Vaccine made from complex of two malaria proteins protects mice from lethal infection

June 23 2014

Credit: CDC

An experimental vaccine designed to spur production of antibodies against a key malaria parasite protein, AMA1, was developed more than decade ago by scientists from the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health. It showed promise in test-tube and animal experiments and in early-stage clinical trials, but returned disappointing results in recent human trials

conducted in malaria-endemic countries.

Now, the NIAID scientists have improved on their original vaccine with a new candidate that delivers AMA1 protein together with part of a second parasite protein called RON2. In a natural infection, malaria parasites use the AMA1-RON2 complex to attach to and invade red blood cells. When injected into mice as a complex, the AMA1-RON2 vaccine prompted robust antibody production and protected the animals from a lethal form of mouse malaria.

Moreover, when antibodies produced in response to AMA1-RON2 vaccine were administered to other, non-vaccinated mice, those animals received some protection from infection as well. Further analysis showed that the improved antibody response following AMA1-RON2 vaccination was due to an increased proportion of antibodies aimed directly at the AMA1-RON2 junction, which made them better at inhibiting parasite invasion.

The researchers note that this strategy of vaccination with the functional protein AMA1-RON2 complex could be tested in the next generation of human malaria vaccines. Such vaccines, which would contain multiple AMA1 sequences in complex with RON2, might induce antibodies targeted to a range of genetically diverse malaria parasites.

More information: P Srinivasan et al. Immunization with a functional protein complex required for erythrocyte invasion protects against lethal malaria. Proceedings of the National Academy of Sciences DOI: 10.1073/pnas.1409928111 (2014).

Provided by NIH/National Institute of Allergy and Infectious Diseases