

Master Project Proposal

Title: Optimize foreign antigen expression and immunogenicity of *Plasmodium berghei* sporozoite-based vaccines

Synopsis:

Vaccination is undoubtedly one of the most cost-effective health interventions available. Whole-organism vaccines employing *Plasmodium* sporozoites constitute the most promising approach to vaccination against malaria. The host lab has developed a novel whole-sporozoite malaria vaccination approach employing genetically modified rodent *Plasmodium* parasites as immunization platforms. This concept can be extended to increase the vaccine's breadth of action through the genetic engineering of suitable antigens on the rodent *Plasmodium* platform.

In collaboration with the Leiden University Medical Centre (The Netherlands), we aim to generate, characterize and evaluate the immunogenicity of an array of genetically modified rodent malaria parasites expressing antigens that confer protection not only against malaria but also against other infections. This project can pave the way to the development of an innovative concept of vaccination against multiple infectious diseases.

The Master's student involved in this work will acquire various technical skills, including the use of animal and cell models of *Plasmodium* infection, immunofluorescence microscopy, quantitative real-time PCR, ELISA and flow cytometry.

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Webpage of the group: <https://imm.medicina.ulisboa.pt/en/investigacao/labs/prudencio-lab/>

Bibliography:

Prudencio, M.; Rodriguez, A.; Mota, M. M., The silent path to thousands of merozoites: the Plasmodium liver stage. *Nat Rev Microbiol* **2006**, *4* (11), 849-56.

Prudencio, M.; Mota, M. M.; Mendes, A. M., A toolbox to study liver stage malaria. *Trends in parasitology* **2011**, *27* (12), 565-74.

Book chapter: A.M. Mendes, A. Scholzen, A.K. Mueller, S.M. Khan, R.W. Sauerwein, M. Prudêncio (2017) "Whole Organism Pre-Erythrocytic Vaccines", In: Rodriguez, A. and Mota M.M. (Eds) Malaria: immune response to infection and vaccination, Springer International Publishing, Cham, Switzerland

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