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Letters to the Editor

Heligmosomoides bakeri or *Heligmosomoides polygyrus?*

Dear Sir:

We were disappointed to see the continued use of the name *Heligmosomoides polygyrus* in experimental studies using the model gastrointestinal nematode parasite maintained in laboratory mice, as in the recent paper in the American Journal of Tropical Medicine and Hygiene by Tetsutani and others.[1] This parasite is now more properly known as *Heligmosomoides bakeri*. This conclusion is not based on an arbitrary, taxonomic, nomenclature judgment, but on a detailed molecular study by Cable and others,[2] which showed conclusively that the laboratory model organism is not closely related to the nematode from wood mice (*Apodemus* spp.) that was originally described as *H. polygyrus* and has priority for this name.

There is a large body of literature in support of this conclusion. The history of the debate about what to call the laboratory-maintained parasites is long, going back to the early 1900s. This debate was originally muddled by the debate over the continued use of *Nematospiroides dubius* in some laboratories and *H. polygyrus* in others.[3] When Ehrenford[4] originally cultured a nematode from *Peromyscus maniculatus gambeli* in California, he identified it as the European species because of its morphologic similarity.[4–6] However, there have always been concerns that the American species maintained in laboratory mice (*Mus* spp.) is different from the European species from wood mice. The American species has a different morphology[7] and many molecular differences;[8,9] reciprocal cross-infections fail without immunosuppressive treatment.[10]

There have always been suspicions that the laboratory model is fundamentally different from the species occurring in wild mice. Durette Desset and others[7] and Tenora and Barus[11] established them as distinct subspecies. However, the work of Cable et al.[2] and Nieberding and others[12,13] makes it clear that these species are not closely related, but have different ribosomal DNA and mitochondrial DNA sequences that differ as much from each other as they do from other valid species of the genus (e.g., *Heligmosomoides glareoli*).

Tenora and others[14] suggested that the two organisms should be raised to full species status but provided little supporting evidence. However, Cable and others[2] then provided the key novel molecular data and raised the subspecies (*H. p. polygyrus* and *H. p. bakeri*) to the status of full species, which was reflected in their status as two distinct species derived from different (unrelated) hosts in different parts of the world. Following international rules for nomenclature, the parasite from wood mice has priority for the name *H. polygyrus*.

We realize that there are many publications in the public domain reporting experiments in which the laboratory mouse–maintained parasite is referred to as *H. polygyrus*, but this is no longer acceptable. We considered the impact this name change would have on the international community working on the laboratory model system, but the differences between *H. bakeri* and *H. polygyrus* are so substantial that they over-ride any plea for nomenclatural stability. We would have expected immunologists who are familiar with frequent changing of the names of molecular markers on their cells as new information becomes available to be less resistant to changing the name of a parasite in which molecular systematics and taxonomy have shown a clear difference in species. Systematics and taxonomy are also legitimate sciences in their own right and parasites, like molecules, need to be renamed and reclassified when new data become available.

We believe that three years after the renaming of the laboratory-maintained intestinal parasite of mice as *H. bakeri*, it is time for everyone to conform to the International Code for Zoological Nomenclature. The parasite maintained in laboratory mice is *H. bakeri*, and the name *H. polygyrus* is reserved for the organism that infects wild wood mice (*Apodemus* spp.) in the Palaearctic.

Jerzy Behnke
Philip Harris
School of Biology
University of Nottingham
University Park
Nottingham NG7 2RD, United Kindgom
E-mail: jerzy.behnke@nottingham.ac.uk

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Dear Sir:

Regarding our recently published research article in the *American Journal of Tropical Medicine and Hygiene,*[1] Behnke and Harris have suggested that the intestinal nematode used in our study should be called *Heligmosomoides bakeri*, not *H. polygyrus*. They cite a report by Cable and others,[2] which analyzed the relationship between the two operational taxonomic units of *H. polygyrus* isolated from wood mouse and laboratory mouse by analyzing the internal transcribed spacers of ribosomal DNA and the mitochondrial cytochrome oxidase I gene. Behnke and Harris concluded that the laboratory nematode in the laboratory mouse is *H. bakeri*, not *H. polygyrus*.

However, we do not agree that the name of this organism should be changed from *H. polygyrus* to *H. bakeri* for a number of reasons. First, a search in the PubMed database (http://ncbi.nlm.nig.gov/pubmed/) found 24 reports published in 2008 with the name *Heligmosomoides polygyrus* (including our own report), and 3 reports with the name *Heligmosomoides bakeri*. We do not believe that changing the name of the organism to *H. bakeri* was widely accepted when our report was written and published in 2008.

Second, Dr. J. Urban (Beltsville Human Nutrition Research Center, U.S. Department of Agriculture, Beltsville, MD) originally provided the nematode that we used in our study. He did not change the name of the organism from *H. polygyrus* to *H. bakeri*. We think it is obligatory to await formal recognition of a name change before it is officially implemented.

Third, the report of Cable and others has some interesting issues that should be emphasized. These investigators did not examine samples of *H. polygyrus bakeri*. They reported that the laboratory-maintained nematode they used originated from a strain derived from *Peromyscus maniculatus*. However, the original population of nematodes may have been heterogeneous, which suggests that not all laboratory-maintained nematodes are identical. Although the authors observed a relatively wide genetic diversity in the Guernsey isolate (Figure 2 in Cable and others[2]), they only raised the level of *H. polygyrus bakeri* to a distinct species. This observation does not indicate that all of the infected larvae in this study were *H. polygyrus bakeri*.

On the basis of the popularity of the name of this organism, ethical concerns of researchers, and reliability of the proposed name change, we are not in favor of changing the name of the organism in our report from *H. polygyrus* to *H. bakeri*. Instead, we would suggest adding the following sentence at the end of the text: "The nematode *Heligmosomoides polygyrus* used in this study was kindly provided by Dr. J. Urban (Beltsville Human Nutrition Research Center, U.S. Department of Agriculture, Beltsville, MD)."

We are slightly confused by with this unexpected issue because the purpose of our study was to observe nematode and protozoa infections. A taxonomically accepted name is not always the most popular name; for example, taxonomists refer to the nematode *Parastorongylus*, which is usually known as *Angiostrongylus*. It also took considerable time for the name *Nematospiroides dubius* to be changed to *Heligmosomoides polygyrus*. Therefore, we request that taxonomic experts quickly reach a consensus about the name of this mouse intestinal nematode because it is a popular and useful experimental model for many researchers.

Kohhei Tetsutani
Shinjiro Hamano
Hajime Hisaeda
Kunisuke Himeno
Department of Parasitology
Kyushu University Graduate School of Medicine
3-1-1, Maidashi, Higashi-ku
Fukuoka, 812-0054, Japan
E-mail: tetztani@parasite.med.kyushu-u.ac.jp

Kenji Ishiwata
Department of Tropical Medicine
The Jikei University School of Medicine
3-25-8, Nishi-shinbashi, Minato-ku
Tokyo, Japan

Motomi Torii
Department of Molecular Parasitology
Ehime University School of Medicine
Shitsukawa, Toon
Ehime 791-0295, Japan

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