



HAL
open science

Appropriate naming of the two *Plasmodium ovale* species

Georges Snounou, Paul Sharp, Richard Culleton

► **To cite this version:**

Georges Snounou, Paul Sharp, Richard Culleton. Appropriate naming of the two *Plasmodium ovale* species. *Trends in Parasitology*, 2024, 40 (3), pp.207-208. 10.1016/j.pt.2024.01.004 . hal-04697379

HAL Id: hal-04697379

<https://hal.science/hal-04697379v1>

Submitted on 24 Nov 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Letter

Appropriate naming of
the two *Plasmodium*
ovale species

Georges Snounou ^{1,2,*},
Paul M. Sharp ³ and
Richard Culleton ^{4,*}



Our recent article [1] reviewed the history of the human malaria parasite *Plasmodium ovale* from its original discovery to the realisation that it comprises two morphologically cryptic species that are genetically quite divergent. We ended with a proposal that the trinomial names that have been used for these two species over the past 14 years be replaced. Šlapeta, Sutherland and Fuehrer [2] concur with this, but object to the names we have proposed. They contend that we have not followed the rules of the International Code for Zoological Nomenclature (ICZN) [3], insofar as (i) we have not lodged a ‘type’ (in the form of a blood smear) for each of the species, and (ii) we have not retained the original name (*P. ovale*) for one of the cryptic species. However, we note that more appropriate ‘types’ have been deposited and that there are indeed provisions within the ICZN that allow deviation from the standard rules when this provides a more accurate and stable nomenclature.

In light of the scientific and technical advances of the 25 years following the publication of the ICZN, calls have been made to implement significant amendments to maintain its relevance [4]. This need for a modern approach is particularly acute for many groups of protists, where the task of classifying known, and numerous new, species challenges the current ICZN [5]. The obvious opportunity is to exploit the ease with which DNA sequences can be characterised for taxa where distinguishing

morphological features appear to be absent. In the case of the two *P. ovale* species, whose blood stages in humans and sporogonic stages in the anopheline host appear morphologically identical, currently the only way to distinguish them is through genetics.

On the face of it, the replacement of the original name (*P. ovale*) by two others constitutes a breach of the ICZN Principle of Priority (ICZN ‘Article 23’). Šlapeta *et al.* [2] advocate the retention of the name *P. ovale* for one of the two species, that is, that originally referred to as the ‘classic’ type, and suggest defining a neotype for this species from a sample from East Africa (the geographic source of the original *P. ovale* described in 1922). However, this is inaccurate and scientifically unacceptable. The naming, in 2004, of the two forms of *P. ovale* as ‘classic’ and ‘variant’ types was quite arbitrary. Given that both *P. ovale* species are currently present in East Africa, the parasite first identified by Stephens [6] could have belonged to either species. Furthermore, all the epidemiological, biological, and clinical observations subsequently published on *P. ovale* could have referred to either one or other of the two species, or indeed both for mixed infections. Thus, linking those data to one of the two species selected at random is as inappropriate as it is scientifically incorrect. This would lead to confusion among malariologists, clinicians, and epidemiologists, and would be detrimental to efforts to control a pathogen associated with potentially severe morbidity. To quote from the ICZN: ‘the rules must enable the Principle of Priority to be set aside on occasions when its application would be destructive of stability or universality or would cause confusion’ (ICZN ‘Principles p. xx’).

Since 2010, the two parasite species have been known as *P. ovale curtisi* and *P. ovale wallikeri* [7], a form of nomenclature that should be reserved for subspecies (ICZN ‘Article 5’), and which has led

to considerable confusion as to the status of these parasites. The solution we propose is simply to concatenate the second and third words to produce single specific names, *P. ovalecurtisi* and *P. ovalewallikeri*. We also propose keeping the name *P. ovale* [6] for all past and present observations made on parasites that cannot be, or were not, diagnosed molecularly as *P. ovalecurtisi* or *P. ovalewallikeri*. The use of these proposed names will preserve historical continuity and scientific accuracy: references to *P. ovale curtisi* and *P. ovale wallikeri* in the literature from 2010 to 2023 can be related immediately to the new nomenclature, while avoiding the potential inference that the literature on *P. ovale* from 1922 to 2010 applies specifically to one of the two species.

Given that the two species can only be distinguished based on their DNA, the deposition of blood smears or microscopic images as neotypes is irrelevant. The complete genome sequences for the two species that were published in 2017 [8], deposited at the European Nucleotide Archive (<http://www.ebi.ac.uk/ena>), and are available as full chromosome assemblies in GenBank, constitute the more appropriate neotypes for the two species. We therefore formally name the two species as *P. ovalecurtisi* sp. nov. (neotype GenBank *P. ovalecurtisi*, strain PocGH01 Accession Number GCA_900090035.2) and *P. ovalewallikeri* sp. nov. (neotype GenBank *P. ovalewallikeri*, strain PowCR01, Accession Number GCA_900090025.2).

Acknowledgments

G.S. was supported by the Agence Nationale de la Recherche, France (ANR-17-CE13-0025-01).

Declaration of interests

The authors declare no competing interests.

¹Université Paris-Saclay, Inserm, CEA, Immunologie des maladies virales, auto-immunes, hématologiques et bactériennes (IMVA-HB/IDMIT/UMR1184), 92265, Fontenay-aux-Roses & Kremlin-Bicêtre, France

²Écologie et Émergence des Pathogènes Transmis par les Arthropodes (CNRS UMR2000), Centre François Jacob, Institut Pasteur, 28 Rue du Dr Roux, 75724, Paris Cedex 15, France

³Institute of Ecology and Evolution, University of Edinburgh, Edinburgh EH9 3FL, UK

⁴Department of Molecular Parasitology, Proteo-Science Centre, Ehime University, 454 Shitsukawa, Toon, Ehime 791-0295, Japan

*Correspondence:

georges.snounou@pasteur.fr; gsnounou@gmail.com (G. Snounou), and culleton.richard.oe@ehime-u.ac.jp (R. Culleton).

<https://doi.org/10.1016/j.pt.2024.01.004>

© 2024 Elsevier Ltd. All rights reserved.

References

1. Snounou, G. *et al.* (2024) The two parasite species formerly known as *Plasmodium ovale*. *Trends Parasitol.* 40, 21–27
2. Šlapeta, J. *et al.* (2024) Calling them names: variants of *Plasmodium ovale*. *Trends Parasitol.* 40, 205–206
3. International Commission on Zoological Nomenclature (1999) *International Code of Zoological Nomenclature* (4th edn), The International Trust for Zoological Nomenclature
4. Dubois, A. (2011) The *International Code of Zoological Nomenclature* must be drastically improved before it is too late. *Bionomina* 2, 1–104
5. Adl, S.M. *et al.* (2007) Diversity, nomenclature, and taxonomy of protists. *Syst. Biol.* 56, 684–689
6. Stephens, J.W.W. (1922) A new malaria parasite of man. *Ann. Trop. Med. Parasitol.* 16, 383–388
7. Sutherland, C.J. *et al.* (2010) Two nonrecombining sympatric forms of the human malaria parasite *Plasmodium ovale* occur globally. *J. Infect. Dis.* 201, 1544–1550
8. Rutledge, G.G. *et al.* (2017) *Plasmodium malariae* and *P. ovale* genomes provide insights into malaria parasite evolution. *Nature* 542, 101–104