Guillouzo C, Hong HJ. An 80-kilodalton protein that binds to the preS1 domain of hepatitis B virus. J Virol 2000;74:110-116.
- 99 MacDonald DM, Holmes EC, Lewis JC, Simmonds P. Detection of hepatitis B virus infection in wild-born chimpanzees (*Pan troglodytes verus*): phylogenetic relationships with human and other primate genotypes. J Virol 2000;74 :4253-4257.
- 100 Hu X, Margolis H, Purcell RH, Ebert J, Robertson B. Identification of hepatitis B virus indigenous of chimpanzees. Proc Natl Acad Sci USA. 2000;97: 1661-1664.
- 101 Theamboonlers A, Jantaradsamee P, Kaew-In N, Tanakijvanich P, Hirsh P, Poovorawan Y. The predominant genotypes of hepatitis B virus in Thailand. Ann Trop Med Parasitol 1999; 93:737-743.

- 102 Noppornpanth S, Sathirapongsasuti N, Chongsrisawat V, Poovorawan, Y. (2000). Detection of HBsAg and HBV DNA in serum and saliva of HBV carriers. Southeast Asian J Trop Med Public Health 2000;31:419-421.
- 103 Takahashi K, Aoyama K, Ohno N, Iwata K, Akahane Y, Baba K. *et al.* The precore/core promoter mutant (T1762A1764) of hepatitis B virus: clinical significance and an easy method for detection. J Gen Virol 1995;76:3159-64.
- 104 Lindh M, Gonzalez JE, Norkrans G, Horal P. Genotyping of hepatitis B virus by restriction pattern analysis of a pre-S amplicon. J Virol Methods 1998;72:163-174.
- 105 Heijtkink RA, Bergen P, Paulij WP, Man RA, Osterhouse ADME. Anti-HBs characteristics after hepatitis B immunisation with plasma-derived and recombinant DNA-derived vaccines. Vaccine 2000;18:1531-1538.
- 106 Seyec JL, Chouteau P, Cannie I, Guguen-Guillouzo C, Gripon P. Infection process of the hepatitis B virus depends on the presence of a defined sequence in the PreS1 domain. J Virol 1999;73:2052-2057.
- 107 Sambrook J, Fritsch EF, Maniatis T. Molecular cloning : A Laboratory Manual. 2nd ed. 1989:pp 1.32. Cold Spring Harbor : Cold Spring Harbor Laboratory Press.
- 108 Sambrook J, Fritsch EF, Maniatis T. Molecular cloning : A Laboratory Manual. 2nd ed. 1989:pp 1.25-1.28. Cold Spring Harbor : Cold Spring Harbor Laboratory Press.
- 109 Felco SD, Ruvoletto MG, Verdoliva A, Ruvo M, Raucci A, Marino M. *et al.* Cloning and expression of a novel hepatitis B virus-binding protein from HepG2 cells. J Biol Chem 2001;276:36613-36623.
- 110 Mabit H, Vons C, Dubanchet S, Capel F, Franco D, Petit MA. Primary cultured normal human hepatocytes for hepatitis B virus receptor studied. J Hepatol 1996;24:403-412.
- 111 Chen HL, Wu HL, Fon CC, Chen PJ, Lai MY, Chen DS. Long-term culture of hepatocytes from human adults. J Biomed Sci 1998;5:435-440.
- 112 Kobayashi N, Fujiwara T, Westerman KA, Inoue Y, Sakaguchi M, Noguchi H. *et al.* Prevention of acute liver failure in rats with reversibly immortalized human hepatocytes. Science 2000;287:1258-1262.

- 113 Kock J, Theilmann L, Galle P, and Schlicht HJ. Hepatitis B virus nucleic acids associated with human peripheral blood mononuclear cells do not originate from replicating virus. Hepatology 1996;23:405-413.
- 114 Fooden J, Quan G, Luo Y. Gibbon distribution in China. Acta Theriologica Sinica 1987;7:161-167.
- 115 Barbara AB. Hematology : Principles and procedures 6th ed. 1993. Philadelphia : Lea & Febiger.
- 116 Paulij WP, Wit PLM, Sunnen CMG, Roosmalen MH, Ettekoven P, Cooreman MP. *et al.* Localization of a unique hepatitis B virus epitope sheds new light on the structure of hepatitis B virus surface antigen. J Gen Virol 1999;80:2121-2126.
- 117 Kann M, Lu X, Tolle T, Gerlich WH. In Rizzetto M, Purcell RH, Gerin JL, Verme G. (eds). Late and early steps in the life cycle of hepatitis B virus. Viral Hepatitis and liver disease 1997. pp 67-72. Torino : S.P.A. Corso Bramante.
- 118 Arya SC, Pathak VP, Ashraf SJ. Type 2 hepatitis B virus (HBV-2) in carriers and patients with malignancy in Saudi Arabia. Infection 1990; 18: 215-218.
- 119 Mast EE, Alter MJ, Margolis HS. Strategies to prevent and control hepatitis B and C virus infection : a global perspective. Vaccine 1999;17:1730-1733.
- 120 Wang JS, Zhu QR. Infection of the fetus with hepatitis B e antigen via the placenta. Lancet 2000;355:989.
- 121 MacQuarrie MB, Forghani B, Wolochow DA. Hepatitis B transmitted by a human bite. JAMA 1974;230:723-724.
- 122 Stornello C. Transmission of hepatitis B via human bite. Lancet 1991;338: 1024-1025.
- 123 Heathcote J, Gateau P, Sherlock S. Role of hepatitis –B antigen carriers in non-parenteral transmission of the hepatitis-B virus. Lancet 1974;2: 370-371.
- 124 Ljunggren KK, Nordenfelt E, Kidd A. Correlation of HBeAg/anti-HBe, ALT level, and HBV DNA PCR results in HBsAg-positive patients. J Med Virol 1993;39:297-302.
- 125 Buckwold VE, Xu Z, Chen M, Yen ST, Ou JH. Effects of a naturally occurring mutation in the hepatitis B virus basal core promoter on precore gene expression and viral replication. J Virol 1996;70:5845-5851.

- 126 Moriyama K, Okamoto H, Tsuda F, Mayumi M. Reduced precore transcription and enhanced core-pregenome transcription of hepatitis B virus DNA after replacement of the precore-core promoter with sequences associated with e antigen-seronegative persistent infections. Virology 1996;226:269-280.
- 127 Lindh M, Hannoun C, Dhillon AP, Norkrans G, Horal P. Core promoter mutations and genotypes in relation to viral replication and liver damage in East Asian hepatitis B virus carriers. J infect Dis 1999;179:775-782.
- 128 Kanai K, Kako M, Aikawa T, Hino K, Tsubouchi H, Takehira Y. *et al.* Core promoter mutations of hepatitis B virus for the response to interferon in e antigen-positive chronic hepatitis B. Am J Gastroenterol 1996;91:2150-2160.
- 129 Takahashi K, Brotman B, Usuda S, Mishiro S, Prince AM. Full-genome sequence analyses of hepatitis B virus (HBV) strains recovered from chimpanzees infected in the wild: implications for an origin of HBV. Virology 2000;267:58-64.
- 130 Simmonds P. The origin and evolution of hepatitis viruses in human. J Gen Virol 2001;82:693-712.
- 131 Hahn BH, Shaw GM, Cock KM, Sharp PM. AIDS as a zoonosis : scientific and public health implications. Science 2000;287: 607-614.
- 132 Karp GC. Cell and molecular biology : concepts and experiments 1999 : pp 296-297. New York : John Wiley&Sons.
- 133 Zhang L, Cao Y, Song J. The correlation between integration of HBV X, S, Pre-S, C gene and the expression of oncogenes/tumor suppressor genes in primary hepatocellular carcinoma. Zhonghua Gan Zang Bing Za Zhi 1999; 7: 138-139. (Abstract).
- 134 Yaginuma K, Kobayashi H, Kobayashi M, Morishima T, Matsuyama K, Koike K. Multiple integration site of hepatitis B virus DNA in hepatocellular carcinoma and chronic active hepatitis tissues from children. J Virol 1987;61:1808-1813.
- 135 Nibert ML, Furlong DB, Fields BN. Mechanisms of viral pathogenesis. Distinct forms of reoviruses and their roles during replication in cells and host. J Clin Invest 1991;3:727-34.

- 136 Pugh JC, Di Q, Mason WS, Simmons H. Susceptibility to duck hepatitis B virus infection is associated with the presence of cell surface receptor sites that efficiently bind viral particles. *J Virol* 1995;69:4814-22.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



APPENDICES

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX A

MOLECULAR TECHNIQUES AND REAGENT

I. Molecular Techniques

1. Small-scale preparation of plasmid

- 1.1 Transfer a single bacteria colony in to 2 ml. of LB medium containing the appropriate antibiotic in a loosely capped 15 ml. tube. Incubate the culture overnight at 37 °C with vigorous shaking.
- 1.2 Pour 1.5 ml of the culture into a microcentrifuge tube. Centrifuge at 12,000g for 30 seconds at 4 °C. Store the remainder of the culture at 4°C.
- 1.3 Remove the medium by aspiration, leaving the bacteria pellet as dry as possible.
- 1.4 Resuspend the bacteria pellet in 100 µl of ice-cold Solution I by vigorous vortexing.

Solution I

50 mM glucose

25 mM Tris-Cl (pH 8.0)

10 mM EDTA (pH 8.0)

Solution I can be prepared in batches of approximately 100 ml., autoclaved for 15 minutes at 10 lb/sq. on liquid cycle, and stored at 4 °C

- 1.5 Add 200 ul of freshly prepared Solution II

Solution II

0.2 N NaOH (fresh diluted from a 10 N stock)

1% SDS

Close the tube tightly, and mix the contents by inverting the tube rapidly five times. Make sure that the entire surface of the tube comes in contact with Solution II. Do not vortex. Store the tube on ice.

- 1.6 Add 150 μ l of ice-cold Solution III

Solution III

5 M potassium acetate 60 ml.

glacial acetic acid 11.5 ml.

H₂O 28.5 ml.

Close the tube and mix gently in an inverted position for 10 seconds to disperse Solution III through the viscous bacterial lysate. Store the tube on ice for 3-5 minutes

- 1.7 Centrifuge at 12,000 g for 5 minutes at 4 °C in a microcentrifuge. Transfer the supernatant to a fresh tube.
- 1.8 Precipitate the double-stranded DNA with 2 volumes of ethanol at room temperature. Mix by vortexing. Allow the mixture to stand at -20 °C for 1 hour.
- 1.9 Centrifuge at 12,000 g for 15 minutes at 4 °C in a microcentrifuge
- 1.10 Remove the supernatant by gentle aspiration. Stand the tube in an inverted position on a paper towel to allow all of the fluid to drain away. Remove any drops of fluid adhering to the walls of the tubes.
- 1.11 Rinse the pellet of double-stranded DNA with 1 ml. of 70% ethanol at 4 °C. Remove the supernatant as described in step 1.9 and 1.10, and allow the pellet of nucleic acid to dry in the air for 10 minutes.
- 1.12 Redissolve the nucleic acids in 50 μ l of TE (pH8.0) containing DNAase-free pancreatic Rnase (20 μ g/ml). Vortex briefly, stored the DNA at -20 °C.
2. Rapid disruption of bacterial colonies to test the size of plasmids
- 2.1 Grow bacteria colonies on rich agar medium (LB or SOB) containing the appropriate antibiotic until they are approximately 1 mm in diameter.
- 2.2 Using a sterile toothpick or disposable loop, transfer a small segment of a bacterial colony to a streak or patch on a master agar plate containing the appropriate antibiotic. When all of the colonies have been replicated in this fashion, incubate the master place for several

hours at 37 °C and then store it at 4 °C until it is needed to recover the appropriate colonies.

- 2.3 Transfer the remainder of each colony from the original plate to a sterile microcentrifuge tube containing LB medium (about 800 µl) and incubate the culture 6 hours at 37 °C with vigorous shaking.
 - 2.4 Pour 300 µl of the culture into a microcentrifuge tube. Centrifuge at 12,000g for 30 seconds at 4 °C. Store the remainder of the culture at 4°C.
 - 2.5 Remove the medium by aspiration, leaving the bacteria pellet as dry as possible.
 - 2.6 Resuspend the bacteria pellet in 50 µl of a sterile solution of 10 mM EDTA (pH 8.0).
 - 2.7 Add 50 µl of a freshly made solution of 0.2 N NaOH, 0.5% NaOH, 0.5% SDS, 20% sucrose. Vortex the mixture for 30 seconds.
 - 2.8 Incubate the mixture for 5 minutes at 70 °C, and then allow it to cool to room temperature.
 - 2.9 Add 1.5 µl of a solution of 4 M KCl and 0.5 µl of a solution containing 0.4% bromophenol blue. Vortex the mixture for 30 seconds.
 - 2.10 Incubate the mixture for 5 minutes on ice.
 - 2.11 Remove bacterial debris by centrifugation at 12,000g for 3 minutes at 4 °C in a microcentrifuge.
 - 2.12 Load 50 µl of the supernatant into a slot case in a 0.8% agarose gel.
 - 2.13 After the dye has migrated two thirds to three fourths the length of the gel, stain the gel by soaking it for 10-15 minutes in a solution of ethidium bromide (0.5 µg/ml in water) at room temperature.
3. Fill-in and dephosphorylation of linearized plasmid DNA
 - 3.1 Digest closed circular plasmid DNA (10-20 µg) with a two- to threefold excess of the desired restriction enzyme for 1 hour. Remove an aliquot (0.3 µg), and analyzed the extent of digestion by electrophoresis through a 0.8% agarose gel, using undigested

plasmid DNA as a marker. If digestions incomplete, add more restriction enzyme and continue the incubation.

- 3.2 When digestion is complete, extract the sample with phenol:chloroform and precipitate the DNA with 2 volumes of ethanol for 15 minutes at -20°C . Recover the DNA by centrifugation at 12,000g for 15 minutes at 4°C in a microcentrifuge, and redissolve it in 90 μl of 10 mM Tris-HCl (pH 8.3). Remove an aliquot of the DNA (200 ng) and store it at -20°C .
- 3.3 To fill in sticky ends of digested DNA, adding Klenow polymerase enzyme and incubate at room temperature for 10 minutes.

Digested DNA	1 μg
Klenow 5x buffer	10 μl
1 mg/ml acetylated BSA	1 μl
2 mM dNTP	1 μl
Klenow polymerase	1-5 U
Sterile H_2O to a final volume of 50 μl	

After incubation, extract DNA once with phenol and once with phenol:chloroform. Add 0.1 volume of 3 M sodium acetate (pH 7.0). Mix well, and add 2 volumes of ethanol. Mix well, and store at -20°C for 15 minutes. Recover the DNA by centrifugation at 12,000 g for 10 minutes at 4°C in a microcentrifuge. Wash the pellet with 70% ethanol at 4°C and recentrifuge. Redissolve the precipitated DNA in 50 μl TE buffer (pH 8.0).

- 3.4 To the filling in of the DNA, add 10 μl of 10x CIP (Calf intestinal alkaline phosphatase) dephosphorylation buffer and the appropriate amount of CIP and incubate under the appropriate conditions.

10X CIP dephosphorylation buffer
10 mM ZnCl_2
10 mM MgCl_2
100 mM tris-HCl (pH 8.3)

Amount of CIP required 1 unit / 2 pmoles of 5'-terminal phosphate residues DNA and incubate 15 minutes at 37 °C. Then add another aliquot of CIP and continue incubation for a further 45 minutes at 55 °C. (2 µg of a linearized plasmid DNA 5 kb in length contains approximately 1.2 pmoles of 5'-terminal phosphate residues)

- 3.5 At the end of the incubation period, add SDS and EDTA (pH 8.0) to final concentrations of 0.5% and 5 mM, respectively. Mix well, and add proteinase K to a final concentration of 100 µg/ml. Incubation for 30 minutes at 56 °C.
- 3.6 Cool the reaction to room temperature, and extract once with phenol and once with phenol:chloroform. Precipitate DNA as describe in 3.3. Redissolve the precipitated DNA in TE (pH 7.6) at a concentration of 100 µg/ml. Store in aliquots at -20 °C.

II. Reagent and buffer

1. Lysis buffer for DNA extraction

10 mM Tris-Cl pH 8.0

0.1 M EDTA pH 8.0

0.5% SDS

20 mg/ml proteinase K

2. 1X Tris boric EDTA (TBE) Buffer

150 mM NaCl

20 mM Tris HCl pH 7.4

3. 6X loading dye

Bromphenol blue	0.25	g
-----------------	------	---

Xylenecyanol	0.25	g
--------------	------	---

Glycerol	50	ml
----------	----	----

1 M Tris (pH 8.0)	1	ml
-------------------	---	----

Distilled water until	100	ml
-----------------------	-----	----

Mixed and stored at 4 °C

4. Buffer for ELISA

4.1 TBS +1% NSS (500 ml.)

25 ml. 1M Tris-HCl pH7.5

0.05% Tween20

g NaCl

5 g. BSA

4.2 EB Buffer : PBS buffer containing

3% NaCl

0.05% Tween 20

1% Normal Goat Serum

0.2% milk powder

4.3 Washing buffer

0.05% Tween 20 in PBS buffer

4.4 TMB substrate

100 mg TMB dissolved in 10 ml. DMSO (keep in dark)



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX B

GENERAL DESCRIPTION OF GIBBONS

No.	Name	Microchip code	Species	Cage	Sex	Born	Arrived
1	Gift	122676133A	<i>H. pileatus</i>	C23	F		1998
2	Daew	401D0A1A4B	<i>H. pileatus</i>	C22	F		
3	Candy	401A697335	<i>H. pileatus</i>	C21	F	1982	
4	Koo	116757314A	<i>H. pileatus</i>	C20	F	1985	
5	Jock	116752443A	<i>H. pileatus</i>	C20	M	1985	
6	Roen	122746225A	<i>H. pileatus</i>	C19	M	1992	
7	Farouk	401B256844	<i>H. pileatus</i>	C18	M	1993	
8	Nong Ni	TN000307095	<i>H. pileatus</i>	C17	F	1988	
9	Pilly	TN000311539	<i>H. pileatus</i>	C17	M	1989	
10	Nong Chai	116444145A	<i>H. pileatus</i>	C16	M	1989	
11	Saboo	TN000770817	<i>H. pileatus</i>	C15	M	1990	
12	Ni	116411213A	<i>H. pileatus</i>	C15	F	1991	
13	Gomez	116869185A	<i>H. pileatus</i>	C14	M	1990	
14	Chmi	116464221A	<i>H. pileatus</i>	C14	F	1990	
15	Saan	122752495A	<i>H. pileatus</i>	C13	M	1983	
16	Kristine	122709557A	<i>H. pileatus</i>	C13	F	1993	
17	Leuis	122717623A	<i>H. pileatus</i>	C12	F	1987	
18	Piercy	122709363A	<i>H. pileatus</i>	C11	F		1996
19	Mila	TN000773585	<i>H. pileatus</i>	C12	F	1990	
20	Thim(Dim)	122711231A	<i>H. lar</i>	C10	F		1996
21	Brownie	122713673A	<i>H. lar</i>	C8	M		
22	Toffee	116917373A	<i>H. lar</i>	C8	F		
23	Tua	122721665A	<i>H. lar</i>	C7	F	1984	
24	Phoon	116827386A	<i>H. lar</i>	C7	M	1990	
25	Gobboly	122709391A	<i>H. lar</i>	C6	M	1990	
26	Apple	TN000101833	<i>H. lar</i>	C6	M	1988	
27	YingYong	TN000875082	<i>H. lar</i>	C5	M	1987	

No.	Name	Microchip code	Species	Cage	Sex	Born	Arrived
28	John	122746332A	<i>H. lar</i>	C4	M		1996
29	Jew	122749117A	<i>H. lar</i>	C4	F	1980	
30	Ted	TN000049337	<i>H. lar</i>	C3	M		
31	Mek	122762633A	<i>H. lar</i>	C2	F	1991	
32	Pok	122758331A	<i>H. lar</i>	C2	M	1991	
33	Vetan	122761320A	<i>H. lar</i>	R1	F	1984	
34	Rusty	122752561A	<i>H. lar</i>	R3	M		1996
35	Jacko	TN001097325	<i>H. lar</i>	R4	M	1988	
36	Ivana	TN000772361	<i>H. lar</i>	R4	F	1987	
37	Darkie	116939650A	<i>H. lar</i>	R5	M		2000
38	Ice	116749756A	<i>H. lar</i>	R5	F		2000
39	Jieb	122676565A	<i>H. lar</i>	R6	F	1982	
40	Kong2	122676527A	<i>H. lar</i>	R7	M	1991	
41	Kingkong	122677225A	<i>H. lar</i>	R6	M		1996
42	Somsak	000887520	<i>H. lar</i>	R8	M	1988	
43	Diaw	116414222A	<i>H. lar</i>	R9	M		
44	Plaa	116936761A	<i>H. lar</i>	R9	F	1989	
45	Leonie	000305007	<i>H. lar</i>	R10	F		1995
46	Bun	-	<i>H. lar</i>	R11	M	1985	
47	Mongkut	401A54437C	<i>H. lar</i>	R12	M	1990	
48	Ooy	-	<i>H. lar</i>	R13	M	1986	
49	Cookie	-	<i>H. lar</i>	R13	F	1988	
50	Thongchai	-	<i>H. lar</i>	R14	M	1987	
51	Emmee	116833533A	<i>H. lar</i>	R15	F		1997
52	Songdiaw	-	<i>H. lar</i>	R15	M		1997
53	Ole	116824574A	<i>H. lar</i>	R16	M		1997
54	Pek	-	<i>H. lar</i>	R16	M		1997
55	Nana	-	<i>H. lar</i>	R17	F	1992	
56	Quan	-	<i>H. lar</i>	R17	F	1993	
57	Pienk	122676345A	<i>H. lar</i>	R18	M	1987	

No.	Name	Microchip code	Species	Cage	Sex	Born	Arrived
58	Pokpik	401A2F3D3A	<i>H. lar</i>	R19	F		1998
59	Dokdik	401A682508	<i>H. lar</i>	R19	F		1998
60	Kevin	116752594A	<i>H. lar</i>	R20	F		2000
61	Mickey	401A371D16	<i>H. lar</i>	R21	M	1987	
62	Emma	116758633A	<i>H. lar</i>	R22	F	1988	
63	Namhieb	4019553A1A	<i>H. lar</i>	R23	F	1986	
64	Jaay	000803791	<i>H. lar</i>	R24	F	1992	
65	Clyde	401B15183B	<i>H. lar</i>	R25	F	1994	
66	Bonnie	401A2C2D14	<i>H. lar</i>	R25	F	1994	
67	Nicole	116869170A	<i>H. lar</i>	R26	F		
68	Midnight	122677730A	<i>H. lar</i>	R27	M	1989	
69	Roger	401A606631	<i>H. lar</i>	R28	M		1989
70	Sea	401A634762	<i>H. lar</i>	R28	F		
71	Ream	116529115A	<i>H. lar</i>	L13	F	1992	
72	Nin	116376534A	<i>H. lar</i>	L14	M	1996	
73	Sang	116749797A	<i>H. lar</i>	L14	F	1995	
74	Baloo	116736464A	<i>H. lar</i>	L14	M	1995	
75	Peter	116736690A	<i>H. lar</i>	L15	M	1995	
76	L16M	401A1F6E45	<i>H. lar</i>	L16	M	1994	
77	Tarzan	401A2F3COD	<i>H. agilis</i>	L18	M		
78	Nungning	000544624	<i>H. agilis</i>	L18	F		
79	Tao	-	<i>H.pileatus</i>	C15	M	130599	
80	Baby R6	-	<i>H.lar</i>	R6	M	2000	
81	Sarah	401C1C2F47	<i>H.lar</i>	Q2	F	1990	
82	Mickey	-	<i>H.lar</i>	Q3	M		
83	Q7	-	<i>H.lar</i>	Q7			
84	NamPhung	-	<i>H.lar</i>	Q8	M		
85	Lucky	-	<i>H.lar</i>	Q4	M		
86	Sean	-	<i>H.lar</i>	Q5			
87	Faed	-	<i>H.lar</i>	Q6	F	1993	
88	Ab	-	<i>H.lar</i>	L15	M		

No.	Name	Microchip code	Species	Cage	Sex	Born	Arrived
89	Tea	0008820368	<i>N.concolor</i>	L10	F	1993	
90	Belle	116814733A	<i>N.concolor</i>	L10	F	1989	
91	Caesar	000310615	<i>N.concolor</i>	L10	M	1992	
92	Ozzy	116738560A	<i>N.concolor</i>	L9	M	1992	
93	Charlie	116945092A	<i>N.concolor</i>	L9	M	1991	
94	Julie	000523553	<i>N.concolor</i>	L11	F	1990	
95	Hannah	116871644A	<i>H.lar</i>	L12	F	1990	
96	Sam	116373121A	<i>H.lar</i>	L13	M	1992	
97	Stevie	001021014	Hybrid	L0	M		1997
98	April	116814463A	<i>H.lar</i>	L1	F	1992	
99	Poe	112451377A	<i>H.lar</i>	L2	M	1987	
100	Chan	116751644A	<i>H.lar</i>	L3	M	1989	
101	Nuan	116912566A	<i>H.lar</i>	L4	M		1997

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX C

T-TEST ANALYSIS OF ALT LEVEL

Independent samples T-test analysis were calculated using ALT level presented in Table 9.

Data comparison of two group samples

HBV1 = HBV carrier animals

HBV2 = HBV noninfected animals and viral cleared subjects

Group Statistic

Group	N	Mean	Std. Deviation	Std. Error Mean
HBV 1	12	68.75	48.12	13.89
HBV 2	28	33.04	15.91	3.01

T-Test for Equality of Means

$$\sigma_1^2 \neq \sigma_2^2, \text{ for test } H_0, \mu_1 - \mu_2 = 0$$

$$H_1, \mu_1 - \mu_2 > 0$$

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}} = 2.513$$

$$\begin{aligned} 95\% \text{ confidence interval of the difference} &= (\bar{X}_1 - \bar{X}_2) \pm t_{(X1-X2)} SE_{(X1-X2)} \\ &= 35.71 \pm t(14.21) \\ &= (4.76, 66.67) \end{aligned}$$

Conclusion : by the T-test of equal variant not assumed

Df = 12.045, so analysis deny H_0

$\therefore \mu_1 - \mu_2 > 0$ or $\mu_1 > \mu_2$ with $\alpha 0.05$

95 % CI of $\mu_1 - \mu_2 = 4.76$ to 66.67

APPENDIX D

SUBMITTED GIBBON HBV SEQUENCES

LOCUS AY077736 3182 bp DNA circular VRL 20-MAR-2002
 DEFINITION Hepatitis B virus isolate G26, complete genome.
 ACCESSION AY077736 AF274498 AF275379
 VERSION AY077736.1 GI:19568072
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 3182)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 3182)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (30-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 COMMENT On Mar 20, 2002 this sequence version replaced gi:9885420.
 FEATURES Location/Qualifiers
 source 1..3182
 /organism="Hepatitis B virus"
 /virion
 /isolate="G26"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS join(2307..3182,1..1623)
 /codon_start=1
 /product="polymerase"
 /protein_id="AAL89569.1"
 /db_xref="GI:19568073"
 /translation="MPLSYPLFRLLLLLDEAGPLEEELPRLADEGLNRRVAEDLNLQ
 LPNVSIPWTHKVGNFSTGLYSSTTPVFNPEWKTSPFPNIHLHQDIIDKCEQFVGPLTVN
 EKRRLLKLIMPSRFYPNSTKYLPLDKGIKPYYPEHVVNHYFQTRHYLHTLWEAGILYKR
 ETTRSASFYGPYSWEQELQHGAESEFRHQSSGILSRVSGPSIQGQHKQSRLGLQPTQ
 GQLARRHKGRSGSIRARVHPPTRRSSGVEPSSGNNNNIASSSSCLYQSAVRKATYS
 HLSTFERHSSSGHAVELHGIPPNFTRSQSEGPVFCWVWLFQRNSDPCSEYCLSHLVNL
 LDDWGPCTQHGHIRIPRTPARVTGGVFLVDKNPHNSTESRLVVDVFSQFSRSTRV
 WPKFAVPNLQSLTNLLSSNLSWLSLDVSAAFYHPLPLHPAAMPHELLVGSGLQRYVARL
 SSTSRITNNQHGTMQNLHDHCSRNLVSLMLLYKTFGRKLHLYSHPIVLGFRKIPMGV
 GLSPFLLAQFTSAICSVVRAFPHCLAFSYMDDVVLGAKSVQHLESLYTAVTNFLLSL
 GIHLSPNKTKRWGYSLHFMGYVIGSWGTLPQEHIVQIKQCFRKLVPVNRPIDWKCQR
 IVGLLGFAAPFTQCGYPALMPLYACIQAKQAFTFSPYKAFRLRKQYLTLYPVARQRP
 LCQVFADATPTGWGLAIGHQRMRTFVAPLPIHTAELLAACFARSRSKANLIGTDNSV
 VLSRKYTSFPWLLGCAANWILRGTSFVYVPSALNPADDPSRGLGLYRPLLRPLPFQPT
 TGRTSLYAVSPSPVSHLPDRVHFASPLHVAWRPP"
 CDS join(2848..3182,1..835)
 /codon_start=1
 /product="surface protein"
 /protein_id="AAG01443.2"
 /db_xref="GI:19568076"
 /translation="MGQNHSVTNPLGFFPEHQDLPLFKANTNNPDWDFNPHKDNWPD

TKVGVGAFGLGFTPPHGGLLGWSPQAQGITTTLPVPPPPASTNRQSGRQPTPI SPPLR
 DTHPQAMQWNSTVFHRTLQDPRVRGLYFPAGGSSSGTVTPAPNTASHISSIFSTTGDP
 APNMDNITSGFLGPLLVLQAGFFLLTKILTIPQSLDSWWTSLNFLGGAPACPGQNSPS
 PISNHSPTSCPPTCPGYRWMCLRRFII FLFILLCLIFLLVLLDYKGMPLVCPPLLPGS
 PTTSTGPCRTCTITAQGTSLYPSCCCTKPSDGNCTCIPI PSSWAFKFLWEWALVRF5
 WLSLLAPFVQWFAGLSPIAWPLVIWMMWYWGPSLYNINLPFIPLLPFIFFCLWVYI "
 1374..1838

CDS

/codon_start=1
 /product="X protein"
 /protein_id="AAG15189.2"
 /db_xref="GI:19568075"
 /translation="MAARLRCQLDPTRDVLCRLPVGAQSRGRPLAGPFGALPPSPSA
 VPADDGAHLSLRGLPVCAFSSAGPCALRFTSARCMETTVNAPRSLPRALHKRTLGLPA
 MSTTEIETYFKDCVFKDWXELGEEIRLKVFLVGGCRHKLVCSPAPCNFFTSA"
 1814..2452

CDS

/codon_start=1
 /product="precore and core protein"
 /protein_id="AAL89570.1"
 /db_xref="GI:19568074"
 /translation="MQLFHLCLII SCSCPTIQASKLCLGWLLGMDIDPYKEFGATVEL
 LSFLPSDFFPVSRDLLDTASALYREALSPEHCSPNHTALRQAVLCWLGELMTLASWVG
 NNLEDPASRELVVNYVNNNMGLKIRQLLWFHISCLTFGRETVLEYLVSFGVWIRTPPA
 YRPPNAPILSTLPETTVVRRRGRSPRRRTPSPRRRRSQSPRRRRSQSPASQC"

BASE COUNT 724 a 880 c 694 g 883 t 1 others
 ORIGIN

```

1 ctccacggta ttccaccgaa cttacaaga tcccagagtg aggggcctgt attttctcgc
61 tgggtggctcc agttcaggaa cagtgacccc tgctccgaat actgcctctc acatctcgtc
121 aatcttctcg acgactgggg accctgcacc caacatggac aacatcacat caggattcct
181 aggacccctg ctcgtgttac aggcggggtt tttcttggtg acaaaaatcc tcacaattcc
241 acagagtcta gactcgtggt ggacttctct caatcttcta gggggagcac ccgcgtgtcc
301 tggccaaaat tcgccgtccc caatctccaa tcaactacca acctctgtc ctccaacttg
361 tcctggctat cgctggatgt gtctgcggcg ttttatcatc ttctcttca tctgtctgt
421 atgcctcatc ttcttggtgg ttcttctgga ctacaaaggt atggtgcccg ttgtcctct
481 acttccagga tcaccaacaa ccagcacggg accatgcaga acctgcacga tcactgctca
541 aggaacctct ttgtatccct catgttgctg tacaaaacct tcggacggaa actgcacctg
601 tattcccatc ccactgcctc gggctttcgc aaaattccta tgggagtggg ccttagtccg
661 tttctcttgg ctcagtttac tagcgccatt tgttcagtgg ttcgcagggc tttcccccat
721 tgcttgccct ttagttatat ggatgatgtg gtattggggg ccaagtctgt acaacatctt
781 gaatcccttt ataccgctgt taccaattht cttttgtctc tgggtataca ttttaagcct
841 aacaaaacaa aacggtgggg ttattctctt cacttcatgg ggtatgtgat tgggaagtgg
901 ggtaccttac cacaagaaca tattgtgcaa aaaatcaagc aatgctttag aaaacttctc
961 gttaacagge ccattgattg gaaagtgtgt caaagaattg tgggtctttt gggcttctgc
1021 gctcctttta cgcaatgtgg atatcctgcc ttaatgcctt tgtatgcatg tatacaagct
1081 aagcaggctt ttacattctc accaacgtat aaggcctttc tacgcaaaca atatctgacc
1141 ctttaccocg ttgctcggca acggccagge ctgtgccaag tgtttgctga tgcaaccccc
1201 actggttggg gcttgccat cgccaccag cgcagcgtg gaacctttgt ggctcctctg
1261 ccgatccata ccgcggaact cctagccgct tgttttgctc gcagcaggtc tggagcaaac
1321 cttattggaa ctgacaactc cgttctctc tcccgcaaat atacatcatt tccatggctg
1381 ctaggctgcg ctgccaactg gatcctacgc gggacgtcct ttgtttacgt ccgctcggcg
1441 ctcaatcccg cggacgaccc ctcgcggggc cgtttggggc tctaccgccc ccttctccgt
1501 ctgccgttcc agccgacgac ggggcygacc tctctttacg cggctctccc gctctgtcct
1561 tctcatctgc cggaccgtgt gcaactctgc tcacctctgc acgttgcatg gagaccaccg
1621 tgaacgcccc tcggagcttg ccaagggcat tgcataagag gactcttgga cttccagcaa
1681 tgtcaacgac cgaaattgag acatacttca aagactgtgt gtttaaggac tggkaggagt
1741 tgggggagga gatcaggtta aaggtctttg tactaggagg ctgtaggcat aaattggctc
1801 gttcaccagc accatgcaac tttttcacct ctgcctaate atctcctggt catgtcctac
1861 tattcaagcc tccaagctgt gccttgggtg gcttttgggc atggacattg acccttataa
1921 agaatttggg gctactgtgg agttactctc ttttttgctc tctgacttct tcccgtcgg
1981 tagagatctc ctgcacaccg cctcagctct gtatcgggaa gccctagagt ctccagaaca

```

2041 ttgtttctct aatcacacag cactcaggca agctgttttg tgctgggggtg agttgatgac
 2101 tctcgcttcc tgggtgggca ataatttaga agaccagca tctagggaac tggtagtcaa
 2161 ttatgttaat aacaatatgg gtctaaaaat caggcaactg ttgtggtttc acatttcctg
 2221 tcttactttt ggaagagaaa ccgttcttga gtatttggtg tcttttgag tgtggattcg
 2281 cactcctccc gcttacagac caccaaatgc ccctatctta tccactcttc cggagactac
 2341 tggtgttaga cgacgaggca ggtcccctag aagaagaact ccctcgctc gcagacgaag
 2401 gtctcaatcg ccgctcgca gaagatctca atctccagct tcccaatggt agtattcctt
 2461 ggactcataa ggtgggaaac tttacggggc tttattcttc tactacgctt gtctttaatc
 2521 ctgagtggaa aactccttct tttcctaaca ttcatttgca ccaggatatt atagataagt
 2581 gtgaacaatt tgtgggcccc cttacagtga atgaaaaacg aagattaaaa ttaattatgc
 2641 cttctagatt ctatcctaac tctacaaat atttgcccct agataaagga attaaacctt
 2701 attatccaga gcatgtggtt aatcattact tccaaacccg aactattta cacactctat
 2761 gggaggcggg catcctatat aaacgagaaa caacacgtag cgctccttc tacgggtcac
 2821 catattcttg ggaacaagag ctacagcatg gggcagaatc attcgcgtcac caatcctctg
 2881 ggattctttc ccgaacatca gttggaccct ctattcaagg ccaacacaaa caatccagat
 2941 tgggacttca acccacacaa ggacaactgg cccgacgcca caaaggtagg agtgggagca
 3001 ttcgggctag ggttcacccc cccacacgga ggtcttctgg ggtggagccc tcaagctcag
 3061 ggaataacaa caacattgcc agcagttcct cctcctgcct ctaccaatcg gcagtcagga
 3121 aggcaaccta ctcccatctc tccacctttg agagacactc atcctcaggc catgagtggtg
 3181 aa

//



ศูนย์วิทยทรัพยากร
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AY077735 3185 bp DNA circular VRL 20-MAR-2002
 DEFINITION Hepatitis B virus isolate G25, complete genome.
 ACCESSION AY077735 AF274497
 VERSION AY077735.1 GI:19568077
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 3185)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 3185)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (30-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 COMMENT On Mar 20, 2002 this sequence version replaced gi:9885418.
 FEATURES Location/Qualifiers
 source 1..3185
 /organism="Hepatitis B virus"
 /virion
 /isolate="G25"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS join(2307..3185,1..1623)
 /codon_start=1
 /product="polymerase"
 /protein_id="AAL89566.1"
 /db_xref="GI:19568078"
 /translation="MPLSYPLFRLLLLLDEEAGPLEEELPRLADEGLNRRVAEDLNLO
 LPNVSIPWTHKVGNF TGLYSSTAPVFNSEWQTPSFPDIHLRQDIIDKCQQFVGPPLTIN
 EKRRLLKLIMPARFYPNSTKYLPLDKGIKPYYPEHVVNHYFQTRHYLHTLWEAGILYKR
 ETTRSASF CGSPYSWEQELQHGAESFRYQSSGILSRASVRPSPGGQQLKQSRLGLQPAQ
 GQLARSHQGRSGSIRARVHP TTRRSSGVEPSGSGTNNNNIASSSSSCLHQSAVRKATY
 SHLSTFEHGSSSGHAVELHGIPQNSTRSQGEGPVFSCWWLQFRNSEPCSEYCLSHIVN
 LLDDWGPCTQHGGHHIRI PRTPARVTGGVFLVDKNPHNSSESRLVVDFSQFSRGSTRV
 SWXKFAVPNLQSLTNLLSSNLSWLSLDVSAAFYHLPLHPAAMPHELLVGGSSGLQRYVAR
 LSSTSRIINNQHGTLDLHDHCSRNL FVSLMLLYKT FGRKLLHYSHPIV LGFRKIPMG
 VGLSPFLLAQFTSAICSVVRRAFP HCLAFSYMDDVVLGAKSVQHLESLYTAVTNFLLS
 LGIHLNPNKTKRWGYSLHFMGYVIGSWGTL PQEHI VQKIKQCF TKLPVNRPV DWKVCQ
 RIVGLLGFAAPFTQCGYPALMPLYACIQAKQAF TFSPTYKAFLRKQYLTLYPVARQRP
 GLCQVFADATPTGWGLAIGHQRMRT FVAPLPIHTAELLAACFARSRSGANLIGTDNS
 VVLSRKYTSFPWLLGCAANWILRGTSFVYVPSALNPADDPSRGRLGLSRPLLRLPFQP
 TTGRTSLYAVSPSPVSHLPDRVHFASPLHVAWRPP"
 CDS join(2848..3185,1..835)
 /codon_start=1
 /product="surface protein"
 /protein_id="AAG01442.2"
 /db_xref="GI:19568081"
 /translation="MGQNH SVTNPLGFFPEHQLDPLVKANSSNP DWFNPHKDNWPEA
 TKVGVGAFPGFT PPHGLLGWSPQAQGQIT TILPAVPPPASTNRQSGRQPTPISPPL
 RDTHPQAMQWNSTVFHRTLQDPRVRGLYFPAGGSSSGTVNPA PNTASPISSIFSTTGD
 PAPNMDNITSGFLGPLLVLQAGFFLLTKILTIPQSLDSWWTSLN FLGGAPACPGQNSP
 SPISNHSPTSCPPTCPGYRWMCLRRFIIFL FILLLCLIFLLVLLDYKGM LPVCPLLPG
 SSTTSTGPCRTCTITAQGTS LYPSCCCTKPSDGNCTCIPI PSSWAFKFLWEWALVRF
 SWLSLLAPFVQWFAELSP IAWPLVIWMMWYWGPSLYNINLPFIPLLP IFFCLWVYI"

CDS 1374..1838
 /codon_start=1
 /product="X protein"
 /protein_id="AAL89568.1"
 /db_xref="GI:19568080"
 /translation="MAARLRCQLDPARDVLCRLPVS AESRGRPLSGPFGAFPPSPSA
 VPADHGAHLSLRGLPVCAFSSAGPCALRFTSARCMTTVNAPRSLPRALLKRTLGLSA
 MSTTEIETYFKDCVFKDWEELGEEIRLKV FVLGGCRHKLVCS PAPANFF TSA"

CDS 1814..2452
 /codon_start=1
 /product="precore and core protein"
 /protein_id="AAL89567.1"
 /db_xref="GI:19568079"
 /translation="MQLFHLCLII SCSCPTFQASKLCLGWLLGMDIDPYKEFGATVEL
 LSFLPSDFP SVRDLDTASALYREAL ESPEHCSPNHTALRQAVLCWGELMTLASWVG
 NNLEDPASRELVVSYVNNNMGLKIRQLLWFHISCLTFGRET VLEYLV SFGVWIRTPPA
 YRPPNAPILSTLPETT VVRRRRGRSPRRRTPSPRRRRSQSPRRRRSQSPASQC"

BASE COUNT 718 a 863 c 706 g 897 t 1 others
 ORIGIN

```

1 ctccacggta ttccacagaa ctctacaaga tcccaggggtg aggggctgt attttctgc
61 tgggtggctcc agttcaggaa cagtgaaccc tgctccgaat actgcctctc ccatatcgtc
121 aatctttctcg acgactgggg accctgcacc caacatggac aacatcacat caggattcct
181 aggaccctcg ctcggtttac aggcgggggtt tttcttggtg acaaaaatcc tcacaattcc
241 tcagagtcta gactcgtggt ggacttctct caatcttcta gggggagcac ccgctgtcc
301 tggscaaaat tcgccgtccc caatctccaa tcaactacca acctcttgtc ctccaacttg
361 tcctggctat cgctggatgt gtctgcggcg ttttatcatc ttctcttca tctgtctgt
421 atgcctcatc ttcttggttg ttcttctgga ctacaaaggt atgttgcccg tttgtcctct
481 acttccagga tcatcaacaa ccagcacggg accctgcagg acctgcacga tcaactgctca
541 aggaacctct ttgtatccct catgttggtg tacaaaacct tcggacggaa attgcacctg
601 tattcccata ccatcgtcct gggctttcgc aaaattccta tgggagtggt ccttagtccg
661 tttctcttgg ctcagtttac tagcgcatt tgttcagtg ttcgcagagc tttccccat
721 tgcttgacct ttagtatat ggatgatgt gtattggggg ccaagtctgt acaacatctt
781 gaatcccttt ataccgctgt taccaatttt cttttgtctt tgggtatata tttaaacctt
841 aacaaaacga aacggtgggg ttattccctt cactttatgg gatatgtgat tgaagtgtg
901 ggaaccttgc cacaagaaca tattgtacaa aaaatcaaac aatgttttac aaaactcctt
961 gtaaacaggg ccggttgattg gaaagtgtgt caaagaattg tgggtctttt aggcttcgct
1021 gctcctttta cacaatgtgg ttatcctgcc ttgatgccct tatacgcatt tatccaagca
1081 aacaggctt ttacattctc gccaaactat aaggcctttc tacgcaaaca atacctgacc
1141 ctttaccctg ttgctcgga acggccagge ctgtgccaag tgtttgctga cgcaaccccc
1201 actggctggg gcttgccat aggccaccag cgcattgcgc gaacctttgt ggctcctctg
1261 ccgatccata cagcggaaact cctagccgct tgttttgctc gcagcaggtc tggggcaaat
1321 ctcatcgga ctgacaactc tgttgctgc tcgcggaaat atacatcctt tccatggctg
1381 ctaggctgag ctgccaaact gatcctgcgc gggacgtcct ttgtctacgt cccgtcagcg
1441 ctgaatcccg cggacgacct ctctcggggc cgtttggggc tttcccgecc ccttctccgt
1501 ctgccgttcc agccgaccac ggggcgcacc tctctttacg cggctcccc gtctgtgcct
1561 tctcatctgc cggaccgtgt gcaactcgtc tcacctctgc acgttgcatg gagaccaccg
1621 tgaacgcccc tcggagcttg ccaagagcat tgctcaagag gactcttggg ctttcagcga
1681 tgtcaacgac cgaaattgag acatacttca aagactgtgt gtttaaagac tgggaggagc
1741 tgggggagga gattaggta aaggctttg tactaggagg ctgtaggcat aaattggtct
1801 gttcaccagc accatgcaac tttttcacct ctgcctaate atctcatgtt catgtcctac
1861 ttttcaagcc tccaagctgt gccttgggtg gcttttgggc atggacattg accctataa
1921 agaatttggg gctactgtgg agttactctc ttttttgct tctgactctt tctcgtcgtt
1981 tagagatctc cttgacaccg cctcagctct atatcgggaa gccctagagt ctccagaaca
2041 ttgttcacct aatcatacag cactcaggca agctgttttg tgctgggggtg agttgatgac
2101 tctggcttcc tgggtgggca ataatttggg agatccagca tctagggaac tagtagtcag
2161 ttatgttaat aataacatgg gtctaaaaat caggcaacta ttgtggttc acatttctctg
2221 tcttactttt ggaagagaaa ctgtccttga gtatttagtg tcttttggag tgtggattcg
2281 cactcctcca gcttacagac caccaaatgc ccctatctta tccactctc cggagactac
2341 tgttgttaga cgaagaggca ggtcccctag aagaagaact ccctcgcctc gcagacgaag
  
```

2401 gtctcaatcg ccgcgtcgca gaagatctca atctccagct tcccaatggt agtatttcctt
 2461 ggactcataa ggtggggaac tttaccgggc tttattcttc tactgcacct gtctttaatt
 2521 ctgagtgcca aactccttct tttcctgata ttcatttgcg tcaggacatt atagataagt
 2581 gtcagcaatt tgtgggccct cttacaataa atgaaaaacg aagattaataa ttaattatgc
 2641 ctgctagggt ttatcctaac tctactaaat atttgccctt ggataaaggt attaaacctt
 2701 attatccaga gcatgtgggt aatcattatt tccaaaccag acaactatta catactctgt
 2761 gggaggcggg cattttatat aaacgagaga cgacacgtag cgcctccttt tgtgggtcac
 2821 catattcttg ggaacaagag ctacagcatg gggcagaatc attccgttac caatcctctg
 2881 ggattctttc ccgagcatca gttagacctt ctggtcaagg ccaactcaag caatccagat
 2941 tgggacttca acccgcaaca ggacaactgg cccgaagcca ccaaggtagg agtgggagca
 3001 ttcgggccag ggttcacccc accacacgga ggtcttctgg ggtggagccc tcaggctcag
 3061 ggacaaataa caacaatatt gccagcagtt cctcctcctg cctccaccaa tcggcagtca
 3121 ggaaggcaac ctactcccat ctctccacct ttgagggaca ctcatcctca ggccatgcag
 3181 tggaa

//



ศูนย์วิทยทรัพยากร
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477494 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus BabyR6 pre-S1 protein gene, partial cds.
 ACCESSION AF477494
 VERSION AF477494.1 GI:19073470
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="BabyR6"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84832.1"
 /db_xref="GI:19073471"
 /translation="MGQNLCVSNPLGFFPEHQLDPLFKANTNNPDWDFNPNKDNWPEA
 TQVGVGAFGPGFTPPHGGLLGWSSQAQGAITTLPAVPPPAATNRQSGRQPTPISPPLR
 DTHPQAMKWNSTVFHQTLQDPRVRGLYFPVG"
 BASE COUNT 97 a 124 c 98 g 79 t
 ORIGIN
 1 atggggcaga acctgtgtgt cagcaatccc ttgggattct tccccgagca tcagttggat
 61 cccctgttca aagccaacac aaacaaccca gattgggact tcaatcccaa caaggacaac
 121 tggccagaag ccaccaggt aggagtggga gcgttcgggc cagggttcac tccaccacac
 181 ggaggtcttt tagggtggag ctctcaggct caggagcaa tcaccacatt gccagcagtt
 241 cctcctcctg ccgccaccaa tcggcagtc gggaggcagc cgactcccat ctctccaccg
 301 ttgagagaca ctcatcctca ggccatgaag tggaactcta cagtattcca ccaaactctg
 361 caagatccca gagtaagggg cctatacttt cctgttgg
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477492 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus PokC2 pre-S1 protein gene, partial cds.
 ACCESSION AF477492
 VERSION AF477492.1 GI:19073466
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="PokC2"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84830.1"
 /db_xref="GI:19073467"
 /translation="MGQNLSVSNPLGFFPEHQLDPLFKANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGGLLGWSSQAQGAITTLPAVPPPAATNRQSGRQPTPISPPLR
 DTHPQAMKWNSTVFHQTLQDPRVRGLYFPVG"
 BASE COUNT 96 a 123 c 97 g 82 t
 ORIGIN
 1 atggggcaga acctgtctgt cagcaatccc ttgggattct tccccgagca tcagttggat
 61 cccctgttca aagccaactc aaacaatcca gattgggact tcaatcccaa caaggacaac
 121 tggccggaag ccaccaaggt aggagtggga gcgttcgggc cagggttcac tccaccacac
 181 ggaggtcttt tagggtggag ctctcaggct caggagcaa tcaccacatt gccagcagtt
 241 cctcctcctg ccgccaccaa tcggcagtcc gggaggcagc ctactcccat ctctccaccg
 301 ttgagagaca ctatcctca ggccatgaag tggaactcta cagtattcca ccaaactctg
 361 caagatccca gagtaagggg cctatacttt cctgtttg

//

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477491 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus TaoC15 pre-S1 protein gene, partial cds.
 ACCESSION AF477491
 VERSION AF477491.1 GI:19073464
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="TaoC15"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84829.1"
 /db_xref="GI:19073465"
 /translation="MGQNHSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGGLLGWSPQAQGLTTLPAAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVFHQTLQDPRVRGLYFPAG"
 BASE COUNT 97 a 126 c 95 g 80 t
 ORIGIN
 1 atggggcaga atcattctgt caccaatcct ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caaagacaac
 121 tggccagaag ccaccaaggt aggagtggga gcattcgggc cagggttcac ccctccacat
 181 ggcggccttt tggggtggag cccccaggct caggcatgt taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtc ggaagacagg ccaactccat ctctccaccg
 301 ttgagagaca ctcatccgca ggccatgcag tggaactcca cggatttcca ccaaactctg
 361 caagatccca gagtaagggg cctgtathtt cctgctgg
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477490 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus NiC15 pre-S1 protein gene, partial cds.
 ACCESSION AF477490
 VERSION AF477490.1 GI:19073462
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="NiC15"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84828.1"
 /db_xref="GI:19073463"
 /translation="MGQNHSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPDA
 TKVGVGAFGPGFTPPHGLLGWSPQAQGILTTLPAAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVVFHQTLQDPRVRGLYFPAG"
 BASE COUNT 99 a 126 c 91 g 82 t
 ORIGIN
 1 atggggcaga atcattctgt caccaatcct ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caagacaac
 121 tggccagatg ccaccaaggt aggagtggga gcattcgggc cagggttcac cctccacat
 181 ggcggccttt tggggtggag cccccaggct caaggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtca ggaagacagg ccaactccaat ctctccaccg
 301 ttgagagaca ctcatcctca ggccatgcag tggaactcca cagtattcca ccaactctg
 361 caagatccca gagtaagggg cctgtatattt cctgctgtg
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477489 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus SabooC15 pre-S1 protein gene, partial cds.
 ACCESSION AF477489
 VERSION AF477489.1 GI:19073460
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="SabooC15"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84827.1"
 /db_xref="GI:19073461"
 /translation="MGQNSSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPAA
 TKVGVGAFGPGFTPPHGGLLGWSPQAQGILTTLPAAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVFHQTLQDPRVRGLYFPAG"
 BASE COUNT 97 a 128 c 93 g 80 t
 ORIGIN
 1 atggggcaga actcatctgt caccaatcct ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caaagacaac
 121 tggccagcag ccaccaaggt aggagtggga gcattcgggc cagggttcac ccctccacat
 181 ggcggccttt tggggtggag ccccaggct cagggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtc ggaaggcagg ccaactccat ctctccaccg
 301 ttgagagaca ctatcctca ggccatgcag tggactcca cagtattcca ccaaactctg
 361 caagatccca gagtaagggg cctgtatattt cctgctgg

//

ศูนย์ห้องปฏิบัติการ
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477488 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus SaanC13 pre-S1 protein gene, partial cds.
 ACCESSION AF477488
 VERSION AF477488.1 GI:19073458
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="SaanC13"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84826.1"
 /db_xref="GI:19073459"
 /translation="MGQTSSVNNPLGFFPEHQLDPLFRANTHNPDWDFNPNKDNWPEA
 TQVGAGAFGPGFTPPHGLLGWSPQAQGVTTILPAVPPPASANRQSGRKPTPISPPLR
 DTHPQAMRWNSTIFHQTLQDPRVRGLYFPAG"
 BASE COUNT 98 a 127 c 93 g 80 t
 ORIGIN
 1 atggggcaga cctcttctgt caacaatcct ctgggattct tccccgagca tcagttggat
 61 cctctattca gagccaacac acacaatcca gactgggact tcaaccccaa caagacaat
 121 tggccagaag ccaccaggt aggagcggga gcattcgggc cagggttcac cccaccacat
 181 ggaggtcttc taggtggag ccctcaggcc cagggcgtaa caactatatt gccagcggtt
 241 cctcctctcg cctccgcaa tcggcagtca gggaggaagc ctactccaat ctctccacct
 301 ttgagagaca ctcatcctca ggccatgagg tgaactcca caatattcca ccaaactctg
 361 caagatccca gagtaagggg cctgtacttt cctgctgg
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477487 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus NongchaiC16 pre-S1 protein gene, partial cds.
 ACCESSION AF477487
 VERSION AF477487.1 GI:19073456
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="NongchaiC16"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84825.1"
 /db_xref="GI:19073457"
 /translation="MGQNHSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGLLGWSPQAQGILTTLPAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVFHQTLQDPRVRGLYFPAG"
 BASE COUNT 98 a 126 c 93 g 81 t
 ORIGIN
 1 atggggcaga atcattctgt caccaatcct ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caagacaac
 121 tggccagaag ccaccaagggt aggagtggga gcattcgggc caggggtcac ccctccacat
 181 ggcggccttt tgggggtggag cccccaggct cagggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtc ggaaggcagg ccaactccaa ctctccaccg
 301 ttgagagaca ctcatcctca ggccatgcag tggaaactcca cagtattcca ccaaactctg
 361 caagatccca gagtaagggg cctgtatttt cctgctgg
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477486 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus MidnightR27 pre-S1 protein gene, partial cds.
 ACCESSION AF477486
 VERSION AF477486.1 GI:19073454
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="MidnightR27"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84824.1"
 /db_xref="GI:19073455"
 /translation="MGQNLSVSNPLGFFPEHQLDPLFKANSNNPDWDFNPHKDNWPEA
 TKVGVGAFGPGFTPPHGLLGWSSQAQGAITTLPAVPPPAATNRQSGRQPTPI SPPLR
 DTHPQAMKWNSTVFHQTLQDPRVRGLYFPVG"
 BASE COUNT 98 a 126 c 95 g 79 t
 ORIGIN
 1 atggggcaga acctgtctgt cagcaatccc ttgggattct tccccgagca ccagttggat
 61 cccctgttca aagccaactc aaacaatcca gattgggact tcaatcccca caaggacaac
 121 tggccagaag ccaccaaggt aggagtggga gcattcgggc cagggttcac tccaccacac
 181 ggaggtcttt tagggtggag ctctcaggct caggagcaa tcacaacatt gccagcagtt
 241 cctcctcctg ccgccaccaa tcggcagtc ccggaggcagc ctactcccat ctctccaccg
 301 ttgagagaca ctcatcctca ggcatgaag tggaaactcaa cagtattcca ccaaactctg
 361 caagatccca gagtaagggg cctctacttc cctggttg

//

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477485 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus JockC20 pre-S1 protein gene, partial cds.
 ACCESSION AF477485
 VERSION AF477485.1 GI:19073452
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="JockC20"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84823.1"
 /db_xref="GI:19073453"
 /translation="MGQTHSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGLLGWSPQAQGILTTLPAPPPASTNRQSGRQATPISPLR
 DTHPQAMQWNSTVFHKTLQDPRVRGLYFPAG"
 BASE COUNT 96 a 127 c 94 g 81 t
 ORIGIN
 1 atggggcaga ctcttctgt caccaatcct ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatccc gattgggact tcaaccccaa caaagacaac
 121 tggccggaag ccaccaaggt aggagtggga gcattcgggc cagggttcac ccctccacat
 181 ggcggccttt tggggtggag ccccaggct cagggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtca ggaaggcagg cactccaat ctctccaccg
 301 ttgagagaca ctcatcctca ggccatgcag tggactcca cagtattcca caaaactctg
 361 caagatccca gagtaagggg cctgtatttt cctgctgg
 //

ศูนย์หอสมุดกลาง
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477484 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus JackoR4 pre-S1 protein gene, partial cds.
 ACCESSION AF477484
 VERSION AF477484.1 GI:19073450
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="JackoR4"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84822.1"
 /db_xref="GI:19073451"
 /translation="MGQNSSVSNPLGFFPEHQLDPLFKANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGGLLGWSSQAQGAITTLPAVPPPAATNRQSGRQPTPISPPLR
 DTHPQAMKWNSTVFHQTLQDPRVRGLYFPVG"
 BASE COUNT 97 a 121 c 97 g 83 t
 ORIGIN
 1 atggggcaga actcgtctgt cagcaatccc ttgggattct tccccgagca tcagttggat
 61 cccctgttca aagccaactc aaacaatcca gattgggact tcaatcccaa caaggacaac
 121 tggccggaag ccaccaaggt aggagtggga gcgttcgggc cagggttcac tccaccacat
 181 ggaggtcttt tagggtggag ctctcaggct cagggagcaa tcacaacatt gccagcagtt
 241 cctcctcctg ccgccaccaa tcggcagtcc gggaggcagc ctactcccat ctctccaccg
 301 ttgagagaca ctcatcctca ggccatgaag tggactcta cagtattcca ccaactctg
 361 caagatccca gagtaagggg cctatacttt cctgttgg
 //

ศูนย์ ทักษะ ทักษะ
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477483 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus GomezC14 pre-S1 protein gene, partial cds.
 ACCESSION AF477483
 VERSION AF477483.1 GI:19073448
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="GomezC14"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84821.1"
 /db_xref="GI:19073449"
 /translation="MGQNHSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGLLGWSPQAQGILTTLPAAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVVFHQTLQDPRVRGLYFPAG"
 BASE COUNT 97 a 125 c 94 g 82 t
 ORIGIN
 1 atggggcaga atcattctgt caccaatcct ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caaagacaac
 121 tggccagaag ccaccaaggt aggagtggga gcattcgggc cagggttcac ccctccacat
 181 ggcggtcttt tgggggtggag ccccaggct cagggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtca ggaaggcagg ccaactccaa ctctccaccg
 301 ttgagagaca ctcatcctca ggccatgcag tggaaactcca cggatttcca ccaaactctg
 361 caagatccca gagtaagggg cctgtatctt cctgctgg
 //

ศูนย์กอบการศึกษาร
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF477482 398 bp DNA linear VRL 04-MAR-2002
 DEFINITION Hepatitis B virus ChmiC14 pre-S1 protein gene, partial cds.
 ACCESSION AF477482
 VERSION AF477482.1 GI:19073446
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Hepatitis B virus isolated from gibbon
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 398)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (29-JAN-2002) Viral Hepatitis Research Unit,
 Chulalongkorn University, Rama IV St., Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..398
 /organism="Hepatitis B virus"
 /virion
 /isolate="ChmiC14"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 CDS 1..>398
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAL84820.1"
 /db_xref="GI:19073447"
 /translation="MGQNHSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGLTPPHGLLGWSPQAQGILTTLPAAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVFHQTLQDPRVRGLYFPAG"
 BASE COUNT 99 a 129 c 92 g 78 t
 ORIGIN
 1 atggggcaga atcattccgt caccaatccc ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caagacaac
 121 tggccagaag ccaccaaggt aggagtggga gcattcgggc cagggctcac ccctccacat
 181 ggcggtttt tggggtggag cccccaggct cagggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtc ggaaggcaag ccaccccaat ctctccacct
 301 ttgagagaca ctcatccgca ggccatgcag tggactcca cagtattcca ccaaactctg
 361 caagatccca gagtaagggg cctgtathtt cctgctgg
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF275380 465 bp DNA linear VRL 20-SEP-2000
 DEFINITION Hepatitis B virus isolate g32-x X protein gene, complete cds.
 ACCESSION AF275380
 VERSION AF275380.1 GI:10198112
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 465)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (07-JUN-2000) Pediatric, Chulalongkorn University, Rama4,
 BKK 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..465
 /organism="Hepatitis B virus"
 /isolate="g32-x"
 /db_xref="taxon:10407"
 /note="isolated from gibbon serum"
 CDS 1..465
 /codon_start=1
 /product="X protein"
 /protein_id="AAG15190.1"
 /db_xref="GI:10198113"
 /translation="MAARVCCQLDTRDVLCLRPVGAESRGRPFSGPLGALPPSPSA
 VPADHGAHLSLRGLPVCAFSSAGPCALRFTSARCMETTVNAPRSLPTVLHKRTLGLPA
 MSTTGIETYFKDCVFKDWEELGEETRLKVFVVLGGCRHKLVCSPAPCNFFTSA"
 BASE COUNT 83 a 140 c 127 g 115 t
 ORIGIN
 1 atggctgcta ggggtgtgctg ccaactggat actacgcggg acgtcctttg tttacgtccc
 61 gtcggcgtg aatcccgcgg acgacccttc tgggggcgc ttggggctct accgccccct
 121 tctccgtctg cegttccagc cgaccacggg ggcacactct ctttacgcgg tctccccgtc
 181 tgtgccttct catctgccgg tccgtgtgca cttcgcttca cctctgcacg ttgcatggag
 241 accaccgtga acgcccccg gagcttgcca acggtcttgc ataagaggac tcttgactt
 301 ccagcaatgt caacgaccg aattgagaca tacttcaaag actgtgtgtt taaggactgg
 361 gaggagctgg gggaggagac gaggttaaag gtctttgtat taggaggctg taggcataaa
 421 ttggtctggt caccagcacc atgcaacttt ttcacctctg cctaa

//

ศูนย์วิทยุโทรพยากร
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF275378 415 bp DNA linear VRL 20-SEP-2000
 DEFINITION Hepatitis B virus isolate g32 pre-S1 protein gene, partial cds.
 ACCESSION AF275378
 VERSION AF275378.1 GI:10198108
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 415)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (07-JUN-2000) Pediatric, Chulalongkorn University, Rama4,
 BKK 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..415
 /organism="Hepatitis B virus"
 /isolate="g32"
 /db_xref="taxon:10407"
 /note="isolated from gibbon serum"
 CDS 1..>415
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAG15188.1"
 /db_xref="GI:10198109"
 /translation="MGQNLSVSNPLGFFPEHQLDPLFKANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGLLGWSSQAQGAITTLPAVHPPAATNRQSGRQPTPISPLR
 DSHPQAMKWNSTV FHQTLQDPRVRGLYFPAGGSSSG"
 BASE COUNT 102 a 124 c 102 g 87 t
 ORIGIN
 1 atggggcaga acctgtctgt cagcaatccc ttgggattct tccccgagca tcagttggat
 61 cccctggtca aagccaactc aaacaatcca gattgggact tcaatcccaa caaggacaac
 121 tggccagaag ccaccaaggt aggagtggga gcgttcgggc cagggttcac ccaccacac
 181 ggaggtcttt tagggtggag ctctcaggct cagggagcaa tcacaacatt gccagcagtt
 241 catcctcctg ccgctaccaa tcggcagtcc gggaggcagc ctactcccat atctcctccg
 301 ttgagagaca gtcacacctca ggccatgaag tggaactcta cagtattcca ccaaactctg
 361 caagatccca gagtaagggg cctatatttt cctgctggtg gctccagttc cggaa
 //

ศูนย์วิทยุทรัพยากร
 จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF274499 415 bp DNA linear VRL 23-AUG-2000
 DEFINITION Hepatitis B virus strain G28 pre-S1 protein gene, partial cds.
 ACCESSION AF274499
 VERSION AF274499.1 GI:9885422
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 415)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Pre S1 region of HBV isolated from gibbon serum
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 415)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (02-JUN-2000) Pediatric, Chulalongkorn University, Rama4,
 Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..415
 /organism="Hepatitis B virus"
 /strain="G28"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 /note="isolated from serum"
 CDS 1..>415
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAG01444.1"
 /db_xref="GI:9885423"
 /translation="MGQNHSVTNPLGFFPEHQLDPLFKANSSNPDWDFNPHKDNWPEA
 TKVGVGAFGPGFTPPHGLLGWSPQAQGNTTILPAVPLPASTNRQSGRQPTPISPPLR
 DTHPQAMQWNSTVFHRTLQDPRVRGLYFPAGGSSSG"
 BASE COUNT 101 a 130 c 97 g 87 t
 ORIGIN
 1 atggggcaga atcattccgt taccaaccct ctgggattct ttcccagca tcagttagac
 61 cctctgttca aggccaactc aagcaatcca gattgggact tcaaccgca caaggacaac
 121 tggcccgaag ccaccaaggc aggagtggga gcattcgggc ctgggttcac cccaccacac
 181 ggaggtcttc tagggtggag ccctcaggct caaggcaata caacatatt gccagcagtt
 241 cctcttcctg cctccaccaa tcggcagtca ggaaggcaac ctactcccat atctccacct
 301 ttgagggaca ctatcctca ggccatgcag tggaactcca cggattcca cagaactcta
 361 caagatccca gagtgagggg cctatatattt cctgctggtg gctccagttc cggaa
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF274496 415 bp DNA linear VRL 23-AUG-2000
 DEFINITION Hepatitis B virus strain G9 pre-S1 protein gene, partial cds.
 ACCESSION AF274496
 VERSION AF274496.1 GI:9885416
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 415)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Pre S1 region of HBV isolated from gibbon serum
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 415)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (02-JUN-2000) Pediatric, Chulalongkorn University, Rama4,
 Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..415
 /organism="Hepatitis B virus"
 /strain="G9"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 /note="isolated from serum"
 CDS 1..>415
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAG01441.1"
 /db_xref="GI:9885417"
 /translation="MGQNLSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGFTPPHGLLGWSPQAQGILTTLPAAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVVFHQTLQDPRVRGLYFPAGGSSSG"
 BASE COUNT 98 a 128 c 99 g 90 t
 ORIGIN
 1 atggggcaga atctttctgt caccaatcct ttgggatttt ttcccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caagacaac
 121 tggccagaag ccaccaaggt aggagtggga gctttcgggc cagggttcac ccctccacat
 181 ggcggtcttt tgggggtggag cccccaggct cagggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtca ggaaggcagg ccaactccaa ctctccaccg
 301 ttgagagaca ctcatcctca ggccatgcag tggaaactcca cggtattcca ccaaactctg
 361 caagatccca gagtgagggg cctatatattt cctgctggtg gctccagttc cggaa
 //

จุฬาลงกรณ์มหาวิทยาลัย

LOCUS AF274495 415 bp DNA linear VRL 23-AUG-2000
 DEFINITION Hepatitis B virus strain G3 pre-S1 protein gene, partial cds.
 ACCESSION AF274495
 VERSION AF274495.1 GI:9885414
 KEYWORDS .
 SOURCE Hepatitis B virus.
 ORGANISM Hepatitis B virus
 Viruses; Retroid viruses; Hepadnaviridae; Orthohepadnavirus.
 REFERENCE 1 (bases 1 to 415)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Pre S1 region of HBV isolated from gibbon serum
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 415)
 AUTHORS Noppornpanth,S., Theamboonlers,A., Ratanakorn,P. and Poovorawan,Y.
 TITLE Direct Submission
 JOURNAL Submitted (02-JUN-2000) Pediatric, Chulalongkorn University, Rama4,
 Bangkok 10330, Thailand
 FEATURES Location/Qualifiers
 source 1..415
 /organism="Hepatitis B virus"
 /strain="G3"
 /specific_host="gibbon"
 /db_xref="taxon:10407"
 /note="isolated from serum"
 CDS 1..>415
 /codon_start=1
 /product="pre-S1 protein"
 /protein_id="AAG01440.1"
 /db_xref="GI:9885415"
 /translation="MGQNHSVTNPLGFFPDHQLDPLFRANSNNPDWDFNPNKDNWPEA
 TKVGVGAFGPGLTPPHGGLLGWSPQAQGILTTLPAAPPPASTNRQSGRQATPISPPLR
 DTHPQAMQWNSTVVFHQTLDPRVRGLYFPAGGSSSG"
 BASE COUNT 102 a 134 c 96 g 83 t
 ORIGIN
 1 atggggcaga atcattccgt caccaatccc ttgggattct tccccgatca tcagttggac
 61 cctctgttca gagccaactc aaacaatcca gattgggact tcaaccccaa caagacaac
 121 tggccagaag ccaccaaggt aggagtggga gcattcgggc cagggctcac ccctccacat
 181 ggcggtcttt tggggtggag cccccaggct cagggcatat taacaacatt gccagcggca
 241 cctcctcctg cctccaccaa tcggcagtca ggaaggcaag ccacccaat ctctccacct
 301 ttgagagaca ctcatcctca ggccatgcag tggaaactcca cggtattcca ccaaactctg
 361 caagatccca gagtaagggg cctatatattt cctgctggtg gctccagttc cggaa
 //

จุฬาลงกรณ์มหาวิทยาลัย

BIOGRAPHY

Miss Suwanna Noppornpanth was born on January 5, 1970 in Bangkok, Thailand. She received her Bachelor degree of Science (Genetic) in 1990 and Master degree of Science (Industrial Microbiology) in 1994 from Faculty of Science, Chulalongkorn University. She has enrolled the Royal Golden Jubilee Scholar (TRF) in graduate program for the Degree of Doctor of Philosophy in Medical Microbiology, Inter-departmental program in Medical Microbiology, Chulalongkorn University since 1998.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย