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New animal model resource developed for malaria research

Malaria is responsible for the deaths of over 400,000 people every year, with most of its victims being children under the age of five. The disease is common in Africa, but also affects people throughout the tropical world, including large areas of Asia and South America. It is estimated that are there are over 230,000,000 cases of malaria every year.

Malaria researchers around the world are desperately seeking safe and affordable new drugs and vaccines to combat this disease. Amongst the most important tools used by researchers to investigate new therapies are the 'rodent malaria parasites'; pathogens that are closely related to the malaria parasites that infect humans, but which can be grown in laboratory mice. These allow scientists that work on malaria to test new drugs and vaccines, and so to discover new ways to fight the spread of the disease and to cure malaria patients.

Malaria in humans is caused by many different species of malaria parasites, and this diversity is one of the reasons the disease is so hard to combat. However, until now, malaria scientists have mainly relied on only two or three different species of rodent malaria parasites in their research, limiting the amount of useful data that can be gained.

Now, an international team of malaria scientists, headed by Professor Richard Culleton at Ehime University Japan and Professor Arnab Pain at King Abdullah University of Science and Technology in Saudi Arabia have developed an additional rodent malaria parasite system which will add an invaluable new resource to the toolbox of malaria researchers.

The team have characterised 10 new strains of a species called *Plasmodium vinckei*, and have made their genomes, phenotypes and the parasites themselves freely available to the malaria research field. In addition, they also generated whole genomes for seven other new parasite strains belonging to other species, bringing the total number of newly characterised strains to 17. The researchers were able to give scientific names to three new sub-species of rodent malaria parasites, welcoming *Plasmodium vinckei baforti*, *Plasmodium yoelii cameronensis* and *Plasmodium chabaudi esekanensis* into the malaria research community's toolkit.

This new work constitutes the largest single addition to the rodent malaria parasite toolbox for 50 years and will, the researchers hope, herald a new chapter for laboratory research in the continuing fight against malaria.

This work is published in the journal BMC Biology.
Link to the paper:
https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-021-00995-5

Link to the accompanying commentary:
https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-021-01019-y

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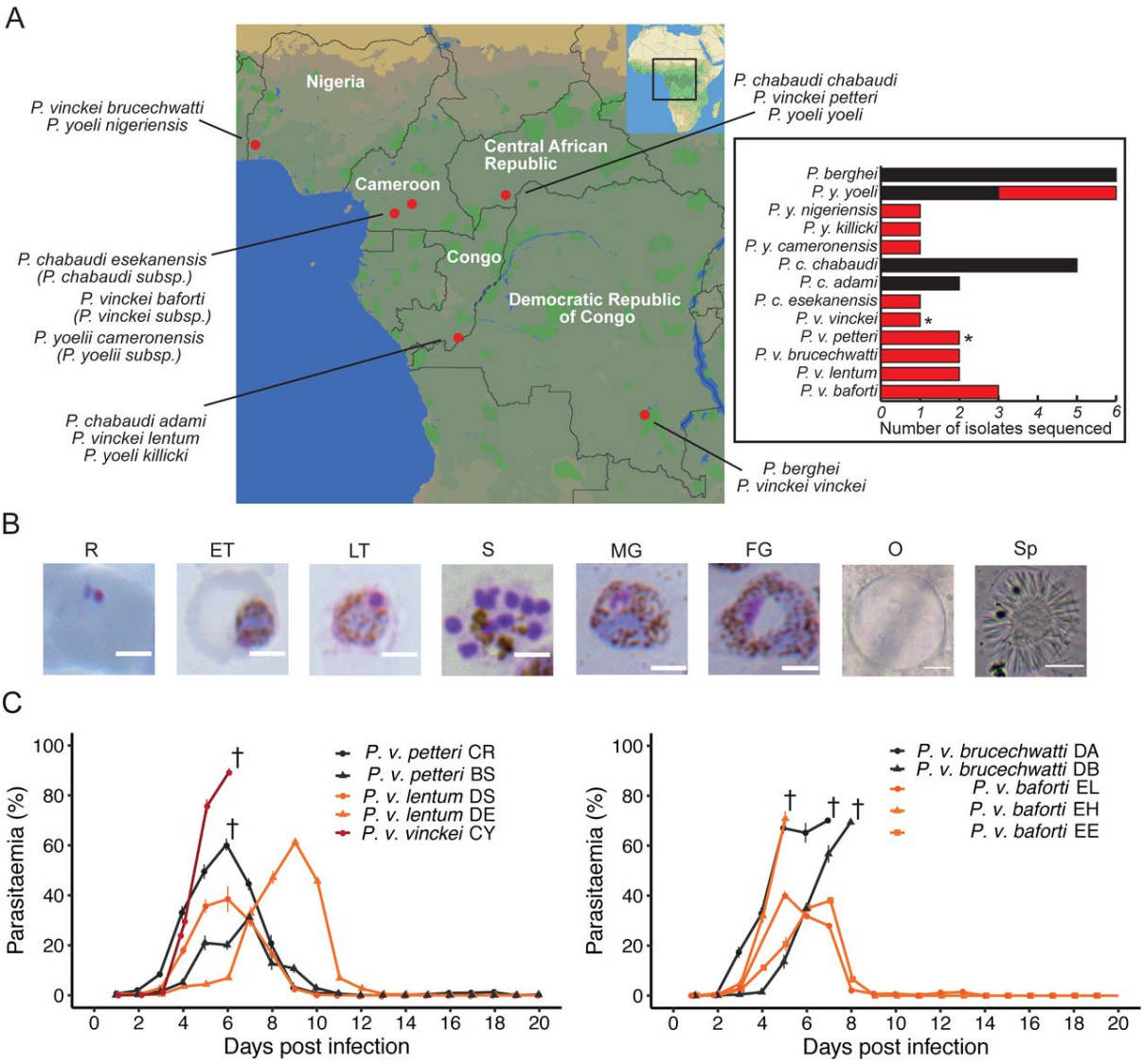

The newly characterised rodent malaria parasites

A) Rodent malaria parasite species and subspecies and the geographical sites in sub-Saharan Africa where from which they were isolated. *Plasmodium vinckei* is the only RMP species to have been isolated from five different locations. Inset: To date, several RMP isolates have been sequenced (black) to aid research with rodent malaria models. Additional RMP isolates have been sequenced in this study (red) to cover all subspecies of *P. vinckei* and further subspecies of *Plasmodium chabaudi* and *Plasmodium yoelii*. B) Morphology of different life

stages of *P. vinckei baforti* EL. R: Ring, ET: early trophozoite, LT: Late trophozoite, S: Schizont, MG: Male gametocyte, FG: Female gametocyte, O: oocyst and Sp: Sporozoite. *Plasmodium vinckei* trophozoites and gametocytes are morphologically distinct from other RMPs due to their rich haemozoin content (brown pigment). C) Parasitaemia of ten *P. vinckei* isolates (split into two graphs for clarity) during infections in mice (n=5) for a 20-day duration. † denotes host mortality. *Plasmodium vinckei* isolates show significant diversity in their virulence phenotypes.