

Publication

CRISPR/Cas9-engineered inducible gametocyte producer lines as a valuable tool for; Plasmodium falciparum; malaria transmission research

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4646515**Author(s)** Boltryk, S. D.; Passecker, A.; Alder, A.; Carrington, E.; van de Vegte-Bolmer, M.; van Gemert, G. J.; van der Starre, A.; Beck, H. P.; Sauerwein, R. W.; Kooij, T. W. A.; Brancucci, N. M. B.; Proellocks, N. I.; Gilberger, T. W.; Voss, T. S.**Author(s) at UniBasel** [Passecker, Armin](#) ; [Carrington, Eilidh](#) ; [Beck, Hans-Peter](#) ; [Brancucci, Nicolas](#) ; [Voss, Till](#) ;**Year** 2021**Title** CRISPR/Cas9-engineered inducible gametocyte producer lines as a valuable tool for; Plasmodium falciparum; malaria transmission research**Journal** Nat Commun**Volume** 12**Number** 1**Pages / Article-Number** 4806**Mesh terms** Animals; Anopheles, parasitology; CRISPR-Cas Systems; Cells, Cultured; Erythrocytes, parasitology; Hepatocytes, parasitology; Host-Parasite Interactions; Humans; Malaria, Falciparum, transmission; Microscopy, Fluorescence; Mosquito Vectors, parasitology; Plasmodium falciparum, physiology; Spores, Protozoan, physiology; Sporozoites, physiology

The malaria parasite *Plasmodium falciparum* replicates inside erythrocytes in the blood of infected humans. During each replication cycle, a small proportion of parasites commits to sexual development and differentiates into gametocytes, which are essential for parasite transmission via the mosquito vector. Detailed molecular investigation of gametocyte biology and transmission has been hampered by difficulties in generating large numbers of these highly specialised cells. Here, we engineer *P. falciparum* NF54 inducible gametocyte producer (iGP) lines for the routine mass production of synchronous gametocytes via conditional overexpression of the sexual commitment factor GDV1. NF54/iGP lines consistently achieve sexual commitment rates of 75% and produce viable gametocytes that are transmissible by mosquitoes. We also demonstrate that further genetic engineering of NF54/iGP parasites is a valuable tool for the targeted exploration of gametocyte biology. In summary, we believe the iGP approach developed here will greatly expedite basic and applied malaria transmission stage research.

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