

## Documents

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**A single injection of 19 kDa carboxy-terminal fragment of Plasmodium yoelii merozoite surface protein 1 (PyMSP1 19) formulated with Montanide ISA and CpG ODN induces protective immune response in mice**  
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### Abstract

**Objective:** To investigate the efficacy of a vaccine formulation of the 19 kDa conserved carboxylterminal fragment of Plasmodium yoelii merozoite surface protein-1 (PyMSP1 19) formulated with CpG ODN 1826 and Montanide ISA51 or ISA720 when used to immunize mice by a single injection. **Methods:** Groups of BALB/c mice were immunized parenterally with one, two or four injections with PBS or PyMSP1 19 formulated with CpG ODN in ISA51 or ISA720. Sera were collected weekly and assessed for total IgG and IgG subclass titers. Protection was tested by challenge infection with P. yoelii YM. **Results:** Interestingly, single injection immunization showed the same kinetics of antibody responses as two- or four-injection immunization. However, the peak antibody response induced by PyMSP1 19 in CpG ODN and ISA51 appeared earlier than that induced by PyMSP1 19 in CpG ODN and ISA720 (28 days vs 41 days). At day 63 after the first injection, the PyMSP1 19-specific IgG antibody levels by single injection and four-injection immunizations were not different. However, the levels of the IgG2a antibody subclass were significantly lower by single injection immunization with PyMSP1 19 in CpG ODN and ISA720. The antibodies were sustained at high levels for at least 20 weeks. After challenge infection, all mice immunized by a single injection of PyMSP1 19 in CpG ODN and ISA51 survived with low-grade parasitemia, while 50% of mice immunized with PyMSP1 19 in CpG ODN and ISA720 died with high levels of parasitemia. **Conclusion:** These findings suggest that MSP119 immunization by a single injection can induce protective immunity, particularly when formulated with an appropriate strong adjuvant.

### Author Keywords

Immunization; Malaria; MSP1; Plasmodium yoelii

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