

DNA sequence of the gene encoding a *Plasmodium falciparum* malaria candidate vaccine antigen

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A major focus of work on malaria vaccine development is to produce a vaccine that induces a protective T cell-mediated immune response against the circumsporozoite protein (CSP) of *Plasmodium falciparum*. Sequence analysis of the gene encoding the CSP in various uncloned strains of *P. falciparum* has revealed variation in putative T cell regions (1,2,3). Immunization/challenge studies conducted with cloned parasites will minimize the potential ambiguity associated with using uncloned lines. We have cloned and sequenced the gene encoding the CSP from the 3D-7 parasite clone derived from the NF54 strain of *P. falciparum*. Oligonucleotide primers homologous to the first and last 18 bases of the CSP gene of another line of *P. falciparum*, 7G8 (1), were synthesized with 5'-Eco RI linkers and used to specifically amplify the CSP gene of 3D-7 by the polymerase chain reaction. The amplified product was ligated into M13mp18 and sequenced in both directions. The complete nucleotide sequence of the gene is shown below.

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ATG ATG AGA AAA TTA GCT ATT TTA TCT GTT TCT TCC TTT TTA TTT GTT
GAG GCC TTA TTC CAG GAA TAC CAG TGC TAT GGA AGT TCG TCA AAC ACA
AGG GTT CTA AAT GAA TTA AAT TAT GAT AAT GCA GGC ACT AAT TTA TAT
AAT GAA TTA GAA ATG AAT TAT TAT GGG AAA CAG GAA AAT TGG TAT AGT
CTT AAA AAA AAT AGT AGA TCA CTT GGA GAA AAT GAT GAT GGA AAT AAC
GAA GAC AAC GAG AAA TTA AGG AAA CCA AAA CAT AAA AAA TTA AAG CAA
CCA GCG GAT GGT AAT CCT GAT CCA AAT GCA AAC CCA AAT GTA GAT CCC
AAT GCC AAC CCA AAT GTA GAT CCA AAT GCA AAC CCA AAT GTA GAT CCA
AAT GCA AAC CCA AAT GCA AAC CCA AAT GCA AAC CCA AAT GCA AAC CCA
AAT GCA AAC CCA AAT GCA AAC CCA AAT GCA AAC CCA AAT GCA AAC CCA
AAT GCA AAC CCA AAT GCA AAC CCA AAT GCA AAC CCA AAT GCA AAC CCA
AAT GCA AAT CCT AAT GCA AAC CCA AAT GCA AAC CCA AAT GCA AAT CCT
AAT GCA AAT CCA AAT GCA AAC CCA AAC GCA AAC CCC AAT GCA AAT CCT
AAT GCA AAC CCC AAT GCA AAT CCT AAT GCA AAT CCT AAT GCC AAT CCA
AAT GCA AAT CCA AAT GCA AAC CCA AAC GCA AAC CCC AAT GCA AAT CCT
CAA GGT CAC AAT ATG CCA AAT GAC CCA AAC CGA AAT GTA GAT GAA AAT
GCT AAT GCC AAC AGT GCT GTA AAA AAT AAT AAT AAC GAA GAA CCA AGT
GAT AAG CAC ATA AAA GAA TAT TTA AAC AAA ATA CAA AAT TCT CTT TCA
ACT GAA TGG TCC CCA TGT AGT GTA ACT TGT GGA AAT GGT ATT CAA GTT
AGA ATA AAG CCT GGC TCT GCT AAT AAA CCT AAA GAC GAA TTA GAT TAT
GCA AAT GAT ATT GAA AAA AAA ATT TGT AAA ATG GAA AAA TGT TCC AGT
GTG TTT AAT GTC GTA AAT AGT TCA ATA GGA TTA ATA ATG GTA TTA TCC
TTC TTG TTC CTT AAT TAG

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