

[0041] FIG. 15B is a photograph of *Plasmodium falciparum* sporozoites pre-incubated with a PfCSP-specific monoclonal antibody and immunofluorescent treatment.

[0042] FIG. 15C is a photograph of *Plasmodium falciparum* sporozoites pre-incubated with PfCelTOS-specific antiserum and immunofluorescent treatment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0043] The practice of the present invention will employ, unless otherwise indicated, conventional methods of chemistry, biochemistry, recombinant DNA techniques and immunology, within the skill of the art. Such techniques are explained fully in the literature. See, e.g., (Sambrook and Russell 2006); DNA Cloning, Vols. I and II (Glover and Hames 1994); Oligonucleotide Synthesis (M. Gait 1984); Nucleic Acid Hybridization; (Perbal 1988), Practical Guide to Molecular Cloning.

[0044] All publications, patents and patent applications cited herein, whether supra or infra, are hereby incorporated by reference in their entirety.

[0045] It must be noted that, as used in this specification and the appended claims, the singular forms “a”, “an” and “the” include plural referents unless the content clearly dictates otherwise. Thus, for example, reference to an antigen includes a mixture of two or more antigens, and the like.

[0046] The following amino acid abbreviations are used throughout the text:

[0047] Alanine: Ala (A) Arginine: Arg (R) Asparagine: Asn (N) Aspartic acid: Asp (D) Cysteine: Cys (C) Glutamine: Gln (O) Glutamic acid; Glu (E) Glycine; Gly (G) Histidine: H (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)

DEFINITIONS

[0048] In describing the present invention, the following terms will be employed, and are intended to be defined as indicated below.

[0049] The terms polypeptide and protein refer to a polymer of amino acid residues and are not limited to a minimum length of the product. Thus, peptides, oligopeptides, dimers, multimers, and the like, are included within the definition. Both full-length proteins and fragments thereof are encompassed by the definition. The terms also include post-expression modifications of the polypeptide, for example, glycosylation, acetylation, phosphorylation and the like.

[0050] For purposes of the present invention, the polypeptide expressed by the coding sequence may be one useful in a vaccine, therapeutic or diagnostic and may be derived from any of several known viruses, bacteria, parasites and fungi, as well as any of the various tumor antigens. Alternatively, the expressed polypeptide may be a therapeutic hormone, a transcription or translation mediator, an enzyme, an intermediate in a metabolic pathway, an immunomodulator, and the like.

[0051] Furthermore, for purposes of the present invention, a polypeptide refers to a protein which includes modifications, such as deletions, additions and substitutions (generally conservative in nature), to the native sequence, so long as the protein maintains the desired activity. These modifications may be deliberate, as through site-directed mutagenesis, or

may be serendipitous, such as through mutations of hosts which produce the proteins or errors due to PCR amplification.

[0052] A coding sequence or a sequence which encodes a selected polypeptide, is a nucleic acid molecule which is transcribed (in the case of DNA) and translated (in the case of mRNA) into a polypeptide in vitro or in vivo when placed under the control of appropriate regulatory sequences. The boundaries of the coding sequence are determined by a start codon at the 5' (amino) terminus and a translation stop codon at the 3' (carboxy) terminus. A coding sequence can include, but is not limited to, cDNA from viral, procaryotic or eucaryotic mRNA, genomic DNA sequences from viral (e.g. DNA viruses and retroviruses) or procaryotic DNA, and synthetic DNA sequences. A transcription termination sequence may be located 3' to the coding sequence.

[0053] A nucleic acid molecule can include both double- and single-stranded sequences and refers to, but is not limited to, cDNA from viral, procaryotic or eucaryotic mRNA, genomic DNA sequences from viral (e.g. DNA viruses and retroviruses) or procaryotic DNA, and especially synthetic DNA sequences. The term also captures sequences that include any of the known base analogs of DNA and RNA.

[0054] Operably linked refers to an arrangement of elements wherein the components so described are configured so as to perform their desired function. Thus, a given promoter operably linked to a coding sequence is capable of effecting the expression of the coding sequence when the proper transcription factors, etc., are present. The promoter need not be contiguous with the coding sequence, so long as it functions to direct the expression thereof. Thus, for example, intervening untranslated yet transcribed sequences can be present between the promoter sequence and the coding sequence, as can transcribed introns, and the promoter sequence can still be considered operably linked to the coding sequence.

[0055] Recombinant as used herein to describe a nucleic acid molecule means a polynucleotide of genomic, cDNA, viral, semisynthetic, or synthetic origin which, by virtue of its origin or manipulation is not associated with all or a portion of the polynucleotide with which it is associated in nature. The term recombinant as used with respect to a protein or polypeptide means a polypeptide produced by expression of a recombinant polynucleotide. In general, the gene of interest is cloned and then expressed in transformed organisms, as described further below. The host organism expresses the foreign gene to produce the protein under expression conditions.

[0056] A control element refers to a polynucleotide sequence which aids in the expression of a coding sequence to which it is linked. The term includes promoters, transcription termination sequences, upstream regulatory domains, polyadenylation signals, untranslated regions, including 5'-UTRs (such as Exon 2 of the hCMV enhancer/promoter region 5'-UTR) and 3'-UTRs and when appropriate, leader sequences and enhancers, which collectively provide for the transcription and translation of a coding sequence in a host cell.

[0057] A promoter as used herein is a DNA regulatory region capable of binding RNA polymerase in a host cell and initiating transcription of a downstream (3' direction) coding sequence operably linked thereto. For purposes of the present invention, a promoter sequence includes the minimum number of bases or elements necessary to initiate transcription of a gene of interest at levels detectable above background.