MedicalXpress

Vaccine blocks malaria transmission in lab experiments

July 22 2009

Researchers at the Johns Hopkins Malaria Research Institute have for the first time produced a malarial protein (Pfs48/45) in the proper conformation and quantity to generate a significant immune response in mice and non-human primates for use in a potential transmission-blocking vaccine.

Antibodies induced by Pfs48/45 protein vaccine effectively blocked the sexual development of the malaria-causing parasite, *Plasmodium*, as it grows within the mosquito. Sexual development is a critical step in the parasite's life cycle and necessary for continued transmission of malaria from mosquitoes to humans. The study is published in the July 22 edition of the journal *PLoS ONE*.

"Development of a successful transmission-blocking vaccine is an essential step in efforts to control the global spread of malaria. In our study, we demonstrate the relative ease of expression and induction of potent transmission-blocking antibodies in mice and non-human primates. This approach provides a compelling rationale and basis for testing a transmission-blocking vaccine in humans," said Nirbhay Kumar, PhD, senior author of the study and professor in Johns Hopkins Bloomberg School of Public Health's W. Harry Feinstone Department of Molecular Microbiology and Immunology.

For the study, the research team expressed full-length Pfs48/45 in E. coli bacteria to produce the vaccine. Previous attempts to fully express the protein had not been successful. The vaccine was first given to mice in

the laboratory. The vaccine was also tested in non-human primates (Olive baboons) in Kenya with similar results. According to the study, a single-dose vaccine provided a 93 percent transmission-blocking immune response, reaching greater than 98 percent after a booster given several months later.

"This is an exciting beginning to what might become an important tool in the arsenal for malaria control and progressive elimination of malaria transmission," said Kumar. There is no animal reservoir for human malaria and in that regard it is possible to gradually reduce malaria transmission to a point of almost eradication. However, Kumar cautioned that more research is needed to achieve that goal. For one, similar research efforts are needed to reduce transmission of Plasmodium vivax, another major human malaria parasite.

Malaria affects greater than 500 million people worldwide and is estimated to kill over one million people each year, most of whom are children living in Africa.

Source: Johns Hopkins University (news : web)