ALPHA DIAGNOSTIC INTERNATIONAL

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Product Specification Sheet

# $(NANP)_{10}$, repeat-sequence peptide of the P. falciparum circumsporozoite protein (CSP)

□ Cat. # NANP101-P ((NANP)10 (40-aa NANP CSP of the P. falciparum rotein, CSP) peptide SIZE: 0.5 mg

Malaria is a severe and debilitating disease caused by the parasitic protozoan *Plasmodium*, which is transmitted by many species of anopheline mosquitoes. *P. falciparum* is the most widespread and also the most serious and potentially fatal form of *Plasmodium* species. Recent estimates of the annual number of clinical malaria cases worldwide range from 214 to 397 million. Estimates of annual mortality (nearly all from *P. falciparum* malaria) are thought to be around 1.1 million. 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. The development of a malaria vaccine is one of the highest priorities in infectious disease research, as such a vaccine could be enormously helpful in reducing the 500 million new Plasmodium infections and over 1 million deaths due to malaria annually.

The 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 is the best-characterized protein of sporozoites. It constitutes the major surface protein of the sporozoite and is a multifunctional molecule that plays a crucial role at various points of the malaria life cycle. The CSP-1 is synthesized as a precursor protein of 67 kDa, which is processed by removal of approximately 50-100 residues to generate the mature protein of 58 kDa. The central domain of CSP-1 is composed of an extensive array of tandemly repeated short sequences. For the CSP-1 of the 7G8 cloned line of *P. falciparum*, this region is composed of 37 copies of NANP, interspersed with 4 copies of NVDP. There are the major repeat region and the minor repeat region in the *P. falciparum* CS protein.

Naturally occurring antibody responses to the CS protein are directed against the repeat domains (a maximum of three copies of NANP compose the B epitope) and high titers of antirepeat antibodies could protect mice, monkeys, and humans against sporozoite challenge. The repeat-sequence (NANP)-based B-cell epitope of the *P. falciparum* CS protein is an immunogenic but not immunodominant epitope. The CS-NANP-based pre-erythrocytic vaccines were the first to be tested, beginning in the 1980s. The vaccines used in the first trials comprised three different formulations of the four amino acid B-cell epitope NANP, which is present as multiple repeats in the CSP covering the surface of the sporozoites of *P. falciparum*. The number of NANP repeats in these vaccines varied from 3 to 19, and three different carrier proteins were used. A number of different recombinant and synthetic peptides consisting of different numbers of *P. falciparum* CS protein (NANP) repeats have been produced and used to develop immunoassays for the detection of antibodies against *P. falciparum* in human sera. IgG antibody to $(NANP)_n$ has been extensively used as a marker of exposure to malaria transmission in immune populations but rarely in non-immune short-term travelers using chemoprophylaxis. Synthetic peptides and recombinant proteins consisting of a combination of different numbers of *P. falciparum* CS protein NANP and NVDP repeats were obtained.

**Specificity**

$(NANP)_{10}$ represents the major repeat region of P. falciparum CSP. In this CSP molecule 37 repeats of NANP are found. $(NANP)_{10}$ is highly specific for *P. falciparum* CSP and does not match any sequences of CSPs of other *Plasmodium* species or any other proteins.

**<u>Sources of Peptides</u>**

Cat. # NANP101-P
Sequence: NANPNANPNANPNANPNANPNANPNANPNANP NANPNANP
Mol. Wt: 4000
Formula: $C_{160}H_{244}N_{60}O_{62}$
Form: Powder
Solubility: not tested
Storage: Store powder at -20°C for up to 6 months.

After reconstitution in water, store solution in small aliquots at -20°C for 3-6 months. Do not freeze and thaw or store diluted solutions.

**General References**: Del Guidice G. et al (1990) Eur. J. Immunol., 20, 1619-1622; Graves P.M., and Gelband H. (2009) Review, published by John Wiley&Sons Ltd, 1-67; Reymond C.D. et al (1993) J. Biol. Chem., 220, 12941-12947; Del Guidice G. et al (1987) Bulletin of WHO, 67, 515-523; Gerloni M. et al (2004) PNAS, 101, 3892–3897; Orlandi-Pradines E. et al (2006) Am. J. Trop. Med. Hyg., 74, 979–985.

**Related items:**

| Cat. # | Description |
|---|---|
| NANP51-P, NANP51-BSA | repeat-sequence peptide of the P. falciparum CSP/ its BSA conjugate |
| NVDP41-P, NVDP41-BSA | repeat-sequence peptide of the P. falciparum CSP/ its BSA conjugate |
| DRAA31-P, DRAA31-BSA | repeat-sequence peptide of the P. vivax CSP/ its BSA conjugate |
| DRAD31-P | repeat-sequence peptide of the P. vivax CSP |
| PAPP31-P | repeat-sequence peptide of the P. berghei CSP |
| PPPP311-P | repeat-sequence peptide of the P. berghei CSP |
| PPPP321-P, PPPP321-BSA | repeat-sequence peptide of the P. berghei CSP / its BSA conjugate |

**This product is for In vitro research use only.*

NANP101-P 121204A

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