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Development of malaria vaccines using an alphavirus virus-like particle (VLP) platform

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Malaria is one of the most serious public health problems worldwide. However, there is no effective, FDA approved vaccine available to prevent it. Here we develop a novel virus-like particle (VLP) platform based on alphavirus VLP (i-αVLP), presenting the malaria circumsporozoite protein (CSP) domain. The proprietary i-αVLP contains antigen insertions into two different sites of its envelope and has displayed 480 copies of the inserted antigen on each αVLP. The highly symmetrical, dense array of antigens elicits very strong immune responses. Mice and monkeys immunized with the *Plasmodium falciparum* (Pf) CSP inserted i-αVLP produced a high titer of antibodies against CSP. Passive transfer of serum collected from immunized rhesus macaques conferred inhibition of parasite liver stage development in mice exposed to *Plasmodium berghei* expressing a functional Pf CSP. In addition, the ability of anti-CSP antibody induced by i-αVLP-based vaccine was further assessed by using a mouse malaria challenge model. The mice immunized with i-αVLP displaying *Plasmodium yoelii* (Py) CSP also showed protection against a Py sporozoites challenge. These results demonstrate a successful VLP platform accommodating CSP increases immunogenicity, which can provide sterile protection against malaria infection. VLP Therapeutic is launching a clinical development program for the product, VLPM01, highlighted by a planned Phase I/IIa clinical trial in 2016.

Biography

Wataru Akahata completed his PhD from Graduate School, Kyoto University and Post-doctoral studies at the Vaccine Research Center, National Institutes of Health (NIH). He has over 10 years of experience in vaccine development against emerging infectious diseases and received NIH Director's award for his work in the development of alphavirus vaccines. He is the CEO of VLP Therapeutics, with the mission to develop innovative medical treatments, transform traditional vaccines and targeted antibody therapies in order to address global unmet medical needs.

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