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Editorial

A Difficult Task on Malaria Control

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Malaria is one most devastating infectious diseases in the world. In 2012, 135 - 287 million people were infected and 473,000 – 789,000 people died from malaria worldwide. Data from WHO show that 90% of these deaths occurred in sub-Saharan Africa; 77% were children under 5 years old [1].

Currently there are two major strategies for controlling malaria: (i) treatment (drugs and vaccines) and (ii) prevention (vector control, prophylactic drugs and vaccines).

The use of drugs to treat malaria is limited, and there are no new drugs on the horizon. The use of drugs is restricted to chloroquine and artemisin, which are cheaper and have saved millions of lives [2,3]. The combination of these two drugs together was initially highly effective; however, the constant use of drugs and the emergence of resistant Plasmodium sp. have rendered the treatment ineffective [2,4,5].

In the last three decades, different groups have studied ways to produce safe and effective vaccines. The program for vaccines involves studies on the three stages of development of Plasmodium: (i) pre-erythrocytic; (ii) asexual; and (iii) sexual. There are thousands of antigens expressed on the surface of parasites circulating in the human bloodstream that could be used to develop vaccines. However, progress on developing vaccines is glacially slow and this limits the treatment [6-8].

The major class of vaccines against Plasmodium targets blood stage merozoites [9]. This vaccine can reduce the number of parasites and mimic the immune response acquired naturally. However, the low response to antibodies and high polymorphism represent a difficulty in development of this vaccine [8,9].

Control of the malaria vector Anopheles sp. is critical to reducing transmission. Insecticides, attractants and repellents have been used to control mosquito populations. The extensive distribution of insecticides should reduce the transmission of malaria but the continuous emergence of mosquitoes resistant to insecticides dramatically reduces their efficacy [3].

Another option for controlling mosquito populations is the use of mosquitoes genetically modified to produce effector peptides in their midgut in order to block the development of the parasite. This methodology is successful in the laboratory; however, transgenesis from one mosquito to population of mosquitoes is complicated. Usually, reproduction of Anopheles occurs isolated population and this limits the gene flux between two different populations [10]. An alternative is the use of paratransgenesis, which consists in genetically modifying symbiotic bacteria from the midgut of the mosquito so that they produce effector peptides to kill the parasite [11].

In summary, more studies involving malaria parasite biology is critical to development of new methods to control of disease in endemic areas. The challenge is create efficient approaches to eradicate the malaria.

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