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マラリア PfCSP タンパクのワクチン抗原としての免疫原性および感染防御効果の検討

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[Background]: Malaria, caused by *Plasmodium falciparum*, continues to have a devastating impact on global health, emphasizing the great need for a malaria vaccine. The circumsporozoite protein (CSP) is an attractive target for a malaria vaccine and forms a major component of RTS,S, the most clinically advanced malaria vaccine. The clinical efficacy of RTS,S has been moderate, yet has demonstrated the viability of a CSP-based malaria vaccine. In this study, we investigated the protective efficacy of various adjuvants combination of the soluble full-length CSP using a transgenic parasite challenge model in mice. In addition, we addressed protective efficacy of the truncated form of CSP.

[Methods]: The full-length PfCSP protein was produced and purified by *E. coli* expression system as a soluble form. The full-length PfCSP was conjugated with various adjuvants including TLR agonists. To evaluate the adjuvant effect, the immunogenicity of the PfCSP vaccines was tested in mice using ELISA. The protective efficacy of these vaccine formulae was evaluated by two challenge infection methods, mosquito bites (natural route) and intravenous sporozoite injection (artificial route).

[Results and Conclusion]: The full-length PfCSP protein with ImjectTM alum induced the highest anti PfCSP total IgG, IgG1 Abs as well as moderate levels of IgG2a, IgG2b. The full-length with Imject AlumTM in three doses immunization provide high protection against both mosquitos biting (100%) and sporozoite injection (60%) whereas, in the presence of CPG ODN 1826, GLA/SE and baculovirus adjuvants elicited lower protection. Unexpectedly, sporozoite injection challenge abridged the protection due to the immune responses induced in the skin traversal phase could not access sporozoites. Interestingly, the N-terminal region conferred similar protection other truncated region. These results highlight that full-length is necessary for better protection.