

รายการอ้างอิง

ภาษาไทย

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ภาษาอังกฤษ

Aikawa M, Andrutis AT, and Howard RJ. Membrane-associated electron-dense material of the asexual stages of *Plasmodium falciparum*: evidence for movement from the intracellular parasite to the erythrocyte membrane. *Am J Trop Med Hyg.* 1986; 35(1): 30-36.

Aikawa M, Miller LH, Johnson J, and Rabbege J. Erythrocyte entry by malarial parasites. A moving junction between erythrocyte and parasite. *J Cell Biol.* 1978; 87: 72-82.

Alonso PL, Lopez MC, Bordmann G, Smith TA, Aponte JJ, Weiss NA, Urassa H, Armstrong-Schellenberg JR, Kitua AY, Masanja H, Thomas MC, Oettli A, Hurt N, Hayes R, Kilama WL, and Tanner M. Immune responses to *Plasmodium falciparum* antigens during a malaria vaccine trial in Tanzanian children. *Parasite Immunol.* 1998; 20(2): 63-71.

Alonso PL, Smith TA, Armstrong-Schellenberg JR, Kitua AY, Masanja H, Hayes R, Hurt N, Font F, Menendez C, Kilama WL, and Tanner M. Duration of protection and age-dependence of the effects of the SPf66 malaria vaccine in African children exposed to intense transmission of *Plasmodium falciparum*. *J Infect Dis.* 1996; 174(2): 367-372.

Al-Yaman F, Genton B, Kramer KJ, Chang SP, Hui GS, and Baisor M. Assessment of the role of naturally acquired antibody levels to *Plasmodium falciparum* merozoite surface protein-1 in protecting Papua New Guinea children from malaria morbidity. *Am J Trop Med Hyg.* 1996; 54: 443-448.

- Anders RF, Crewther PE, Edwards S, Margetts M, and Matthew ML, Pollock B, Pye D. Immunisation with recombinant AMA-1 protects mice against infection with *Plasmodium chabaudi*. *Vaccine* 1998; 16(2-3): 240-247.
- Aribot G, Rogier C, Sarthou JL, Trape JF, Balde AT, Druilhe P and Roussilhon C. Pattern of immunoglobulin isotype response to *Plasmodium falciparum* blood-stage antigens in individuals living in a holoendemic area of Senegal (Dielmo, west Africa). *Am J Trop Med Hyg.* 1996; 54(5): 449-457.
- Ayala FJ, and Fitch WM. Genetics and the origin of species: an introduction. *Proc Natl Acad Sci USA.* 1997; 94(15): 7691-7697.
- Ayala FJ, and Rich SM. Genetic variation and the recent worldwide expansion of *Plasmodium falciparum*. *Gene* 2000; 261(1): 161-170.
- Babiker HA, Lines J, Hill WG and Walliker D. Population structure of *Plasmodium falciparum* in villages with different malaria endemicity in east Africa. *Am J Trop Med Hyg.* 1997; 56(2): 141-147.
- Barale JC, Candelle D, Attal-Bannefoy G. Dehoux P, Bonnefoy S, Ridley R, Pereira da Silva L, Langsley G. *Plasmodium falciparum* AARP1, a giant protein containing repeated motifs rich in asparagine and aspartate residues, is associated with the infected erythrocyte membrane. *Infect Immun.* 1997; 65(8): 3003-3010.
- Baruch DI, and Gormely JA, Ma C, Howard RJ, Pasloske BL. *Plasmodium falciparum* erythrocyte membrane protein 1 is a parasitized erythrocyte receptor for adherence to CD36, thrombospondin, and intercellular adhesion molecule 1. *Proc Natl Acad Sci USA.* 1996; 93. 3497-3502.
- BenMohamed L, Gras-Masse H, Tartar A, Daubersies P, Brahim K, Bossus M, Thomas A, and Druilhe P. Lipopeptide immunization without adjuvant induces potent and long-lasting B, T helper, and cytotoxic T lymphocyte responses against a malaria liver stage antigen in mice and chimpanzees. *Eur J Immunol.* 1997; 27(5): 1242-1253.
- Berzins K, and Anders RF. The malaria antigens. Malaria. , in **Malaria; Molecular and clinical aspects**, eds. Wahlgren M. and Perlmann P. (Singapore: Overseas Publishers Association, 1999), p 181-216.

- Blackman MJ, Heidrich HG, Donachie S, McBride JS, and Holder AA. A single fragment of a malaria merozoite surface protein remains on the parasite during red cell invasion and is the target of invasion-inhibiting antibodies. *J Exp Med.* 1990; 172(1): 379-382.
- Blackman MJ, and Holder AA. Secondary processing of the *Plasmodium falciparum* merozoite surface protein-1 (MSP1) by a calcium-dependent membrane-bound serine protease: shedding of MSP1₃₃ as a noncovalently associated complex with other fragments of the MSP1. *Mol Biochem Parasitol.* 1992; 50(2): 307-315.
- Blackman MJ, Ling IT, Nicholls SC, and Holder AA. Protein proteolytic processing of the *Plasmodium falciparum* merozoite surface protein-1 produces a membrane-bound fragment containing two epidermal growth factor-like domains. *Mol Biochem Parasitol.* 1991; 49(1): 29-33.
- Blackman MJ, Scott-Finnigan TJ, Shai S, and Holder AA. Antibodies inhibit the protease-mediated processing of a malaria merozoite surface protein. *J Exp Med.* 1994; 180(1): 389-393.
- Blackman MJ, Whittle H, and Holder AA. Processing of the *Plasmodium falciparum* major merozoite surface protein-1: identification of a 33-kilodalton secondary processing product which is shed prior to erythrocyte invasion. *Mol Biochem Parasitol.* 1991; 49(1): 35-44.
- Borre MB, Dziegiel M, Hogh B, Petersen E, Rieneck K, Riley E, Meis JF, Aikawa M, Nakamura K, and Harada M. Primary structure and localization of a conserved immunogenic *Plasmodium falciparum* glutamate rich protein (GLURP) expressed in both the pre-erythrocytic and erythrocytic stages of the vertebrate life cycle. *Mol Biochem Parasitol.* 1991; 9(1): 19-31.
- Bottius E, BenMohamed L, Brahimi K, Gras H, Lepers JP, Raharimalala L, Aikawa M, Meis J, Slierendregt B, Tartar A, Thomas A, and Druilhe P. A novel *Plasmodium falciparum* sporozoite and liver stage antigen (SALSA) defines major B, T helper, and CTL epitopes. *J Immunol.* 1996; 156(8): 2874-2884.

- Branch OH, Takala S, Kariuki S, Nahlen BL, Kolczak M, Hawley W and Lal AA. *Plasmodium falciparum* genotypes, low complexity of infection, and resistance to subsequent malaria in participants in the Asembo Bay Cohort Project. *Infect Immun.* 2001; 69(12) :7783-7792.
- Branch OH, Udhayakumar V, Hightower AW, Oloo AJ, Hawley WA, Nahlen BL, Bloland PB, Kaslow DC, and Lal AA. A longitudinal investigation of IgG and IgM antibody responses to the merozoite surface protein-1 19-kiloDalton domain of *Plasmodium falciparum* in pregnant women and infants: associations with febrile illness, parasitemia, and anemia. *Am J Trop Med Hyg.* 1998; 58(2): 211-219.
- Brown AE, Webster HK, Lyon JA, Thomas AW, Permpnich B, and Gross M. Characterization of naturally acquired antibody responses to a recombinant fragment from the N-terminus of *Plasmodium falciparum* glycoprotein 195. *Am J Trop Med Hyg.* 1991; 45(5): 567-573.
- Camargo LM, dal Colletto GM, Ferreira MU, Gurgel Sde M, Escobar AL, Marques A, Krieger H, Camargo EP and da Silva LH. Hypoendemic malaria in Rondonia (Brazil, western Amazon region): seasonal variation and risk groups in an urban locality. *Am J Trop Med Hyg.* 1996; 55(1): 32-38.
- Camus D, and Hadley TJ. A *Plasmodium falciparum* antigen that binds to host erythrocytes and merozoites. *Science* 1985; 230(4725): 553-556.
- Cavanagh DR, Dobano C, Elhassan IM, Marsh K, Elhassan A, Hviid L, Khalil EA, Theander TG, Arnot DE, and McBride JS. Differential patterns of human immunoglobulin G subclass responses to distinct regions of a single protein, the merozoite surface protein 1 of *Plasmodium falciparum*. *Infect Immun.* 2001; 69(2): 1207-1211.
- Cavanagh DR, Elhassan IM, Roper C, Robinson VJ, Giha H, Holder AA, Hviid L, Theander TG, Arnot DE, and McBride JS. A longitudinal study of type-specific antibody responses to *Plasmodium falciparum* merozoite surface protein-1 in an area of unstable malaria in Sudan. *J Immunol.* 1998; 161(1): 347-359.
- Cavanagh DR, and McBride JS. Antigenicity of recombinant proteins derived from *Plasmodium falciparum* merozoite surface protein 1. *Mol Biochem Parasitol.* 1997 ; 85(2): 197-211.

- Certa U, Rotmann D, Matile H, and Reber-Liske R. A naturally occurring gene encoding the major surface antigen precursor p190 of *Plasmodium falciparum* lacks tripeptide repeats. **EMBO J.** 1987; 6(13): 4137-4142.
- Chang SP, Case SE, Gosnell WL, Hasimoto A, Kramer KJ and Tam LQ. A recombinant baculovirus 42-kilodaton C-terminal fragment of *Plasmodium falciparum* merozoite surface protein 1 protects *Aotus* monkeys against malaria **Infect Immun.** 1996; 64: 253-261
- Chang SP, Gibson HL, Gibson HL, Lee-Ng CT, Barr PJ, and Hui GS. A carboxyl-terminal fragment of *Plasmodium falciparum* gp195 expressed by a recombinant baculovirus induces antibodies that completely inhibit parasite growth. **J Immunol.** 1992; 149(2): 548-555.
- Chang SP, Hui GS, Kato A, and Siddiqui WA. Generalized immunological recognition of the major merozoite surface antigen (gp195) of *Plasmodium falciparum*. **Proc Natl Acad Sci USA.** 1989; 86(16): 6343-6347.
- Chang SP, Kramer KJ, Yamaga KM, Kato A, Case SE, Siddiqui WA. *Plasmodium falciparum*: gene structure and hydropathy profile of the major merozoite surface antigen (gp195) of the Uganda-Palo Alto isolate. **Exp Parasitol.** 1988; 67(1): 1-11.
- Chappel JA, Egan AF, Riley EM, Druilhe P, and Holder AA. Naturally acquired human antibodies which recognize the first epidermal growth factor-like module in the *Plasmodium falciparum* merozoite surface protein 1 do not inhibit parasite growth in vitro. **Infect Immun.** 1994; 62(10): 4488-4494.
- Chappel JA, and Holder AA. Monoclonal antibodies that inhibit *Plasmodium falciparum* invasion in vitro recognise the first growth factor-like domain of merozoite surface protein-1. **Mol Biochem Parasitol.** 1993; 60(2): 303-311.
- Chaudhuri A, Zbrzezna V, Polyakova J, Pogo AO, Hesselgesser J, and Horuk R. Expression of the Duffy antigen in K562 cells. Evidence that it is the human erythrocyte chemokine receptor. **J Biol Chem.** 1994; 269(11): 7835-7838.
- Cheung A, Leban J, Shaw AR, Merkli B, Stocker J, Chizzolini C, Sander C, and Perrin LH. Immunization with synthetic peptides of a *Plasmodium falciparum* surface antigen induces antimerozoite antibodies. **Proc Natl Acad Sci USA.** 1986; 83(21): 8328-8332.

- Clark JT, Donachie S, Anand R, Wilson CF, Heidrich HG, and McBride JS. 46-53 kilodalton glycoprotein from the surface of *Plasmodium falciparum* merozoites. *Mol Biochem Parasitol*. 1989; 32(1): 15-24.
- Collins WE, Pye D, Crewther PE, Vandenberg KL, Galland GG, Sulzer AJ, Kemp DJ, Edwards SJ, Coppel RL, and Sullivan JS. Protective immunity induced in squirrel monkeys with recombinant apical membrane antigen-1 of *Plasmodium fragile*. *Am J Trop Med Hyg*. 1994; 51(6): 711-719.
- Conway DJ, Cavanagh DR, Tanabe K, Roper C, Mikes ZS, Sakihama N, Bojang KA, Oduola AM, Kremsner PG, Arnot DE, Greenwood BM, and McBride JS. A principal target of human immunity to malaria identified by molecular population genetic and immunological analyses. *Nat Med*. 2000; 6(6): 689-692.
- Conway DJ, Greenwood BM, McBride JS. Longitudinal study of *Plasmodium falciparum* polymorphic antigens in a malaria-endemic population. *Infect Immun*. 1992; 60(3): 1122-1127.
- Cooper JA, Cooper LT, and Saul AJ. Mapping of the region predominantly recognized by antibodies to the *Plasmodium falciparum* merozoite surface antigen MSA 1. *Mol Biochem Parasitol*. 1992; 51(2): 301-312.
- Cooper JA, Ingram LT, Bushell GR, Fardoulis CA, Stenzel D, Schofield L, and Saul AJ. The 140/130/105 kilodalton protein complex in the rhoptries of *Plasmodium falciparum* consists of discrete polypeptides. *Mol Biochem Parasitol*. 1988; 29(2-3): 251-260.
- Corcoran LM, Forsyth KP, Bianco AE, Brown GV, and Kemp DJ. Chromosome size polymorphisms in *Plasmodium falciparum* can involve deletions and are frequent in natural parasite populations. *Cell* 1986; 44(1): 87-95.
- Corcoran LM, Thompson JK, Walliker D, and Kemp DJ. Homologous recombination within subtelomeric repeat sequences generates chromosome size polymorphisms in *Plasmodium falciparum*. *Cell* 1988; 53(5): 807-813.
- Crawley J, English M, Waruiru C, Mwangi I, and Marsh K. Abnormal respiratory patterns in childhood cerebral malaria. *Trans R Soc Trop Med Hyg*. 1998; 92(3): 305-308.

- Crewther PE, Culvenor JG, Silva A, Cooper JA, and Anders RF. *Plasmodium falciparum*: two antigens of similar size are located in different compartments of the rhoptry. *Exp Parasitol.* 1990; 70(2): 193-206.
- Crewther PE, Matthew ML, Flegg RH, and Anders RF. Protective immune responses to apical membrane antigen 1 of *Plasmodium chabaudi* involve recognition of strain-specific epitopes. *Infect Immun.* 1996; 64(8): 3310-3317.
- Culvenor JG, and Crewther PE. S-antigen localization in the erythrocytic stages of *Plasmodium falciparum*. *J Protozool.* 1990; 7(1): 9-65.
- D'Alessandro U, Leach A, Drakeley CJ, Bennett S, Olaleye BO, Fegan GW, Jawara M, Langerock P, George MO, and Targett GA. Efficacy trial of malaria vaccine SPf66 in Gambian infants. *Lancet* 1995; 346(8973): 462-467.
- Delersnijder W, Hendrix D, Bendahman N, Hanegreefs J, Brijs L, Hamers-Casterman C, and Hamers R. Molecular cloning and sequence analysis of the gene encoding the major merozoite surface antigen of *Plasmodium chaubaudi chaubaudi* IC-PCL. *Mol Biochem Parasitol.* 1990; 43: 231-244.
- Del Portillo HA, Longacre S, Khouri E, and David PH. Primary structure of the merozoite surface antigen 1 of *Plasmodium vivax* reveals sequences conserved between different Plasmodium species. *Proc Natl Acad Sci USA.* 1991; 88(9): 4030-4034.
- Dodoo D, Theander TG, Kurtzhals JA, Koram K, Riley E, Akanmori BD, Nkrumah FK and Hviid L. Levels of antibody to conserved parts of *Plasmodium falciparum* merozoite surface protein 1 in Ghanaian children are not associated with protection from clinical malaria. *Infect Immun.* 1999; 67(5): 2131-2137.
- Dolan SA, Herrfeldt JA, and Wellems TE. Restriction polymorphisms and fingerprint patterns from an interspersed repetitive element of *Plasmodium falciparum* DNA. *Mol Biochem Parasitol.* 1993; 61(1): 137-142.
- Doolan DL, Hedstrom RC, Rogers WO, Charoenvit Y, Rogers M, de la Vega P, and Hoffman SL. Identification and characterization of the protective hepatocyte erythrocyte protein 17 kDa gene of *Plasmodium yoelii*, homolog of *Plasmodium falciparum* exported protein 1. *J Biol Chem.* 1996; 271(30): 17861-17868.

- Doolan DL, and Hoffman SL. Pre-erythrocytic-stage immune effector mechanisms in *Plasmodium* spp. infections. *Philos Trans R Soc Lond B Biol Sci.* 1997; 352: 1361-1367.
- Egan AF, Burghaus P, Druilhe P, Holder AA, and Riley EM. Human antibodies to the 19kDa C-terminal fragment of *Plasmodium falciparum* merozoite surface protein 1 inhibit parasite growth in vitro. *Parasite Immunol.* 1999; 21(3): 133-139.
- Egan AF, Morris J, Barnish G, Allen S, Greenwood BM, and Kaslow DC. Clinical immunity to *Plasmodium falciparum* malaria is associated with serum antibodies to the 19 kDa C-terminal fragment of the merozoite surface protein, PfMSP-1. *J Infect Dis.* 1996; 173: 765-769.
- Egan JE, Hoffman SL, Haynes JD, Sadoff JC, Schneider I, Grau GE, Hollingdale MR, Ballou WR, and Gordon DM. Humoral immune responses in volunteers immunized with irradiated *Plasmodium falciparum* sporozoites. *Am J Trop Med Hyg.* 1993; 49(2): 166-173.
- Ekala MT, Jouin H, Lekoulou F, Issifou S, Mercereau-Puijalon O and Ntoumi F. *Plasmodium falciparum* merozoite surface protein 1 (MSP1): genotyping and humoral responses to allele-specific variants. *Acta Trop.* 2002; 81(1): 33-46.
- Engel J. EGF-like domains in extracellular matrix proteins: localized signals for growth and differentiation?. *FEBS Microbiol Lett.* 1989. 17; 251(1-2): 1-7.
- Escalante AA, and Ayala FJ. Phylogeny of the malarial genus *Plasmodium*, derived from rRNA gene sequences. *Proc Natl Acad Sci USA.* 1994; 91(24):11373-11377.
- Escalante AA, and Ayala FJ. Evolutionary origin of *Plasmodium* and other Apicomplexa based on rRNA genes. *Proc Natl Acad Sci USA.* 1995; 92(13): 5793-5797.
- Escalante AA, Barrio E, and Ayala FJ. Evolutionary origin of human and primate malarias: evidence from the circumsporozoite protein gene. *Mol Biol Evol.* 1995; 12(4): 616-626.
- Etlinger HM, Caspers P, Matile H, Schoenfeld HJ, Stueber D, and Takacs B. Ability of recombinant or native proteins to protect monkeys against heterologous challenge with *Plasmodium falciparum*. *Infect Immun.* 1991; 59(10): 3498-3503.

- Ettling MB, Thimasarn K, Krachaiklin S, and Bualombai P. Malaria clinics in Mae Sot, Thailand: factors affecting clinic attendance. **Southeast Asian J Trop Med Public Health**. 1989; 20(3): 331-340.
- Feng Z, Hoffmann RN, Nussenzweig RS, Tsuji M, Fujioka H, Aikawa M, Lensen TH, Ponnudurai T, and Pologe LG. Pfs2400 can mediate antibody-dependent malaria transmission inhibition and may be the *Plasmodium falciparum* 11.1 gene product. **J Exp Med**. 1993; 177(2): 273-281.
- Ferreira MU, Liu Q, Kaneko O, Kimura M, Tanabe K, Kimura EA, Katzin AM, Isomura S, and Kawamoto F. Allelic diversity at the merozoite surface protein-1 locus of *Plasmodium falciparum* in clinical isolates from the southwestern Brazilian Amazon. **Am J Trop Med Hyg**. 1998; 59(3): 474-480.
- Fidock DA, Bottius E, Brahimi K, Moelans II, Aikawa M, Konings RN, Certa U, Olafsson P, Kaidoh T, and Asavanich A. Cloning and characterization of a novel *Plasmodium falciparum* sporozoite surface antigen, STARP. **Mol Biochem Parasitol**. 1994; 64(2): 219-232.
- Freeman RR, Trejdosiewicz AJ, and Cross GA. Protective monoclonal antibodies recognising stage-specific merozoite antigens of a rodent malaria parasite. **Nature** 1980; 284(5754): 366-368.
- Fries HC, Lamers MB, van Deursen J, Ponnudurai T, and Meuwissen JH. Biosynthesis of the 25-kDa protein in the macrogametes/zygotes of *Plasmodium falciparum*. **Exp Parasitol**. 1990; 71(2): 229-235.
- Fruh K, Doumbo O, Muller HM, Koita O, McBride J, Crisanti A, Toure Y, and Bujard H. Human antibody response to the major merozoite surface antigen of *Plasmodium falciparum* is strain specific and short-lived. **Infect Immun**. 1991; 59(4): 1319-1324.
- Fujioka H, and Aikawa M, " The malaria parasite and its life cycle," in **Malaria; Molecular and clinical aspects**, eds. Wahlgren M. and Perlmann P. (Singapore: Overseas Publishers Association, 1999), p. 19-56.
- Gandon S, Mackinnon MJ, Nee S and Read AF. Imperfect vaccines and the evolution of pathogen virulence. **Nature**. 2001; 414(6865): 751-756.

- Gibson HL, Tucker JE, Kaslow DC, Krettli AU, Collins WE, Kiefer MC, Bathurst IC, and Barr PJ. Structure and expression of the gene for Pv200, a major blood-stage surface antigen of *Plasmodium vivax*. *Mol Biochem Parasitol*. 1992; 50(2): 325-333.
- Goman M, Langsley G, Hyde JE, Yankovsky NK, Zolg JW, and Scaife JG. The establishment of genomic DNA libraries for the human malaria parasite *Plasmodium falciparum* and identification of individual clones by hybridisation. *Mol Biochem Parasitol*. 1982; 5(6): 391-400.
- Guerin-Marchand C, Druilhe P, Galey B, Londono A, Patarapotikul J, Beaudoin RL, Dubeaux C, Tartar A, Mercereau-Puijalon O, and Langsley G. A liver-stage-specific antigen of *Plasmodium falciparum* characterized by gene cloning. *Nature* 1987; 329(6135): 164-167.
- Guevara Patino JA, and Holder AA, McBride JS, Blackman MJ. Antibodies that inhibit malaria merozoite surface protein-1 processing and erythrocyte invasion are blocked by naturally acquired human antibodies. *J Exp Med*. 1997; 186(10): 1689-1699.
- Harrison Ba, Rattanarithikul R, Peyton EL, and Mongkolpanya K. Taxonomic changes, revised occurrence records and note on the Culicidae of Thailand and neighboring countries. *Mosquito Systematics*. 1990; 22(3): 196-227.
- Herrera S, Herrera MA, Perlaza BL, Burki Y, Caspers P, Dobeli H, Rotmann D, and Certa U. Immunization of *Aotus* monkeys with *Plasmodium falciparum* blood-stage recombinant proteins. *Proc Natl Acad Sci USA*. 1990; 87(10): 4017-4021.
- Herrera MA, Rosero F, Herrera S, Caspers P, Rotmann D, Sinigaglia F, and Certa U. Protection against malaria in *Aotus* monkeys immunized with a recombinant blood-stage antigen fused to a universal T-cell epitope: correlation of serum gamma interferon levels with protection. *Infect Immun*. 1992; 60(1): 154-158.
- Herrington D, Davis J, Nardin E, Beier M, Cortese J, Eddy H, Losonsky G, Hollingdale M, Sztein M, and Levine M. Successful immunization of humans with irradiated malaria sporozoites: humoral and cellular responses of the protected individuals. *Am J Trop Med Hyg*. 1991; 45(5): 539-547.

- Holder AA. The precursor to major merozoite surface antigens: structure and role in immunity. *Prog Allergy* 1988; 41: 72-97.
- Holder AA, and Blackman MJ. What is the function of MSP-1 on the malaria merozoite? *Parasitol Today* 1994; 10: 182-184.
- Holder AA, and Freeman RR. Biosynthesis and processing of a *Plasmodium falciparum* schizont antigen recognized by immune serum and a monoclonal antibody. *J Exp Med.* 1982; 156(5): 1528-1538.
- Holder AA, and Freeman RR. Immunization against blood-stage rodent malaria using purified parasite antigens. *Nature* 1981; 294: 361-364.
- Holder AA, Locker MJ, Odink KG, Sandhu JS, Davey LS, and Tizard MLV. Primary structure of the precursor to the three major antigens of *Plasmodium falciparum* merozoites. *Nature* 1985; 317: 270-273.
- Holder AA, Sandhu JS, Hillman Y, Davey LS, Nicholls SC, Cooper H, and Lockyer MJ. Processing of the precursor to the major merozoite surface antigens of *Plasmodium falciparum*. *Parasitol.* 1987; 94 (Pt 2): 199-208.
- Howard RF, Narum DL, Blackman M, and Thurman J. Analysis of the processing of *Plasmodium falciparum* rhoptry-associated protein 1 and localization of Pr86 to schizont rhoptries and p67 to free merozoites. *Mol Biochem Parasitol.* 1998; 92 (1): 111-122.
- Howard RJ, McBride JS, Aley SB, Marsh K. Antigenic diversity and size diversity of *P. falciparum* antigens in isolates from Gambian patients. The schizont surface glycoprotein of molecular weight approximately 200,000. *Parasite Immunol.* 1986; 8(1): 57-68
- Hughes AL and Verra F. Very large long-term effective population size in the virulent human malaria parasite *Plasmodium falciparum*. *Proc R Soc Lond B Biol Sci.* 2001; 268(1478): 1855-1860.
- Hughes AL. Positive selection and interallelic recombination at the merozoite surface antigen-1 (MSA-1) locus of *Plasmodium falciparum*. *Mol Biol Evol.* 1992; 9(3): 381-393.

- Hui GS, Chang SP, Gibson H, Hashimoto A, Hashiro C, Barr PJ, and Kotani S. Influence of adjuvants on the antibody specificity to the *Plasmodium falciparum* major merozoite surface protein, gp195. *J Immunol.* 1991; 147(11): 3935-3941.
- Hui GS, Hashimoto A, Chang SP. Roles of conserved and allelic regions of the major merozoite surface protein (gp195) in immunity against *Plasmodium falciparum*. *Infect Immun.* 1992 ;60(4):1422-1433.
- Hui GS, and Siddiqui WA. Serum from Pf195 protected *Aotus* monkeys inhibit *Plasmodium falciparum* growth in vitro. *Exp Parasitol.* 1987; 64(3): 519-522.
- Imbert P, Sartelet I, Rogier C, Ka S, Baujat G, and Candito D. Severe malaria among children in a low seasonal transmission area, Dakar, Senegal: influence of age on clinical presentation. *Trans R Soc Trop Med Hyg.* 1997; 91(1): 22-24.
- Jiang G, Daubenberger C, Huber W, Matile H, Tanner M, and Pluschke G. Sequence diversity of the merozoite surface protein 1 of *Plasmodium falciparum* in clinical isolates from the Kilombero District, Tanzania. *Acta Trop.* 2000; 74(1): 51-61.
- Jongwutiwes S, Tanabe K, Kakazawa S, Yanaki T, and Kanbara H. Sequence variation in the tripeptide repeats and T cell epitopes in P190 (MSA-1) of *Plasmodium falciparum* from field isolates. *Mol Biochem Parasitol.* 1992; 51(1): 81-89.
- Jongwutiwes S, Tanabe K, and Kanbara H. Sequence conservation in the C-terminal part of the precursor to the major merozoite surface proteins (MSP1) of *Plasmodium falciparum* from field isolates. *Mol Biochem Parasitol.* 1993; 59: 95-100.
- Jongwutiwes S, Tanabe K, Nakazawa S, Uemura H, and Kanbara H. Coexistence of gp195 alleles of *Plasmodium falciparum* in a small endemic area. *Am J Trop Med Hyg.* 1991; 44: 299-305.
- Jouin H, Rogier C, Trape JF, and Mercereau-Puijalon O. Fixed, epitope-specific, cytophilic antibody response to the polymorphic block 2 domain of the *Plasmodium falciparum* merozoite surface antigen MSP-1 in humans living in a malaria-endemic area. *Eur J Immunol.* 2001; 31(2): 539-550.
- Kaneko O, Kimura M, Kawamoto F, Ferreira MU and Tanabe K. *Plasmodium falciparum*: allelic variation in the Merozoite surface protein-1 gene in wild isolates from southern Vietnam. *Exp Parasitol.* 1997; 89: 45-57.

- Kaslow DC, Quakyi IA, Syin C, Raum MG, Keister DB, Coligan JE, McCutchan TF, and Miller LH. A vaccine candidate from the sexual stage of human malaria that contains EGF-like domains. *Nature*. 1988; 333: 74-76.
- Kemp DJ, Thompson JK, Walliker D, and Corcoran LM. Molecular karyotype of *Plasmodium falciparum*: conserved linkage groups and expendable histidine-rich protein genes. *Proc Natl Acad Sci USA*. 1987; 84 (21): 7672-7676.
- Kerr PJ, Ranford-Cartwright L, and Walliker D. Proof of intragenic recombination in *Plasmodium falciparum*. *Mol Biochem Parasitol*. 1994; 66: 242-248.
- Kimura E, Mattei D, di Santi SM, Scherf A. Genetic diversity in the major merozoite surface antigen of *Plasmodium falciparum*: high prevalence of a third polymorphic form detected in strains derived from malaria patients. *Gene* 1990; 91(1): 57-62.
- Kitua AY, Urassa H, Wechsler M, Smith T, Vounatsou P, Weiss NA, Alonso PL, and Tanner M. Antibodies against *Plasmodium falciparum* vaccine candidates in infants in an area of intense and perennial transmission: relationships with clinical malaria and with entomological inoculation rates. *Parasite Immunol*. 1999; 21(6): 307-317.
- Konate L, Zwetyenga J, Rogier C, Bischoff E, Fontenille D, Tall A, Spiegel A, Trape JF, and Mercereau-Puijalon O. Variation of *Plasmodium falciparum* msp1 block 2 and msp2 allele prevalence and of infection complexity in two neighbouring Senegalese villages with different transmission conditions. *Trans R Soc Trop Med Hyg*. 1999; 93 Suppl 1: 21-28.
- Krotoski WA, Collins WE, Bray RS, Garnham PC, Cogswell FB, Gwadz RW, Killick-Kendrick R, Wolf R, Sinden R, Koontz LC, and Stanfill PS. Demonstration of hypnozoites in sporozoite-transmitted *Plasmodium vivax* infection. *Am J Trop Med Hyg*. 1982; 31(6): 1291-1293.
- Krotoski WA, Krotoski DM, Garnham PC, Bray RS, Killick-Kendrick R, Draper CC, Targett GA, and Guy MW. Relapses in primate malaria: discovery of two populations of exoerythrocytic stages. *Br Med J*. 1980; 280(6208): 153-154.

- Kumar N, Folgar JP, and Lubega P. Recognition of *Plasmodium falciparum* asexual stage antigens by antibodies in sera from people exposed to *Plasmodium vivax*. *Am J Trop Med Hyg.* 1992; 47(4): 422-428.
- Kumar S, Yadava A, Keister DB, Tian JH, Ohl M, and Perdue Greenfield KA. Immunogenicity and in vivo efficacy of recombinant *Plasmodium falciparum* merozoite surface protein-1 in *Aotus* monkeys. *Mol Med.* 1995; 1: 325-332.
- Lew AM, and Back DJ. The epitope of a protective monoclonal antibody occurs in region of microheterogeneity in *Plasmodium chabaudi*. *Mol Biochem Parasitol.* 1990; 25(3): 153-154.
- Lewis AP. Cloning and analysis of the gene encoding the 230-kilodalton merozoite surface antigen of *Plasmodium yoelii*. *Mol Biochem Parasitol.* 1989; 36(3): 271-282.
- Locher CP, Tam LQ, Chang SP, McBride JS, and Siddiqui WA. *Plasmodium falciparum*: gp195 tripeptide repeat-specific monoclonal antibody inhibits parasite growth in vitro. *Exp Parasitol.* 1996; 84(1): 74-83.
- Lyon JA, Geller RH, Haynes JD, Chulay JD, and Weber JL. Epitope map and processing scheme for the 195,000-dalton surface glycoprotein of *Plasmodium falciparum* merozoites deduced from cloned overlapping segments of the gene. *Proc Natl Acad Sci USA.* 1986; 83: 2989-2993.
- Mackay M, Goman M, Bone N, Hyde JE, Scaife J, Certa U, Stunnenberg H and Bujard H. Polymorphism of the precursor for the major surface antigens of *Plasmodium falciparum* merozoites: studies at the genetic level. *EMBO J.* 1985; 4: 3823-3829.
- Maitland K, Kyes S, Williams TN, and Newbold CI. Genetic restriction of *Plasmodium falciparum* in an area of stable transmission: an example of island evolution? *Parasitol.* 2000; 120 (Pt 4): 335-343.
- Majarian WR, Daly TM, Weidanz WP, and Long CA. Passive immunization against murine malaria with an IgG3 monoclonal antibody. *J Immunol.* 1984 ; 132(6): 3131-3137.

- Marshall VM, Silva A, Foley M, Cranmer S, Wang L, McColl DJ, Kemp DJ, and Coppel RL. A second merozoite surface protein (MSP-4) of *Plasmodium falciparum* that contains an epidermal growth factor-like domain. *Infect Immun*. 1997; 65(11): 4460-4467.
- Marsh K, English M, Crawley J, and Peshu N. The pathogenesis of severe malaria in African children. *Ann Trop Med Parasitol*. 1996; 90(4): 395-402.
- McBride JS, Newbold CI, and Anand R. Polymorphism of a high molecular weight schizont antigen of the human malaria parasite *Plasmodium falciparum*. *J Exp Med*. 1985; 161: 160-180.
- McColl DJ, Silva A, Foley M, Kun JF, Favaloro JM, Thompson JK, Marshall VM, Coppel RL, Kemp DJ, and Anders RF. Molecular variation in a novel polymorphic antigen associated with *Plasmodium falciparum* merozoites. *Mol Biochem Parasitol*. 1994; 8(1): 53-67.
- McCutchan TF, Dame JB, Miller LH, and Barnwell J. Evolutionary relatedness of *Plasmodium* species as determined by the structure of DNA. *Science* 1984; 225: 808-811.
- Miller LH, Good MF, and Milon G. Malaria pathogenesis. *Science* 1994; 264: 1878-1883.
- Miller LH, Howard RJ, Carter R, Good MF, Nussenzweig V, and Nussenzweig RS. Research toward malaria vaccines. *Science* 1986; 234(4782): 1349-1356.
- Moelans II, Meis JF, Kocken C, Konings RN, and Schoenmakers JG. A novel protein antigen of the malaria parasite *Plasmodium falciparum*, located on the surface of gametes and sporozoites. *Mol Biochem Parasitol*. 1991; 45(2): 193-204.
- Muller HM, Fruh K, von Brunn A, Esposito F, Lombardi S, Crisanti A, and Bujard H. Development of the human immune response against the major surface protein (gp190) of *Plasmodium falciparum*. *Infect Immun*. 1989; 57(12): 3765-3769.
- Myler PJ. Nucleotide and deduced amino acid sequence of the gp195 (MSA-1) gene from *Plasmodium falciparum* Palo Alto PLF-3/B11. *Nucleic Acids Res*. 1989; 17(13):5401.

- Nosten F, Luxemburger C, Kyle DE, Ballou WR, Wittes J, Wah E, Chongsuphajaisiddhi T, Gordon DM, White NJ, Sadoff JC, and Heppner DG. Randomised double-blind placebo-controlled trial of SPf66 malaria vaccine in children in northwestern Thailand. Shoklo SPf66 Malaria Vaccine Trial Group. **Lancet** 1996; 348(9029): 701-707.
- Nussenzweig RS, and Long CA. Malaria vaccines: multiple targets. **Science** 1994; 265: 1381-1383.
- Nussenzweig V, and Nussenzweig RS. Rationale for the development of an engineered sporozoite malaria vaccine. **Adv Immunol.** 1989; 45: 283-334.
- Olafasson P, Matile H, and Certa U. *Plasmodium falciparum*: the repetitive MSA-1 surface protein of the RO-71 isolate is recognized by mouse antibody against the nonrepetitive repeat block of RO-33. **Exp Parasitol.** 1992; 74(4): 381-389.
- Pace T, Ponzi M, Scotti R, and Frontali C. Structure and superstructure of *Plasmodium falciparum* subtelomeric regions. **Mol Biochem Parasitol.** 1995; 69(2): 257-268.
- Pan W, Tolle R. and Bujard H. A direct and rapid sequencing strategy for the *Plasmodium falciparum* antigen gene gp190/MSA1. **Mol Biochem Parasitol.** 1995; 73 (1-2), 241-244.
- Patarroyo ME, Amador R, Clavijo P, Moreno A, Guzman F, Romero P, Tascon R, Franco A, Murillo LA, and Ponton G. A synthetic vaccine protects humans against challenge with asexual blood stages of *Plasmodium falciparum* malaria. **Nature** 1988; 332: 158-160.
- Perlmann H, BerZins K, Wahlgren M, Classon J, Bjorkman A, Patarroyo ME, and Perlmann P. Antibodies in malarial sera to parasite antigen in the membrane of erythrocytes infected with early sexual stages of *Plasmodium falciparum*. **J Exp Med.** 1984; 159: 1686-1704.
- Perrin LH, Merkli B, Loche M, Chizzolini C, Smart J, and Richle R. Antimalarial immunity in *Saimiri* monkeys. Immunization with surface components of asexual blood stages. **J Exp Med.** 1984; 160(2): 441-451.
- Peterson MG, Coppel RL, McIntyre P, Langford CJ, Woodrow G, Brown GV, Anders RF, and Kemp DJ. Variation in the precursor to the major merozoite surface antigens of *Plasmodium falciparum*. **Mol Biochem Parasitol.** 1988; 27(2-3): 291-301.

- Peterson MG, Coppel RL, Moloney MB, and Kemp DJ. Third form of the precursor to the major merozoite surface antigens of *Plasmodium falciparum*. *Mol Cell Biol*. 1988; 8(6): 2664-2667.
- Peterson MG, Marshall VM, Smythe JA, Crewther PE, Lew A, Silva A, Anders RF, and Kemp DJ. Integral membrane protein located in the apical complex of *Plasmodium falciparum*. *Mol Cell Biol*. 1989; 9(7) : 3151-3154.
- Pollack Y, Katzen AL, Spira DT, and Golenser J. The genome of *Plasmodium falciparum*. I: DNA base composition. *Nucleic Acids Res*. 1982; 10(2): 539-546.
- Prensier G, and Slomianny C. The karyotype of *Plasmodium falciparum* determined by ultrastructural serial sectioning and 3D reconstruction. *J Parasitol*. 1986; 72(5): 731-716.
- Qari SH, Shi YP, Pieniazek NJ, Collins WE, and Lal AA. Phylogenetic relationship among the malaria parasites based on small subunit rRNA gene sequences: monophyletic nature of the human malaria parasite, *Plasmodium falciparum*. *Mol Phylogenet Evol*. 1996; 6(1): 157-165.
- Quakyi IA, Matsumoto Y, Carter R, Udomsangpetch R, Sjolander A, Berzins K, Perlmann P, Aikawa M, and Miller LH. Movement of a *Plasmodium falciparum* malaria protein through the erythrocyte cytoplasm to the erythrocyte membrane is associated with lysis of the erythrocyte and release of gametes. *Infect Immun*. 1989; 57(3): 833-839.
- Ranford-Cartwright LC, Balfe P, Carter R and Walliker D. Direct sequencing of enzymatically amplified DNA of alleles of the merozoite surface antigen MSA-1 gene from the malaria parasite *Plasmodium falciparum*. *Mol Biochem Parasitol*. 1991; 46(1):185-187.
- Rich SM, and Ayala FJ. Population structure and recent evolution of *Plasmodium falciparum*. *Proc Natl Acad Sci USA*. 2000; 97(13): 6994-7001.
- Rich SM, Licht MC, Hudson RR and Ayala FJ. Malaria's Eve: evidence of a recent population bottleneck throughout the world populations of *Plasmodium falciparum*. *Proc Natl Acad Sci USA*. 1998; 95(8): 4425-4430.

- Riley EM, Allen SJ, Wheeler JG, Blackman MJ, Bennett S, Takacs B, Schonfeld HJ, Holder AA, and Greenwood BM. Naturally acquired cellular and humoral immune responses to the major merozoite surface antigen (PfMSP1) of *Plasmodium falciparum* are associated with reduced malaria morbidity. *Parasite Immunol.* 1992; 14(3): 321-337.
- Rogers WO, Malik A, Mellouk S, Nakamura K, Roger MD, Szarfman A, Gordon Nussler AK, Akiawa M, and Hofman SL. Characterization of *Plasmodium falciparum* sporozoite surface protein 2. *Proc Natl Acad Sci USA.* 1992; 89: 9176-9180..
- Rosenberg R, and Rungsiwongse J. The number of sporozoites produced by individual malaria oocysts. *Am J Trop Med Hyg.* 1991; 45(5): 574-577.
- Rosenberg R, Wirtz RA, Schneider I and Burge R. An estimation of the number of malaria sporozoites ejected by a feeding mosquito. *Trans R Soc Trop Med Hyg.* 1990; 84(2): 209-212.
- Sakihama N, Kimura M, Hirayama K, Kanda T, Na-Bangchang K, Jongwutiwes S, Conway D and Tanabe K. Allelic recombination and linkage disequilibrium within Msp-1 of *Plasmodium falciparum*, the malignant human malaria parasite. *Gene* 1999; 230(1): 47-54.
- Sam -Yellowe TY, Fujioka H, Aikawa M, and Messineo DG. *Plasmodium falciparum* rhoptry proteins of 140/130/110 kd (Rhop-H) are located in an electron lucent compartment in the neck of the rhoptries. *J Eukaryot Microbiol.* 1995; 42(3): 224-231.
- Sanger F, Nicklen S, and Coulson AR. DNA sequencing with chain-terminating inhibitors. *Proc Natl Acad Sci USA.* 1977; 74: 5463-5467.
- Scherf A, Mattei D, and Sarthou JL. Multiple infections and unusual distribution of block 2 of the MSA1 gene of *Plasmodium falciparum* detected in west African clinical isolates by polymerase chain reaction analysis. *Mol Biochem Parasitol.* 1991; 44 (2): 297-299.
- Scherf A, Barbot P, and Langsley G. Sequence and length polymorphic of major malaria vaccine candidate analysed following DNA amplification. *Nucleic Acids Res.* 1989; 17, 1774.

- Shofield L. On the function of repetitive domains in protein antigens of *Plasmodium* and other eukaryotic parasite. **Parasitol Today**. 1991; 7: 99-105.
- Siddiqui WA, Tam LQ, Kramer KJ, Hui GS, Case SE, Yamaga KM, Chang SP, Chan EB, and Kan SC. Merozoite surface coat precursor protein completely protects *Aotus* monkeys against *Plasmodium falciparum* malaria. **Proc Natl Acad Sci USA**. 1987; 84(9): 3014-3018.
- Smythe JA, Coppel RL, Brown GV, Ramasamy R, Kemp DJ, and Anders RF. Identification of two integral membrane proteins of *Plasmodium falciparum*. **Proc Natl Acad Sci USA**. 1988; 85(14): 5195-5209.
- Smythe JA, Coppel RL, Day KP, Martin RK, Oduola AM, Kemp DJ, and Anders RF. Structural diversity in the *Plasmodium falciparum* merozoite surface antigen 2. **Proc Natl Acad Sci USA**. 1991; 88(5): 1751-1755.
- Snewin VA, Herrera M, Sanchez G, Scherf A, Langsley G, and Herrera S. Polymorphism of the alleles of the merozoite surface antigens MSA1 and MSA2 in *Plasmodium falciparum* wild isolates from Colombia. **Mol Biochem Parasitol**. 1991; 49(2): 265-275.
- Somboon P, Aramrattana A, Lines J and Webber R. Entomological and epidemiology investigation of malaria transmission in relation to population movement in forest areas of north-west Thailand. **Southeast Asian J Trop Med Public Health**. 1998; 29: 3-9.
- Spencer HC. Epidemiology of malaria. **Clin Trop Med Com Dis**. 1986; 1: 1-28
- Stahl HD, Bianco AE, Crewther PE, Burkot T, Coppel RL, Brown GV, Anders RF, Kemp DJ. An asparagine-rich protein from blood stages of *Plasmodium falciparum* shares determinants with sporozoites. **Nucleic Acids Res**. 1986;14(7): 3089-3102.
- Stoute JA, Slaoui M, Heppner DG, Momin P, Kester KE, Desmons P, Wellde BT, Garcon N, Krzych U, and Marchand M. A preliminary evaluation of a recombinant circumsporozoite protein vaccine against *Plasmodium falciparum* malaria. **N Engl J Med**. 1997; 336(2): 86-91.

- Suhrbier A, Holder AA, Wiser MF, Nicholas J, and Sinden RE. Expression of the precursor of the major merozoite surface antigens during the hepatic stage of malaria. *Am J Trop Med Hyg.* 1989; 40(4): 351-355.
- Szarfman A, Walliker D, McBride JS, Lyon J, Quakyi IA, and Carter R. Allelic forms of gp195, a major blood-stage antigen of *Plasmodium falciparum*, are expressed in liver stages. *J Exp Med.* 1988; 167: 231-236.
- Tadei WP and Dutary Thatcher B. Malaria vectors in the Brazilian amazon: Anopheles of the subgenus Nyssorhynchus. *Rev Inst Med Trop Sao Paulo.* 2000; 42(2):87-94.
- Tam JP, Clavijo P, Lu YA, Nussenzweig V, Nussenzweig R, and Zavala F. Incorporation of T and B epitopes of the circumsporozoite protein in a chemically defined synthetic vaccine against malaria. *J Exp Med.* 1990; 171(1): 299-306.
- Tanabe K, Mackay M, Goman M, and Scaife JG. Allelic dimorphism in a surface antigen gene of the malaria parasite *Plasmodium falciparum*. *J Mol Biol.* 1987;195(2): 273-287.
- Tanabe K, Sakihama N, Nakamura Y, Kaneko O, Kimura M, Ferreira MU, and Hirayama K. Selection and genetic drift of polymorphisms within the merozoite surface protein-1 gene of *Plasmodium falciparum*. *Gene* 2000; 241(2): 325-331.
- Tolle R, Fruh K, Doumbo O, Koita O, N'Diaye M, Fischer A, Dietz K, and Bujard H. A prospective study of the association between the human humoral immune response to *Plasmodium falciparum* blood stage antigen gp190 and control of malarial infections. *Infect Immun.* 1993; 61(1): 40-47.
- Triglia T, Wellems TE, and Kemp DJ. Toward a high resolution restriction map of the *Plasmodium falciparum* genome. *Parasitol Today* 1992; 8: 225-229.
- Valero MV, Amador R, Aponte JJ, Narvaez A, Galindo C, Silva Y, Rosas J, Guzman F, and Patarroyo ME. Evaluation of SPf66 malaria vaccine during a 22-month follow-up field trial in the Pacific coast of Colombia. *Vaccine* 1996; 14(15): 1466-1470.

- Valero MV, Amador LR, Galindo C, Figueroa J, Bello MS, Murillo LA, Mora AL, Patarroyo G, Rocha CL, and Rojas M. Vaccination with SPf66, a chemically synthesised vaccine, against *Plasmodium falciparum* malaria in Colombia. *Lancet* 1993; 341: 705-710.
- Vernick KD, and McCutchan TF. Sequence and structure of a *Plasmodium falciparum* telomere. *Mol Biochem Parasitol*. 1988; 28(2): 85-94.
- Volkman SK, Barry AE, Lyons EJ, Nielsen KM, Thomas SM, Choi M, Thakore SS, Day KP, Wirth DF and Hartl DL. Recent origin of *Plasmodium falciparum* from a single progenitor. *Science* 2001; 293(5529): 482-484.
- Warrell DA, Molyneux ME, and Beale PF. Severe and complicated malaria. *Tran Roy Soc Trop Med Hyg*. 1990; 84: 1-65.
- Waters AP, Higgins DG, and McCutchan TF. Evolutionary relatedness of some primate models of *Plasmodium*. *Mol Biol Evol*. 1993; 10(4): 914-923.
- Waters AP, Higgins DG, and McCutchan TF. *Plasmodium falciparum* appears to have arisen as a result of lateral transfer between avian and human hosts. *Proc Natl Acad Sci USA*. 1991 ; 88(8): 3140-3144.
- Weber JL. Molecular biology of malaria parasites. *Exp Parasitol*. 1988; 66(2): 143-170.
- Weber JL, Leininger WM, Lyon JA. Variation in the gene encoding a major merozoite surface antigen of the human malaria parasite *Plasmodium falciparum*. *Nucleic Acids Res*. 1986;14(8):3311-3323.
- Weber JL, Lyon JA, Wolff RH, Hall T, Lowell GH, and Chulay JD. Primary structure of a *Plasmodium falciparum* malaria antigen located at the merozoite surface and within the parasitophorous vacuole. *J Biol Chem*. 1988; 263(23): 11421-11425.
- Wellems TE, Walliker D, Smith CL, do Rosario VE, Maloy WL, Howard RJ, Carter R, McCutchan TF. A histidine-rich protein gene marks a linkage group favored strongly in a genetic cross of *Plasmodium falciparum*. *Cell* 1987; 49(5): 633-642.
- Wernsdorfer WH. The development and spread of drug resistant malaria. *Parasitol Today*. 1991; 7: 297-303.

- Williamson KC, Fujioka H, Aikawa M, and Kaslow DC. Stage-specific processing of Pfs230, a *Plasmodium falciparum* transmission-blocking vaccine candidate. **Mol Biochem Parasitol.** 1996; 78(1-2): 161-169.
- World Health Organization. **Fighting disease**, Fostering development WHO Report, Geneva WHO/CTD/Health, 1997.
- World Health Organization. World malaria situation in 1983. **World Health Statistic Quarterly.** 1985; 38: 193-231.
- Yoshida N, Nussenzweig RS, Potocnjak P, Nussenzweig V, and Aikawa M. Hybridoma produces protective antibodies directed against the sporozoite stage of malaria parasite. **Science** 1980; 207(4426): 71-73.
- Zhu J, and Hollingdale MR. Structure of *Plasmodium falciparum* liver stage antigen-1. **Mol Biochem Parasitol.** 1991; 48(2): 223-226.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก ก

การเตรียมสารเคมี

การเตรียม 0.5 EDTA (pH 8.0)

EDTA	186.1	g.
double distilled water	800	ml.

นำส่วนผสมนี้มากวนด้วย magnetic stirrer จนสารละลายเป็นเนื้อเดียวกัน ปรับ pH ด้วย NaOH ให้มีค่า pH = 8.0 และปรับปริมาตรให้เท่ากับ 1 ลิตรด้วย double distilled water นำไปนึ่งฆ่าเชื้อด้วยหม้อนึ่งปลอดเชื้อ ภายใต้ความดัน 15 ปอนด์ต่อตารางนิ้ว ที่อุณหภูมิ 121°C เป็นเวลา 20 นาที

การเตรียม TAE (50x)

Tris-base	242	g.
glacial acetic acid	57.1	ml.
0.5 M EDTA (pH 8.0)	100	ml.

ปรับปริมาตรให้เท่ากับ 1 ลิตรด้วย double distilled water

การเตรียม 1 M Tris (pH 7.8)

Tris base	121.1	g.
Double distilled water	800	ml.

นำไปผสมด้วย magnetic stirrer จนเป็นสารละลายเนื้อเดียว ปรับ pH ด้วย HCl ให้มีค่า pH = 7.4 และปรับปริมาตรให้เท่ากับ 1 ลิตร ด้วย double distilled water นำไปนึ่งฆ่าเชื้อด้วยหม้อนึ่งปลอดเชื้อภายใต้ความดัน 15 ปอนด์ต่อตารางนิ้ว ที่อุณหภูมิ 121°C เป็นเวลา 20 นาที

การเตรียม TE (อัตราส่วน 1:0.1)

1 M Tris	800	ml.
0.5 M EDTA	200	ml.

ผสมให้เข้ากันแล้วนำไปนึ่งฆ่าเชื้อด้วยหม้อนึ่งปลอดเชื้อภายใต้ความดัน 1 ปอนด์ต่อตารางนิ้วที่อุณหภูมิ 121°C เป็นเวลา 20 นาที

การเตรียม loading dye (Gel-loading buffer, 6x buffer type II)

bromophenol blue	0.25	g.
Xylene cyano FF	0.25	g.
Ficoll (type 400; Pharmacia)	15	g.

ละลายใน double distilled water โดยปรับปริมาตรให้เท่ากับ 1 ลิตร

การเตรียม phosphate buffer saline (PBS)

NaCl	8	g.
KCl	0.2	g.
Na ₂ HPO ₄	1.44	g.
KH ₂ PO ₄	0.24	g.
ละลายใน double distilled water	800	ml.

นำไปผสมด้วย magnetic stirrer จนเป็นสารละลายเนื้อเดียว ปรับ pH ด้วย HCl ให้มีค่า pH = 7.4 และปรับปริมาตรให้เท่ากับ 1 ลิตรด้วย double distilled water นำไปนึ่งฆ่าเชื้อด้วยหม้อนึ่งปลอดเชื้อภายใต้ความดัน 15 ปอนด์ต่อตารางนิ้วที่อุณหภูมิ 121°C เป็นเวลา 20 นาที

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก ข

แสดงรหัสพันธุกรรม (genetics code)

		Second position								
		U	C	A	G					
First position (5' End)	U	UUU	Phe	UCU		UAU	Tyr	UGU	Cys	U
		UUC		UCC	Ser	UAC		UGC		C
		UUA	Leu	UCA		UAA*	Stop	UGA*	Stop	A
		UUG		UCG		UAG*	Stop	UGG	Trp	G
	C	CUU		CCU		CAU	His	CGU		U
		CUC	Leu	CCC	Pro	CAC		CGC	Arg	C
		CUA		CCA		CAA	Gln	CGA		A
		CUG		CCG		CAG		CGG		G
	A	AUU		ACU		AAU	Asn	AGU	Ser	U
		AUC	Ile	ACC	Thr	AAC		AGC		C
		AUA		ACA		AAA	Lys	AGA	Arg	A
		AUG ⁺	Met	ACG		AAG		AGG		G
	G	GUU		GCU		GAU	Asp	GGU		U
		GUC	Val	GCC	Ala	GAC		GGC	Gly	C
		GUA		GCA		GAA	Glu	GGA		A
		GUG		GCG		GAG		GGG		G

* Chain terminating, or "nonsense," codon

+ the initiator codon

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แสดงรหัสและตัวย่อสำหรับกรดอะมิโน

Amino acid	Three-letter abbreviation	One-letter symbol
Alanine	Ala	A
Arginine	Arg	R
Asparagine	Asn	N
Aspartic acid	Asp	D
Asparagine or aspartic acid	Asx	B
Cysteine	Cys	C
Glutamine	Gln	Q
Glutamic acid	Glu	E
Glutamine or glutamic acid	Glx	Z
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I
Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V

ประวัติผู้เขียนวิทยานิพนธ์

ชื่อ – สกุล นายอุดมศักดิ์ ตั้งชัยสุริยา

วันเดือนปีเกิด วันที่ 7 เดือน กันยายน พ.ศ. 2520

ภูมิลำเนา จังหวัดแพร่

ประวัติการศึกษา

- พ.ศ. 2542 สำเร็จการศึกษาระดับปริญญาบัณฑิต
หลักสูตรวิทยาศาสตรบัณฑิต (สาธารณสุขศาสตร์) คณะสาธารณสุขศาสตร์
มหาวิทยาลัยมหิดล
- พ.ศ. 2543 เข้าศึกษาต่อระดับปริญญาโท
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ภาควิชาปรสตีวิทยา คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

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