MALARIA VACCINE

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Solid-phase Peptide Synthesis

A complete vaccine typically has a synthetic peptide conjugated with a relevant adjuvant and a carrier protein molecule. As the potential malaria vaccine will contain peptides as a major component, the synthesis of appropriate peptides with epitopes which will induce immunogenecy is important. Therefore, the preparation of peptides using potential antigen gene sequences is a basic requirement for the malaria vaccine.

The fundamental premise of a solid-phase peptide synthesis is that amino acids can be assembled into a peptide of any desired sequence while one end of the chain is anchored to an insoluble solid support. After the desired sequence of amino acids has been linked together, a reagent can be applied to cleave the chain from the support and liberate the finished peptide into solution.

The solid support is a synthetic polymer that bears reactive groups. These groups are made to react with carbonyl groups of an amino acid in such a way that the amino acid is bonded covalently to the polymer. During this step, the amino group of the amino acid must be covered with a protecting group so that the amino end will not react with the polymer. The protecting group must be such that it can be selectively removed without damage to the bond holding amino acid to the support. After removal of this protecting group, a second N-protected amino acid can acylate the exposed amino group of the first amino acid thus forming the first peptide bond. By repeating these two, deprotection and coupling steps using the proper N-protected amino acid each time, the peptide of desired sequence is assembled on the polymer support. At the end of the synthesis, a different reagent is applied to cleave specifically the bond joining the first amino acid to the polymer, and free peptide is liberated into the solution.