เอกสารอ้างอิง

1. ประวิทย์ ชุมเกษียร "สถานภาพโรคพิษสุนัขบ้าในประเทศไทยและปัญหาการควบคุมป้องกัน" ของกองวิทยาศาสตร์ สภากาชาดไทย ปี พ.ศ.2531 พิมพ์ใน รายงานการประชุมสัมมนาโรคพิษสุนัขบ้าในประเทศไทย การปรับเปลี่ยนเพื่ออนาคต, หน้า 17-26, 2531

2. ประวิทย์ ชุมเกษียร "ระบาดวิทยาโรคพิษสุนัขบ้าในประเทศไทย" การป้องกันและควบคุมโรคพิษสุนัขบ้าในประเทศไทย กรุงเทพมหานคร: สำนักพิมพ์เมดิคัลมีเดีย, หน้า 30-32, 2527

3. Murphy, F.A., Bauer, S.P., and Harrison, A.K. "Comparative pathogenesis of rabies and rabies-like viruses, viral infection and transit from inoculation site to the central nervous system" Lab. Invest., 28: 361-376, 1973a.

4. Murphy, F.A., Harrison, A.K., and Win, W.C. "Comparative pathogenesis of rabies and rabies-like viruses, infection of the central nervous system and centrifugal spread of virus to peripheral tissue" Lab. Invest., 29; 1-16, 1973b.

5. Johnson, H.N. "Rabies virus" Viral and Rickettsial Infections of Man. pp. 814-840, Horsfell, F.I., and Tamm., I, eds. Philadelphia, Lippincott , 1965.

6. Anderson, L.T., Nicholson, K.G., and Tauxe, R.V. "Human rabies in the United States, 1960 to 1979: epidemiology, diagnosis, and prevention" Ann. Intern, Med., 100, 728-735, 1984.

7. Hemachudha, T., Phanuphak, P., and Sriwanthana, B. "Immunologic study of human encephalitic and paralytic rabies: A preliminary study of 16 patients" Am. J. Med. 84, 673-677, 1988c.

8. Warrell, D.A. "The clinical picture of rabies in man" Trans. Roy. Soc. Trop. Med. Hyg. 701, 188-195, 1976a.

9. Hattwick, M.A.W., and Gregg, M.B. "The disease in man" The National History of Rabies, pp. 281-303, Baer, G.M., ed., New York, Academic Press, 1975.

10. Sitthi-Amorn, C., Jiratanavattana, V., and Keoyoo, J. "The diagnostic properties of laboratory tests for rabies" Int. J. Epidemiol. 16, 602-605, 1987.

11. Hemachudha, T. "Rabies" Handbook of Clinical Neurology, pp.38, Mc Kendall, R.R., ed., 1989.

12. Thongcharoen, P "Prodome and incubation period in human rabies" Rabies, pp.35-47 Thongcharoen, ed., Bangkok, Aksarasmai,1980.

13. Conrat, H.F., Kimball, P.C., Levy, J.A. "Minus-strand RNA viruses" Virology, pp.127-129, 2nd, Conrat,ed., 1988.

14. Wiktor, T.J., Flamand, A., Koprowski, H. "Use of monoclonal antibodies in diagnosis of rabies virus infection and differentiation of rabies and rabies-related viruses" J. Virol. Methods., 1, 33-46, 1980.

15. Schmidt, J.R., Williams, M.C., Lule, M., and Mujomba, E. "Viruses isolated from mosquitoes collected in the Southern Sudan and Ethiopia" East African Virus Research Institute Reports, 15, 24-26, 1965.

16. Boulger, L.R., and Porterfield, J.S. "Isolation of a Virus from Nigerian fruit bats" Trans. R. Soc. Trop. Med. Hyg., 52, 421, 1958.

17. Rabies Statistic Division of Epidemiology Ministry of Public Health. Thailand, 1980-1986.

18. Trishnanda, M. "Rabies" Rabies, pp.29-34, Thongcharoen, ed., Bangkok, Aksarasmai, 1980.

19. Corey, L. "Rabies" Harrison's Principles ofInternal Medicine, pp.712-715, 11th, Braunwald ,E., ed., New York, Mc Graw-Hill, 1987.

20. Vaughn, J.B., Gerhardt, P., and Newell, K.W. "Excretion of street virus in saliva of dogs" JAMA, 193, 363, 1965.

21. Fekadu, M., Shaddock, J.H., and Baer, G.M. "Excretion of rabies virus in the saliva of dogs" J.Infect. Dis., 145, 715-719, 1982

22. Queen Saovabha Memorial Institute, Bangkok, Thailand. Rationale of treatment, personal communication.

23. Ermine, A., Tordo, N., and Tsiang, H. "Rapid diagnosis of rabies infection by means of a dot hybridization assay" Mol. cell. probes., 2, 75-82, 1988.

24. Sacramento, D., Bourhy, H., and Tordo, N. "PCR technique as an alternative method for diagnosis and molecular epidemiology of rabies virus" Mol. cell. probes., 5, 229-240, 1991.

25. Albert, J., and Fenyo, E.M. "Simple, sensitive, and specific detection of human immunodeficiency virus type I in clinical specimens by polymerase chain reaction with nested primers" J. Clin. Microb., July, 1560-1564, 1990.

26. Kaneyo, S., Feinstone, S.M., and Miller, R.H. "Rapid and sensitive method for the detection of serum hepatitis B virus DNA using the polymerase chain reaction technique" J. Clin. Microb., Sep., 1930-1933, 1989.

27. Evander, M., Edlund, K., and Boden, E. "Comparison of a one-step and two-step polymerase chain reaction with degenerate general primers in a population-based study of human papilloma virus infection in young swedish women" J. Clin. Microb., Apr., 987-992, 1992.

28. Baer, G.M. "Rabies virus" In: Field, B.N., et al. (Eds) Virology, New York, Raven press, 1133-1156, 1985.

29. Kaplan, C., Turner, G.S., and Warell, D.A. "Rabies in man: natural history, pathology, and illustrative case history" Rabies the fact 2nd edition, Oxford university press, 21-48, 1985.

30. Crick, J., and Brown, F."The biology of large RNA viruses" pp. 130-140, Barry, R.D., and Mahy, B.W.J., eds., Academic press, London, 1970.

31. Schneider, L.G., and Diringer, H. "Structure and molecular biology of Rabies virus" Curr. Top. Microbiol., 75, 153, 1976.

32. Davis, B.D., Dulbecco, R., Eisen, H.N., Ginsberg, H.S., Wood, W.B., and McCarty, M. "Rhabdoviruses" Microbiology ,pp.1367, 2nd, Harpes & Row, Publishers, 1973.

33. Pinteric, L., and Fenje, P. "Electron-microscopic observation of the rabies virus" International Symposium on Rabies Symp. Ser. Immunobiol. Standard., 1, 9-25, 1965.

34. Sokol, F., Kuwert, E., and Wiktor, T.J. "Purification of rabies virus grown in tissue culture" Virology, 2, 836-849, 1968.

35. Delagneau, J.F., Perrin, P., and Atanasiu, P. "Chemical dissection of rabies virus" Ann. Virol., 132, 473-493, 1981.

36. Wiktor, T.J., Gyorgy, E., and Schlumberger, H.D. "Antigenic properties of rabies virus components" J.Immunol., 110, 269-276, 1973.

37. Tordo, N., and Poch, O. "Structure of rabies virus" In: Campbell, J.B., and Charlton, K.M. (Eds) Rabies, pp.25-45, Kluwer Academic publishers , 1988.

38. Dietzschold, B., Cox, J.H., Schneider, L.G., Wiktor, T.J., and Koprowski, H. "Isolation and purification of polymeric forms of the glycoprotein of the rabies virus" J. Gen. Virol., 40, 1341-1350, 1978.

39. Wunner, W.H., Dietzschold, B., Curtis, P.J., and Wiktor, T.J. "Rabies subunit vaccines" J. Gen. Virol., 64, 1649-1656, 1983.

40. Anilionis, A., Wunner, W.H., and Curtis, P.J. "Structure of the glycoprotein gene in rabies virus" Nature, 294, 275-278, 1981.

41. Yelverton, E., Norton, S., Obijeski, J.F., and Goeddel, D.V. "Rabies virus glycoprotein analog: biosynthesis in E. coli" Science, 219, 614-620, 1983.

42. Tordo, N., Poch, O., Ermine, A., Keith, G., and Rougeon, F. "Walking along the rabies genome: is the large G-L intergenic region a remnant gene?" Proc. Natl. Acad. Sci. USA., 83, 3914-3918, 1986.

43. Dietzschold, B., Wunner, W.H., Wiktor, T.J., Lopes, A.D., Lafon, M., Smith, C.L. "Characterization of an antigenic determinant of the glycoprotein that correlates with pathogenicity of rabies virus" Proc. Natl. Acad. Sci. USA., 80, 70-74, 1983.

44. Wunner, W.H., Larson, J.K., Dietzschold, W., and Smith, C.L. "The molecular biology of rabies virus" Reviews of infectious disease, 10(54), S 771-S 784, 1988.

45. Perrin, P., Versmisse, P., and Delangneau, J.F. "The influence of the type of immunosorbent on rabies antibody EIA; advantanges of purified glycoprotein over whole virus" J. Biol. Stand., 14, 995-1020, 1986b.

46. Kawai, A. "Transcriptase activity associated with rabies virion" J. Virol., 24, 826-835, 1978.

47. Tordo, N., Poch, O., Ermine, A., and Keith, G. "Primary structure of leader RNA and nucleoprotein genes of the rabies genome: segmented homology with VSV" Nucleic Acid Res. 14, 2671-2683, 1986.

48. Maxam, A.M., and Gilbert, W. "Sequencing end-labeled DNA with base-specific chemical clevages" Methods Enzymol., 65, 499-560, 1980.

49. Dietzschold, B., Lafon, M., Wang, H., and Koprowski, H. "Localization and immunological characterization of antigenic domains of the rabies virus internal N and NS protein" Virus Res., 8, 103-125, 1987a.

50. Flamand, A., and Delagneau, J.F. "Transcriptional mapping of rabies virus in vivo" J.Virol., 28, 518-523, 1978.

51. Yusoff, K., Millar, N.S., Chambers, P., and Emmerson, P.T. "Nucleotide sequence analysis of the L gene of New castle disease virus: Homologics with Sendai and vesicular stomatitis viruses" Nucleic Acids Res., 15, 3961-3976, 1987.

52. Tordo, N., Poch, O., Keith, G., and Rougeons, F. "Completion of the rabies virus genome sequence determination: Highly conserved domains among the L (polymerase) proteins of unsegmented negative-strand RNA viruses" Virology, 165, 565-576, 1988.

53. Kurilla, M.G., Cabradilla, C.D., Holloway, B.P., and Keene, J.D. "Nucleotide sequence and host La protein interactions of rabies virus leader RNA" J. Virol., 50, 773-778, 1984.

54. Rose, J.K. "Complete intergenic and flanking gene sequence from the genome of Vesicular Stomatitis Virus" Cell, 19, 415-421, 1980.

55. Coslett, G.D., Holloway, B.P., and Obijeski, J.F. "The structural proteins of rabies virus and evidence for their synthesis from separate monocistronic RNA species" J. Gen. Virol., 49, 161-180, 1980.

56. Holloway, B.P., and Obijeski, J.F. "Rabies virus-induced RNA synthesis in BHK-21 cells" J. Gen. Virol., 49, 187-195, 1980.

57. Pennica, D., Holloway, B.P., Heyward, J.T., and Obeijeski, J.F. "In vitro translation of rabies virus messenger RNAs" Virology, 103, 517-521, 1980.

58. Helenius, A., Marsh, M., and White, J. "The entry of viruses into animal cells" Trends Biochem. Sci., 5, 104-106, 1980.

59. Wickner, W.T., and Lodish, H.F. "Multiple mechanisms of protein insertion into and across membranes" Science, 230, 400-407, 1985.

60. Choppin, P.W., and Compans, R.W. "Replication of para-myxoviruses" Comprehensive Virology (Conrat, H.F., and Wagner, R., eds) Plenum Press, New York, 4, 95-178, 1975.

61. Leppert, M., Rittenhouse, L., Perrault, J., Summers, D.F., and Kolakofsky, D. "Plus-strand leader RNA virus" Cell, 18, 735-747, 1979.

62. Watson, J.D. "VSV transcriptase is a multifunctional system that catalyzes both mRNA synthesis and replication" Molecular biology of the gene, vol 2, pp. 917-920, 1987.

63. Iwasaki, Y., Ohtani, S., and Clark, H.F. "Maturation of rabies virus by budding from neuronal cell membrane in suckling mouse brain" J.Virol., 15, 1020-1023, 1975.

64. Dean, D.J., Evans, W.M., and McClure, R.C. "Pathogenesis of Rabies" Bull. WHO., 29, 803, 1963.

65. Schindler, R. "Studies on the pathogenesis of rabies" Bull. WHO., 25, 119, 1961.

66. Murphy, F.A. "Rabies pathogenesis" Arch. Virol., 54, 279, 1977.

67. Murphy, F.A., and Bauer, S.P. "Early street virus infection in striated muscle and later progression to the central nervous system" Intervirol, 3, 256-268, 1974.

68. Baer, G.M., Shanthaveerappa, T.R., and Bourne, G.H. "Studies on the pathogenesis of fixed rabies virus in rats" Bull. WHO., 33, 783-794, 1965.

69. Baer, G.M., Shantha, T.R., and Bourne, G.H. "The pathogenesis of street rabies virus in rats" Bull. WHO., 38, 119-125, 1968.

70. Iwasaki, Y., and Clark, H.F. "Cell to cell transmission of virus in the central nervous system" Lab. Invest. 33, 391, 1975.

71. Schneider, L.G. "The rabies pathogenesis and the infection of central nervous system" Z. Bl. Bakt., 211, 281, 1969.

72. Schneider, L.G. "Spread of virus from the central nervous system" The Natural History of Rabies, pp.273-301, Baer, G.M., ed., Academic Press, 1975.

73. White, J., Matlin, K., and Helenius, A. "Rabies virus glycoprotein: Biological and serological characterization" Infect. Immun., 16, 754-759, 1977.

74. Seif, I., Coulon, P., Rollin, R.E., and Flamand, A. "Rabies virulence: effect on pathogenicity and sequence characterization of rabies virus mutations affecting antigenic site III of the glycoprotein" J. Virol., 53, 926-934, 1985.

75. Wunner, W.H., and Koprowski, H. "Clinical and molecular aspects of rabies virus infections of the nervous system" Clinical and Molecular Aspects of Neurotropics virus infection, pp.268-299, Gilden, D.H., and Lipton, H.L., eds, Kluwer Academic Publishers, 1989.

76. Dietzschold, B., Wiktor, T.J., Trojanowski, J.A., Macfarlan, R.I., and Wunner, W.H. "Differences in cell-to-cell spread of pathogenic and apathogenic rabies virus in vivo and in vitro" J. Virol., 56, 12-18, 1985.

77. Kucera, P., Dolivo, M., Coulon, P., and Flamand, A. "Pathways of the early propagation of virulent and avirulent rabies strains from the eye to the brain" J. Virol., 55, 158-162, 1985.

78. Torres-Anjel, M.L., Montano-Hirose, J., and Wiktor, T.J. "A new approach to the pathogenicity of rabies virus as aided by immunoperoxidase staining" Am. Assn. Vet. Lab. Diagnost., 27, 1-26, 1984.

79. Soave, O.A. "Transmission of rabies to mice by ingestion of infected tissue" Am. J. Vet. Res., 166, 44, 1966.

80. Houff, S.A., Burton, R.C., Wilson, R.W., Henson, T. E., and Loudon, W.T. "Human to human transmission of rabies virus by corneal transplant" New Eng. J. Med., 300, 603-604, 1979.

81. Atanasiu, P. "Animal inoculation and the Negri body" In the Natural History of Rabies, Baer, G.M., ed, pp. 373, Academic press, New York, 1975.

82. Coons, A.H., and Kaplan, M.H. "Localization of antigen in tissue cells: Improvements in a method for the detection of antigen by mean of fluorescent antibody" J.Exp. Med., 91, 1-13, 1950.

83. Goldwasser, R.A., and Kissling, R.E. "Fluorescent antibody staining of street and fixed rabies virus antigen in mouse brain" Proc. Soc. Exp. Biol. Med., 98, 219, 1958.

84. Dean, D.J., and Abelseth, K.M. "The fluorescent antibody test" W.H.O. Monogr. Ser., 23, 73-84, 1973.

85. Blenden, C.D., Creek, W., and Anjel, J.M. "Use of immunofluorescence examination to detect rabies virus antigen in the skin of humans with clinical encephalitis" J. Inf. Dis., 154(4), 698-701, 1986.

86. Bourhy, H., Rollin, E.P., Vincent, J., and Sureau, P. "Comparitive field evaluation of the fluorescent antibody test, virus isolation from tissue culture, and enzyme immunodiagnosis for rapid laboratory diagnosis of rabies" J. Clin. Microb., Mar, 519-523, 1989.

87. Webster, L.T., and Dawson, J.R. "Early diagnosis of rabies by mouse inoculation" Proc. Soc. Exp. Biol. Med., 32, 570-573, 1935.

88. Koprowski, H "The mouse inoculation test" Laboratory techniques in rabies, 3rd ed., Kaplan, M.M., and Koprowski, H, eds., W.H.O. Monogr. Ser., 23, 85, 1973.

89. Smith, J.S., Yager, P.A., and Baer, G.M. "A rapid reproducible test for determining rabies neutralizing antibody" Bull. WHO., 48, 535, 1973.

90. Heberling, R.L., and Kalter, S.S. "Rapid dot immunobinding assay on nitrocellulose for viral antibodies" J. Clin. Microbiol., 23, 109-113, 1986.

91. Heberling, R.L., Kalter, S.S., Smith, J.S., and Hidebrand, D.G. "Serodiagnosis of rabies by dot immunobinding assay" J. Clin. Microbiol., July, 1262-1264, 1987.

92. Vishawapoka, U., Hemachudha, T., Tepsumethanon, W., Polsuwan, C., Tirawatnpong, S., and Phanuphak, P. "Development of new diagnostic test of rabies infection by immunoblot" Lancet, i, 881, 1988.

93. Rudd, R.J., Trimarchi, C.V., and Melvin, K.A. "Tissue culture technique for routine isolation of street virus" J. Clin. Microbiol., Oct, 590-593, 1980.

94. Rudd, R.J., and Trimarchi, C.V. "Comparison of sensitivity of BHK-21 cells and murine neuroblastoma cells in the isolation of a street strain rabies virus" J. Clin. Microbiol., 25, 1456-1458, 1987.

95. Rudd, R.J., and Trimarchi, C.V. "Development and evaluation of an in vitro virus isolation procedure as a replacement for mouse inoculation test in rabies diagnosis" J. Clin. Microbiol., Nov, 2522-2528, 1989.

96. Perrin, P., and Sureau, P. "A collaborative study of an experimental kit for rapid rabies enzyme immunodiagnosis (RREID)" Bull. Wld. Hlth. Org., 65(4), 489-493, 1987.

97. Saiki, R.K., Scharf, S., Faloona, F., Mullis, K.B., Horn, G.T., and Eelich, H.A. "Enzymatic amplification of β-globin genomic sequences and restriction site analysis for diagnosis of sickle cell anemia" Science, 230, 1350-1354, 1985.

98. Mullis, K.B., Faloona, F.A., Scharf, S.J., Saiki, R. K., Horn, G.T., and Erlich, H.A. "Specific enzymatic amplification of DNA in vitro: the polymerase chain reaction" Cold Spring Harbor Symp. Quant. Biol., 51, 263-273, 1986.

99. Mullis, K.B., and Faloona, F.A. "Specific synthesis of DNA in vitro via a polymerase-catalyzed chain reaction" Methods Enzymol., 155, 335-350, 1987.

100. Saiki, R.K. "The design and optimization of the PCR" PCR Technology: principles and applications for DNA amplification, Erlich, H.A., ed., pp.7-16 ,W.H. Freeman and company, New York, 1991.

101. Innis, A.M., Gelfand, H.D., Sninsky, J.J., and White, J.T. "Optimization of PCRs" PCR protocols, Innis, A.M., ed., pp. 3-12, Academic press, 1990.

102. Innis, A.M., Myambo, B.K., and Gelfand, H.D. "DNA sequencing with Thermus aquaticus DNA polymerase and direct sequencing of polymerase chain reaction-amplified DNA" Proc. Natl. Acad. Sci. USA, 85, 9436-9440, 1988.

103. Chien, A., Edgar, B.D., and Trela, M.J. "Deoxyribonucleic acid polymerase from the extreme thermophile Thermus aquaticus" J. Bacteriol., 127, 1550, 1976.

104. Saiki, R.K., Gelfand, H.D., Stoffel, S., Scharf, J. S., Higuchi, R., and Horn, T.G. "Primer-directed enzymatic amplification of DNA with a thermostable DNA polymerase" Science, 239, 487-491, 1988.

105. Gelfand, D.H. "Taq DNA polymerase" PCR Technology: principle and applications for DNA amplification, Erlich, H.A., ed., pp. 17-22, W.H. Freeman and company, New York, 1991.

106. Tindall, K.R., and Kunkel, T.A. "Fidelity of DNA synthesis by the Thermus aquaticus DNA polymerase" Biochemistry, 27, 6008-6013, 1988.

107. Chomczynski, P., and Sacchi, N. "Single-step method of RNA isolation by acid guanidinium thiocyanate phenol chloroform extraction" Anal. Biochem., 162, 156-159, 1987.

108. Kamolvarin, N., Tirawatnpong, T., Rattanasiwamoke, R., Tirawatnpong, S., Panpanich, T., and Hemachudha, T. "Diagnosis of Rabies by Polymerase Chain Reaction with Nested Primers" J. Infect. Dis., 167, 207-210, 1993.

109. Maniatis, T., Fritsch, E.F., and Sambrook, J. "Qunatitation of DNA and RNA" Molecular Cloning: a aboratory manual, pp.468, Cold Spring Harbor, New York, 1982.

110. จิตร สิทธิอมร และ สังคม จงพิพัฒน์วณิชย์ "การตรวจพิเศษเพื่อการวินิจฉัย, เอกสารหมายเลข 9" เอกสารการปฐมนิเทศนิสิตปริญญาโทและประกาศนียบัตรบัณฑิต คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย 27-31 พค., 2534

111. Maniatis, T., Fritsch, E.F., and Sambrook, J. "Extraction, purification, and analysis of mRNA from eukaryotic cells" Molecular Cloning: a laboratory manual, pp.188-190, Cold Spring Harbor, New York, 1982.

112. Gama, R.E., Hughes, P.J., Bruce, C.B., and Stanway, G. "Polymerase chain reaction amplification of rhinovirus nucleic acids from clinical material" Nucleic Acids Res., 16, 9346, 1988.

113. Gouvea, V., Glass, R.I., Woods, P., Taniguchi, K., and Fang, Z.Y. "Polymerase chain reaction amplification and typing of Rotavirus nucleic acid from stool specimens" J. Clin. Microbiol., Feb, 276-282, 1990.

114. Smith, J.S., Fishbein, D.B., Rupprecht, C.E., and Clark, K. "Unexplained rabies in three immigrants in the United States: A virologic investigation" New Eng J Med, 324, 205-211, 1991.

ภาคผนวก ก

สารเคมี อุปกรณ์ และเครื่องมือต่าง ๆ

1. สารเคมี

Guanidine (Aminomethanamidine) thiocyanate salt (CH_3N_3-HSCN) (Sigma, MO., USA)

Sarcosyl ($C_{15}H_{30}N\ NaO_2$) (Sigma, MO., USA)

2-mercaptoethanol (Sigma, MO., USA)

Sodium acetate (CH_3COONa) (Sigma, MO., USA)

phenol; ultra pure phenol redistilled nucleic acid grade (BRL, USA)

Chloroform ($CHCl_3$) (Merck, Germany)

Isoamyl alcohol ($C_5H_{11}OH$) (Farmitalia carlo erba S.P.A., Milano)

Tri-sodium citrate ($C_6H_5Na_3O_7 \cdot 2H_2O$) (Merck, Germany)

Bromophenol blue ($C_{19}H_{10}Br_4O_5S$) (Sigma, MO., USA)

Xylene cyanol FF ($C_{25}H_{27}N_2O_6S_2Na$) (Sigma, MO., USA)

Sucrose ($C_{12}H_{22}O_{11}$) (Sigma, MO., USA)

Diethylpyrocarbonate ($C_6H_{10}O_5$) (Sigma, MO., USA)

Isopropanol

Absolute ethanol (C_2H_5OH) (E.Merck, Damstadt, Germany)

Sodium chloride (NaCl) (BDH, England)

Sodium hydroxide (NaOH) (BDH, England)

Agarose; ultra pure electrophoresis grade (Gibco BRL, USA)

EDTA (Ethylenediamine tetraacetic acid (Sigma, MO., USA)

Ethidium bromide ($C_{21}H_{20}N_3Br$) (Sigma, MO., USA)

Trisma base ($C_4H_{11}NO_3$) (Sigma, MO., USA)

Deoxynucleotide triphosphate 100 mM (Promega, WI, USA)

Mineral oil (BRL, USA)

99% Glycerol (BRL, USA)

RNA_{se} inhibitor 40,000 U/ml (Promega, WI, USA)

Reverse transcriptase (AMV) 8,000-10,000 U/ml พร้อม 5x RT buffer (Promega, WI, USA)

Taq DNA polymerase 5,000 U/ml พร้อม 10x Taq DNA polymerase buffer (Promega, WI, USA)

Primer I (17 bases) 5' CTA CAA TGG ATG CCG AC 3' (Synthetic genetics, USA)

Primer II (18 bases) 5' GAG TCA CTC GAA TAT GTC 3' (Synthetic genetics, USA)

Primer III (19 bases) 5' GAC ATG TCC GGA AGA CTG G 3'
(Synthetic genetics, USA)

Primer IV (20 bases) 5' GTA TTG CCT CTC TAG CGG TG 3'
(Synthetic genetics, USA)

DNA/Hind III size markers 500 ug (BRL, USA)

2. อุปกรณ์เครื่องใช้

2.1 วัสดุพลาสติก

Polypropylene, round-bottom tube with cap size 17x100 mm (Becton Dickinson Co, USA)

Centrifuge tube 50 ml with screwcap (Nunc, Denmark)

Micro-centrifuge tube 1.5 ml, 0.6 ml (Elkay Products, Inc., USA)

2.2 เครื่องแก้ว

Serological pipettes (Pyrex, Corning, NY, USA)

Erlenmeyer flask (Pyrex, Corning, NY, USA)

beaker (Pyrex, Corning, NY, USA)

Cylinder (Pyrex, Corning, NY, USA)

3. <u>เครื่องมือ</u>

Homoginizer : Ultra-turrax T 25 (Janke-kunkel, Germany)

Biohazard

Automatic pipettes (Gilson, France)

Microcentrifuge (Hermile, Germany)

Speed vacuum (UniEquip, Germany)

Spectrophotometer DU-6 (Beckman, USA)

DNA Thermal Cycler 48 wells (Perkin Elmer Cetus, USA)

Horizontal apparatus and gel casting system (BRL, USA)

Power supply (Pharmacia LKB, Sweden)

Mixer vortex (Scientific industries, USA)

UV transluminator (Fotodyne, Inc., USA)

FRC-10 camera system (Fotodyne, Inc., USA)

ภาคผนวก ข

การเตรียมน้ำยา

1. การเตรียมน้ำยาสำหรับสกัด RNA

1.1 0.75 M Sodium citrate pH 7.0

Tri-sodium citrate	22.05	g
ปรับ pH ด้วย glacial acetic acid		
เติมน้ำกลั่นให้ครบ	100	ml
ทำให้ปราศจากเชื้อโดย autoclave		

1.2 Diethylpyrocarbonate water (DEPC·H_2O)

DEPC	1	ml
เติมน้ำกลั่นให้ครบ	1,000	ml
ทำลาย DEPC โดยการ autoclave		

1.3 Guanidium thiocyanate stock solution
(GTC stock solution)

guanidine thiocyanate salt	250	g
0.75 M sodium citrate pH 7.0	17.6	ml
น้ำกลั่น	293	ml

เก็บในขวดสีน้ำตาล

1.4 10% Sarcosyl

Sarcosyl	10	g
น้ำกลั่น	100	ml

1.5 Guanidium thiocyanate working solution
(Denaturing solution)

GTC stock solution	47.1	ml
10% Sarcosyl	2.5	ml
2-mercaptoethanol	0.4	ml

เตรียมก่อนใช้

1.6 Phenol (nucleic acid grade)
ละลาย phenol ที่ 65 ^{o}C
เติม DEPC·H_2O เท่าตัว
วางไว้จนกระทั่ง phenol แยกจาก DEPC·H_2O ชัดเจน
เก็บในขวดสีน้ำตาล หรือห่อด้วยกระดาษฟอยล์

หมายเหตุ saturated phenol สามารถเก็บไว้ได้
นาน 1 เดือนที่ 4 ^{o}C

1.7 5 M NaOH

NaOH	200	g
เติมน้ำกลั่นจนครบ	1,000	ml

1.8 2 M NaOH

5 M NaOH	400	ml
เติมน้ำกลั่นจนครบ	1,000	ml

1.9 Chloroform : isoamylalcohol 45:1

Isoamylalcohol	1	ml
เติม chloroform ครบ	50	ml

เก็บในขวดสีน้ำตาล หรือ ห่อด้วยกระดาษฟอยล์

1.10 2 M Sodium acetate pH 4.0

Sodium acetate	162.02	g
ปรับ pH ด้วย glacial acetic acid		
เติมน้ำกลั่นครบ	1,000	ml

ทำให้ปราศจากเชื้อโดย autoclave

2. การเตรียมน้ำยาสำหรับ PCR

2.1 5 mM dNTP (dATP, dCTP, dGTP, dTTP)

เตรียม 25 mM dNTP จาก 100 mM และ dilute ลง 5 เท่า

2.2 1.25 mM dNTP

เตรียม 1.25 mM dNTP จาก 5 mM dNTP โดย dilute ลง 4 เท่า

3. การเตรียมน้ำยาสำหรับ gel eletrophoresis

3.1 50x TAE buffer stock solution

Trisma base	242	g
Glacial acetic acid	57.1	ml
0.5 M EDTA pH 8.0	100	ml
เติมน้ำกลั่นครบ	1,000	ml

ทำให้ปราศจากเชื้อโดย autoclave

3.2 1x TAE buffer working solution

50x TAE	20	ml
เติมน้ำกลั่นครบ	1,000	ml

3.3 0.5 M EDTA pH 8.0

EDTA	18.6	g
เติมน้ำกลั่นครบ	100	ml

ปรับ pH ด้วย NaOH

3.4 1.2% agarose

Agarose	3	g
1x TAE	250	ml

ต้ม agarose ด้วย microwave oven จนกระทั่งใส เติม ethidium bromide 12.5 ul, mix ให้เข้ากัน ตั้งทิ้งไว้ให้มีอุณหภูมิประมาณ 55-60 ^{o}C ก่อนเท gel

3.5 Ethidium bromide

Ethidium bromide	0.1	g
เติมน้ำกลั่นครบ	10	ml

3.6 Gel loading buffer (Type I)

0.25% bromophenol blue

0.25% Xylene cyanol

40% (W/V) sucrose in distilled water

เก็บไว้ที่ 4 ^{o}C

ประวัติผู้เขียน

ราตรี รัตนศิวรัมกษ์ เกิดเมื่อวันที่ 3 มีนาคม พศ. 2508 ที่จังหวัดปทุมธานี สำเร็จการศึกษาบริญญาวิทยาศาสตร์บัณฑิต (เทคนิคการแพทย์) จากมหาวิทยาลัยขอนแก่น เมื่อปี พศ.2531 เข้ารับราชการที่ รพ.ธรรมศาสตร์ มหาวิทยาลัยธรรมศาสตร์ ในตำแหน่งนักวิทยาศาสตร์ตั้งแต่ปี พศ. 2531 จนถึงปัจจุบัน