Vaccine hope for malaria

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One person dies of it every 30 seconds, it rivals HIV and tuberculosis as the world's most deadly infection and the vast majority of its victims are under five years old. Now, just over 100 years since Britain's Sir Ronald Ross was awarded the Nobel Prize for finally proving that malaria is transmitted by mosquitoes, researchers at The University of Nottingham believe they have made a significant breakthrough in the search for an effective vaccine.

Malaria infects around 400 million people every year and kills between one and three million, mostly children.

Dr Richard Pleass, from the Institute of Genetics, said: "Our results are very, very significant. We have made the best possible animal model you can get in the absence of working on humans or higher primates, as well as developing a novel therapeutic entity."

Using blood from a group of people with natural immunity to the disease, a team from the School of Biology refined and strengthened the antibodies using a new animal testing system which, for the first time, mimics in mice the way malaria infects humans. When injected into mice, these antibodies protected them against the disease.

The World Health Organisation (WHO) says malaria is a public health problem in more than 90 countries and describes it as by far the world's most important tropical parasitic disease. It kills more people than any other communicable disease except tuberculosis and more than 90 per cent of all malaria cases are in sub-Saharan Africa. According to WHO,

the dream of the global eradication of malaria is beginning to fade with the growing number of cases, rapid spread of drug resistance in people and increasing insecticide resistance in mosquitoes.

Until now there has been no reliable animal model for human malaria. Mice do not get sick when infected with the blood-borne parasite that causes malaria in people. And the immune system of mice shows a different response to humans when it comes into contact with the parasite.

This meant that despite making a promising antibody vaccine that worked against the parasite in a lab dish, the team could not test it in a living animal.

In a new study published in the journal *PLoS Pathogens* an open access journal published by the Public Library of Science — Dr Pleass and his collaborators in London, Australia and The Netherlands describe how they got around the problem by creating a mouse model of the human malaria infection. They took a closely related mouse parasite and genetically modified it to produce an antigen that the human immune system recognises.

Next, they genetically altered the mouse's immune system to produce a "human molecule" on its white blood cells that recognises the parasite and, together with antibodies, destroys it. In trials the team showed that human antibodies given to the mice protected them from the parasite.

The team, who were funded by the Medical Research Council and the European Union, are now hoping to refine the model with a view to starting the first phase of clinical trials in humans.

Source: University of Nottingham