ALPHA DIAGNOSTIC INTERNATIONAL

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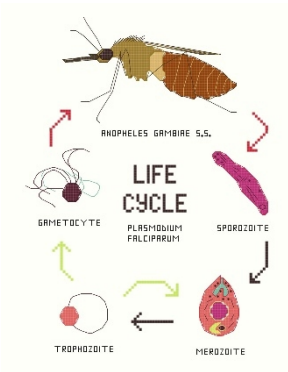
Malaria Vaccines Antibody ELISA Kits, Recombinant Proteins, Peptides and Antibodies

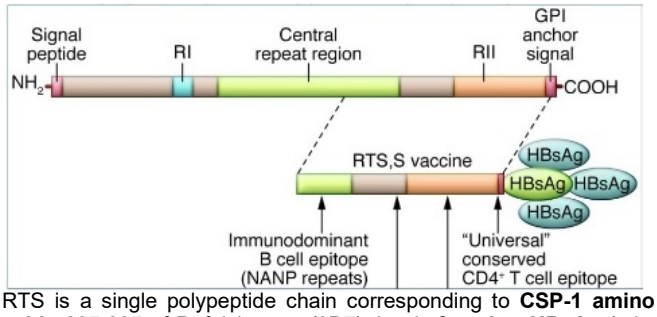


Malaria is a parasitic disease spread by mosquitoes. It affects about ~500 millions of people worldwide and killing an estimated 1 million annually. The causative agent, the parasitic protozoan **Plasmodium**, is transmitted by mosquitoes. Four Plasmodium species infect humans. These are **Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale and Plasmodium malariae**. **Plasmodium berghei** infects rodents.

P. falciparum is the most common cause of infection and is responsible for about 80% of all malaria cases, and is also responsible for about 90% of the deaths from malaria. Parasitic Plasmodium species also infect **birds, reptiles, monkeys, chimpanzees and rodents**. There have been documented human infections with several simian species of malaria, namely P. knowlesi, P. inui, P. cynomolgi, P. simiovale, P. brazilianum, P. schwetzi and P. simium; however, with the exception of P. knowlesi, these are mostly of limited public health importance.

P. falciparum is the most widespread and also the most serious and potentially fatal form. The life cycle of the malaria is complex, with phases both in human host and the insect vector, the female anopheline mosquito. There are several Plasmodium forms: sporozoites, merozoites, gametocytes, gamets, ookinets, oocysts. Parasite may encode in the order of 2000 proteins, several hundred of which are antigenic. Proteins synthesized by each stage may be specific to that stage, such as liver stage-specific antigen (LSA-1), or be common to several stages, such as ring-infected erythrocyte surface antigen (**RESA**). The malaria parasite develops through several phases in the human body that evoke different immunologic responses, and vaccines for all phases are under development. The best-characterized protein of sporozoites is circumsporozoite protein-1 (**CSP-1**), an approximate 60 kDa protein located on the surface of developing and mature sporozoites and present in developing exoerythrocytic forms. It constitutes the major surface protein of the sporozoite. The central domain of CSP-1 is composed of an extensive array of tandemly repeated short sequences (**NANP)n** and **(NVDP)n**.

RTS,S is the most clinically advanced **malaria vaccine** candidate. It targets the pre-erythrocytic stage of the disease. RTS,S vaccine aims to induce antibodies to a parasitic protein (CSP-1) that is expressed in pre-eryhtrocytic stage and therefore prevent the parasite from infecting, maturing, and multiplying in the liver, and from re-entering the bloodstream and infecting red blood cells. RTS,S consists of two polypeptides that spontaneously form composite particulate structures on their simultaneous synthesis in yeast (Saccharomyces cerevisiae).



RTS is a single polypeptide chain corresponding to **CSP-1 amino acids 207-395** of P. falciparum (3D7) that is **fused to HBsAg** (adw serotype). S is a polypeptide of 226 amino acids that corresponds to HBsAg. The addition of GSK's proprietary Adjuvant Systems (**AS01/AS02/QS21/Mpla** etc) aims to further improve the immune response. Phase III trial of RTS,S reported that it may protect approximately 50% of inoculated infants and children in malaria-endemic areas against infection and clinical disease caused by Plasmodium falciparum. Antibodies to the Plasmodium falciparum circumsporozoite repeat region were measured by ELISA using a recombinant antigen R32LR that contains the sequence **[NVDP(NANP)15]2LR**. Antibodies to **HBsAg** were also measured by ELISA. However, no association between anti-circumsporozoite antibody titres and clinical malaria has been identified.

Merozoite surface protein 1 (MSP-1) of the malaria parasite is an important molecule involved in invasion of erythrocytes. In Plasmodium falciparum, MSP-1 is synthesized as a large precursor on the surfaces of merozoites. Proteolytic cleavage of MSP-1 leaves a C-terminal 19-kDa fragment (MSP-119) on the surface of the parasite, which is necessary for invasion of the erythrocyte. The remaining fragments are shed as a soluble complex. The C-terminal MSP-119 region is functionally conserved across species of the genus Plasmodium, and its tertiary structure is maintained by disulfide bridges. Immunization with MSP-119 of P. falciparum MSP-1, or its equivalent in rodent parasites, is able to generate protective immunity, and development of MSP-1 as a potential vaccine has, therefore, concentrated on this region of the molecule

About ADI's Malaria Vaccine ELISA Kits-ADI is the first company to develop an antibody ELISA to determine the efficacy of the RTS,S vaccine. ADI's RTS,S antibody ELISAs (mouse, rabbit, and human) use the recombinant P. falciparum CSP-1 protein (207-395aa) that is the most critical and an active component of the RTS,S vaccine. ADI is further expanding the RTS,S antibody ELISAs to measure IgG (and IgG1, IgG2a, IgG3, IgG4) and IgM classes. Antibody ELISA kits for RTS,S vaccine carrier protein (HBsAG) are also available to assess the efficacy of the vaccine.

Malaria Related Reagents and ELISA kits

Items Description	Species	Antibody Type IgG Cat#	Antibody Type IgM Cat#
RTS,S Malaria Vaccine (CSP-Antibody, *P. falciparum*) ELISA Kits	Rabbit	970-200-CSR	970-210-CSM
	Mouse	970-300-MMG	970-310-MMM
	Human	970-400-CHG	970-410-CHM
MSP, Malaria Vaccine (MSP-1 Antibody, P. falciparum) ELISA Kits	Mouse	970-320-MSG	970-330-MSM
	Rabbit	970-340-RMG	970-350-RMM
	Human	970-360-HMG	970-370-HMM

Note: ADI also developed antibody ELISA kits using (NANP)n and NVDP)n synthetic peptides.

Item	Catalog#	Product Description	Product Type
CSP Protein and peptides	CSPF11-S	Rabbit Anti-Circumsporozoite (CSP, P.falciparum) C-terminal (207-397 aa) protein antiserum	Antibodies
	CSPF15-P	YLKKIKNSL, P. falciparum circumsporozoite (CSP) peptide (CSP334–342)	Peptides pure
	CSPF15-R	Recombinant (E. coli, full length, CSP antigen (P. falciparum)	Recomb. Protein
	CSPF16-R	Recombinant CSP mosaic protein (107-129, 334-351 aa) P.falciparum) purified	Recomb. Protein
	CSPF17-R-10	Recombinant (E. coli), purified, Circumsporozoite (CSP) (207-397 aa) P.falciparum) Protein	Recomb. Protein
	CSPV11-M	Mouse Anti-Circumsporozoite (CSP) (P. vivax) IgG, aff pure #1	Antibodies
	CSPV16-R	Recombinant (E. coli) CSP; 353-aa and GST) antigen (P. vivax)	Recomb. Protein
	CSPY11-P	KIYNRNIVNRLLGD, P. yoelii circumsporozoite, PyCSP (57–70) peptide	Peptides pure
	CSPY12-P	SYVPSAEQI,P. yoelii circumsporozoite, PyCSP (280–288) peptide	Peptides pure
	DRAA31-A	Rabbit Anti-(DRAAGQPAG)3 peptide (repeat-sequence peptide of the P. vivax CSP) IgG, aff pure	Antibodies
	DRAA31-BSA	(DRAAGQPAG)3 peptide (repeat-sequence of the P. vivax CSP) conjugated with BSA	Conj. Peptides
	DRAA31-P	(DRAAGQPAG)3 (repeat-sequence P. vivax CSP) control/blocking peptide	Peptides pure
	DRAD31-P	(DRADGQPAG)3 peptide (repeat-sequence peptide of the P. vivax CSP protein, pure	Peptides pure
	RP-650	Recombinant Malaria Cs Mosaic	Pure protein
Hemoglobin (hb)	HBG25-P	DABCYL-GABA-ERMFLSFP-EDANS, Hb, 3037a, Malaria FRET Substrate II	Substrates
	HBG31-P	DABCYL-GABA-ALERMFLSFP-EDANS, Hb, 2837a, Malaria FRET Substrate III	Substrates
HRP	HRPF21-M	Mouse Anti-Histidine rich glycoprotein II (HRP II, P. falciparum) IgG, aff pure #1	Antibodies
	HRPF22-M	Mouse Anti-Histidine rich glycoprotein II (HRP II, P. falciparum) IgM, aff pure	Antibodies
	HRPF25-R	Recombinant (E. coli) Histidine rich glycoprotein II (HRP II, P. falciparum)	Recomb. Protein
LSA	LSPF31-P	LEESQVNDDIFNSLVKSVQQEQQHNV, P. falciparum, LSA3-NRII (81-106) peptide	Peptides pure
	LSPF32-P	DELFNELLNSVDVNGENILEESQ, P. falciparum Liver-Stage Antigen 3-NRI peptide	Peptides pure
MAP	MAPF15-P	DABCYL-ERNleFLSFP-EDANS, Malaria Aspartyl Proteinase FRET (Fluorescence Resonance Energy Transfer) Substrate I	Substrates
	MAPF15-P-5	DABCYL-ERNleFLSFP-EDANS, Malaria Aspartyl Proteinase FRET Substrate I	Substrates
Malaria Parasite	MFV11-M	Mouse Anti-Malaria (clone 1); reacts to P.vivax/falciparum	Antibodies
MSP-1	MSPF11-M	Mouse Anti-Merozoite surface protein-1 (MSP-1; P. falciparum) IgG, aff pure #1	Antibodies
	MSPF11-P	VTHESYQELVKKLEALEDAV, MSP-1 P1, peptide of P. falciparum	Peptides pure
	MSPF12-P	GYRKPLDNIKDNVGKMEDYIKK, MSP-1 P2, peptide of P. falciparum	Peptides pure
	MSPF131P	KLNSLNNPHNVLQNFSVFFNK, MSP-1 P3, peptide of P. falciparum	Peptides pure
	MSPF15-R	Recombinant (E. coli) merozoite surface protein-1 (MSP-1; P. falciparum)	Recomb. Protein
	MSPF25-R	Recombinant (E. coli) merozoite surface protein-2 (MSP-2; P. falciparum)	Recomb. Protein
	MSPV11-P	LEYYLREKAKMAGTLIIPES, P. vivax PvMSP-1 peptide 19 (378-397)	Peptides pure
	MSPV12-P	SKDQIKKLTSLKNKLERRQN, P. vivax PvMSP-1 peptide 53 (1058-1077)	Peptides pure
	MSPV13-P	NFVGKFLELQIPGHTDLLHL, P. vivax PvMSP-1 peptide 4 (78-97)	Peptides pure
	MSPV14-M	Mouse Anti-Merozoite surface protein-1 (MSP-1; P. vivax) IgG, aff pure #1	Antibodies
	MSPV14-P	FNQLMHVINFHYDLLRANVH, P. vivax PvMSP-1 peptide 6 (118-137)	Peptides pure
	MSPV15-M	Mouse Anti-Merozoite surface protein-1 (MSP-1; P. vivax) IgG, aff pure #2	Antibodies
	MSPV15-P	LDMLKKVVLGLWKPLDNIKD, P. vivax PvMSP-1 peptide 8 (158-177)	Peptides pure
	MSPV16-R	Recombinant (E. coli) merozoite surface protein-1 (MSP-1; 108-aa; P. vivax)	Recomb. Protein
	MSPV26-R	Recombinant (E. coli) merozoite surface protein-2 (MSP-2; 460-aa; P. vivax)	Recomb. Protein
(NANP)n peptides	NANP101-P	(NANP)10 (40-aa NANP repeat-sequence peptide of the P. falciparum CSP	Peptides pure
	NANP51-A	Rabbit Anti-(NANP)5 peptide (CSP repeat, P. falciparum) IgG, aff pure	Antibodies
	NANP51-BSA	(NANP)5 peptide (CSP repeat, P. falciparum) conjugated with BSA	Conj. Peptides
	NANP51-P	(NANP)5 peptide control/blocking peptide	Peptides pure
(NVDP)n Peptides	NVDP41-A	Rabbit Anti-(NVDP)4 peptide (minor CSP repeat-sequence P. falciparum IgG, aff pure	Antibodies
	NVDP41-BSA	(NVDP)4 peptide (CSP repeat- P. falciparum conjugated with BSA	Conj. Peptides
	NVDP41-P	(NVDP)4 peptide (CSP repeat-sequence P. falciparum control/blocking peptide	Peptides pure
(PAPP)n Peptides	PAPP311-P	(PAPPNAAND)3 peptide (repeat-sequence peptide of the P. berghei CSP), pure	Peptides pure
pLDH	PLDH11-M	Mouse Anti-parasite specific lactate dehydrogenase (pLDH), (PAN PLDH) IgG	Antibodies
	PLDH14-M	Mouse Anti-parasite pLDH, (P. ovale specific) IgG	Antibodies
	PLDH22-M	Mouse Anti-pLDH (P. falciparum specific) IgG	Antibodies
	PLDH31-M	Mouse Anti- pLDH (P. vivax specific) IgG	Antibodies
(PPPPNAAND)n	PPPP312-P	(PPPPNPPND)3 peptide (repeat-sequence of P. berghei CSP	Peptides pure
	PPPP321-A	Rabbit Anti-(PPPPNAAND)3 peptide (repeat-sequence P. berghei CSP) IgG, aff pure	Antibodies
	PPPP321-BSA	(PPPPNAAND)3 peptide (repeat-sequence P. berghei CSP) conjugated with BSA	Conj. eptides
	PPPP321-P	(PPPPNAAND)3 peptide (repeat-sequence P. berghei CSP) blocking peptide	Peptides pure
RESAF15-R	RESAF15-R	Recombinant Ring-infected erythrocyte surface antigen (RESA) (P.falciparum)	Recomb. Protein
HSP	RP-649	Recombinant Malaria Protein Heat Shock protein (HSP)	Pure protein
Sag	SAGF11-M	Mouse Anti-S Antigen (Sag) (P. falciparum) IgG, aff pure #1	Antibodies
	SAGF12-M	Mouse Anti-S Antigen (Sag) (P. falciparum) IgG, aff pure #2	Antibodies
SERA	SERA15-R	Recombinant (E. coli) Serine-repeat antigen (SERA) P.falciparum	Recomb. Protein
MSP	SP-88357-1	MSP-1 (20 - 39), Merozoite Surface Peptide 1 (AA:Val-Thr-His-Glu-Ser-Tyr-Gln-Glu-Leu-Val-Lys-Lys-Leu-Glu-Ala-Leu-Glu-Asp-Ala-Val) (MW: 2301.60)	Pure Peptide
	SP-88358-1	MSP-1 P2, Malaria Merozoite Surface Peptide – 1	Pure Peptide

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