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Immune responses in mice to oronasal immunisation with a malaria parasite antigen displayed on *Lactococcus* cell walls

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Lactic acid bacteria are considered as suitable vehicles to deliver antigens to the mucosal immune system because of their inherent safety. *Plasmodium falciparum* merozoite surface protein, MSA2, was covalently attached to the cell walls of live *Lactococcus lactis* (MSA2cP). ICR, Balb/c, C57 and C3H mice were oronasally immunised with MSA2cP-*L. lactis* cells ($5x10^9$ cells) and the immune response of mice to MSA2 was investigated. Each strain was divided into two groups (test and controls) of 3-5 mice in each group.

Serum IgG antibodies to MSA2 were elicited by the immunogen in a strain dependent manner. Balb/c and C3H mice responded well in ELISA at 10^{-2} dilution of sera with highest antibody reactivity in Balb/c mice. The IgG responses of C57 and ICR mice were weak at 10^{-2} dilution of sera. However IgG responses were noticeable in these mice at 1/30 dilution of sera. The predominant IgG isotypes were IgG1, IgG2a and IgG2b in Balb/c while it was mainly IgG2a and IgG2b in C3H mice. IgG isotypes of antibodies in the mice reflected the influence of Th1 and Th2 helper cells. Serum IgA and IgM antibody responses were detected by ELISA in 2 of 3 Balb/c, 1 of 4 C3H, 1 of 5 ICR mice and 2 of 3 Balb/c, 2 of 4 C3H, 1 of 5 ICR mice respectively. The antisera of Balb/c, C3H and ICR reacted with native MSA2 on the surface of *P. falciparum* merozoites in an IFA. ICR mice responded better to native antigens compared to others. Antigen specific IFN-γ secreting T cells were however only detectable in spleen of C57 mice by ELISPOT. Results suggests that oronasal immunisation with *P. falciparum* MSA2 is able to generate systemic immune responses and cellular immunity in mice in a strain dependent manner and *L. lactis* PrtP system is suitable for delivering subunit vaccines.

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