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MALARIA MEROZOITE SURFACE PEPTIDES EXPRESSED ON THE SMALL COAT PROTEIN OF CHIMAERIC COWPEA MOSAIC VIRUS

Merozoite surface proteins have been identified as potential candidate molecules for developing an erythrocytic stage malaria vaccine. Foreign peptide sequences can be inserted into the β B-β C loop of the cowpea mosaic virus (CPMV) small coat protein to yield functional chimaeric viruses. Immunisation with chimaeric CPMV has been shown to elicit biologically relevant immune responses against human immunodeficiency and mink enteritis viruses. A putative protective B cell epitope from the merozoite surface antigen-1 of the malaria parasite *Plasmodium falciparum* was expressed in CPMV to investigate its potential as an epitope based vaccine.

DNA encoding a 19 aa sequence (VTHESYQELVKKLEALEDA, termed P109), which is the N-terminus of the mature PfMSP1, was cloned into the small coat protein gene yielding a chimaeric virus CPMV-P109. CPMV-P109 developed primary lesions and a systemically spreading infection in cowpea plants. CPMV-P109 was shown to be genetically stable by sequencing reverse transcription polymerase chain reaction (RT-PCR) products from the purified virus.

Electron microscopy of recombinant virus particles showed normal morphology with the stain failing to penetrate a high proportion of the virus particles because of the RNA inside the particles. The P109 epitope was detected on CPMV-P109 by ELISA with an antiserum produced against homopolymeric P109. PfMSP1 peptide P109 epitope was therefore successfully expressed on the small coat protein of chimaeric CPMV.