

Malaria Vaccine Warrants More Support

BY ROBIN ANDERS

While Australian scientists have contributed to the science behind the development of a malaria vaccine, there is insufficient local support for the clinical development of promising vaccines.

In 2002 the World Health Organisation estimated there were ~400,000 clinical cases of malaria and 1–2 million deaths annually, the majority occurring in Africa. Recent evidence suggests that insecticide-impregnated bed nets and more effective drug treatment are reducing the prevalence of malaria in several African countries.

Though it may now be possible to eliminate malaria from some countries, global eradication – a goal of the munificent Bill and Melinda Gates Foundation – is not feasible without developing new tools, including drugs and a vaccine, to supplement existing controls of *Plasmodium falciparum*, the parasite causing the most severe form of human malaria.

A vaccine being developed by Glaxo-SmithKline with the PATH Malaria Vaccine Initiative (MVI) is in advanced clinical trials in Africa, and may be licensed for some countries by 2012. Known as RTS,S, this vaccine targets the early stages of the parasite and has significantly reduced infection rates and the incidence of disease in phase 2 trials. But there is doubt that it will be highly effective in reducing the disease burden in regions with high rates of malaria transmission.

One strategy is to combine RTS,S with antigens from the asexual blood stages of the parasites that cause disease. Many asexual blood-stage antigens have been identified as potential components of a vaccine, but assessment of their potential in clinical trials has been slower than hoped.

Several asexual blood-stage antigens considered as potential components of a malaria vaccine were identified two decades ago by malaria researchers at Melbourne's Walter and Eliza Hall Institute of Medical Research. Three antigens have reached clinical development, and 9 years ago one of these (MSP2) was found to reduce parasite densities in Papua New Guinean children in a region of East Sepik province, where malaria transmission is intense.

An improved form of an MSP2 vaccine is being developed with support from the MVI but it is unlikely to be tested in the field for several years. Other potential malaria vaccines under development in Australia are even further from being tested for efficacy in field trials.

The antigenic complexity of malaria parasites has posed major difficulties but numerous demonstrations show that asexual blood-stage antigens can induce protection in animal models. Consequently, we must question why the clinical assessment of these antigens is not more advanced. Lack of funding is no longer a major impediment because of the financial support for malaria research from various sources, especially the Gates Foundation.

Developing new vaccines beyond the early preclinical stage is usually driven by potential returns to the pharmaceutical industry. As malaria is a disease of the rural poor in developing countries, investment in malaria vaccines is not attractive



Prof Anders has been researching malaria for three decades. He and colleagues developed a vaccine that reduced parasite densities in Papua New Guinean children.

Photo: Tess Flynn, La Trobe University

commercially. But industry involvement is essential for producing the vaccines to test in clinical trials.

Although public and philanthropic sources could support industrial involvement, these public–private partnerships are usually difficult and do not result in optimal outcomes because the industrial interests are not aligned with their academic and philanthropic partners. This problem may be alleviated to some degree by the current establishment of a dedicated facility in Pune, India, to manufacture malaria vaccines.

Malaria vaccine development has been largely driven by academic researchers interested in a particular antigen or delivery strategy, resulting in a fragmented approach. In Australia this has also led to a lack of institutional support for the clinical phase of these complex research and development programs.

The global progress of the past two decades has convinced most scientists that a malaria vaccine is possible. But it is unfortunate that Australian scientists will probably not play a significant role in determining whether the use of asexual blood-stage antigens can provide protection in the field and/or provide increased efficacy when combined with the promising RTS,S vaccine.

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