

MALARIA VACCINE: CAN WE WIN THIS WAR?

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More than a decade since the disease was found to be caused by a protozoan parasite in the blood and *Plasmodium* parasites were found to be transmitted by mosquitoes, malaria still represents a leading parasitic disease that causes death. Over 1 million people die each year of the disease and most of them are children in Africa. The most virulent parasite causing malaria in humans is *Plasmodium falciparum*. This strain of parasite can cause severe disease associated with severe anemia, hypoglycemia, renal failure, respiratory distress, multiple convulsions and coma. Development of drug resistance by malaria parasites and insecticide resistance in the *Anopheles* species mosquito prompts an urgent need for a malaria vaccine. It's not possible to produce a malaria vaccine based on attenuated or killed parasites. The current malaria vaccine development activities focus on developing subunit vaccines and DNA vaccines. It has been a difficult task to develop a vaccine against malaria since the parasite has a complicated multi-stage life cycle with stage-specific expression of many proteins at each stage. AFRIMS has been part of the multi-organization effort to develop a subunit malaria vaccine. During the last 6 years, AFRIMS has worked closely with Walter Reed Army Institute of Research, GlaxoSmithKline and USAID to optimize malaria vaccine candidates for clinical evaluation. One strategy to improve the effectiveness of the current malaria vaccine candidates is to use a potent and safe adjuvant. After the first use in the 1940s, alum is still the only adjuvant approved by the US Food & Drug Administration. The weak adjuvant activity, especially for Th1 and CD8+ T cell responses, limits its use in a vaccine against malaria and other intracellular pathogens. Development of a new adjuvant which can induce high magnitude and long-lasting immunity is the major issue in the vaccine industry. I will discuss the current topics about malaria vaccines and also will present some of the works that are being carried out at AFRIMS.

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