

Susan Kutz, Andrew Thompson

Editor-in-Chief

International Journal for Parasitology: Parasites and Wildlife

16 May, 2019

Dear Editor-in-chief,

We have formatted the manuscript according to the guidelines to the best of our ability now.

Please find our manuscript entitled “*Eimeria falciformis* BayerHaberKorn1970 and novel wild derived isolates from house mice: differences in parasite lifecycle, pathogenicity and host immune reactions” enclosed here for review and eventual publication as a research article in the International Journal for Parasitology: Parasites and Wildlife.

Populations of the house mouse living as human commensals are increasingly recognized as study systems in Ecology and Evolution. Working with close relatives of the most commonly used model organism in biomedical research – but in a wildlife setting- can show the relevance of parasites. *Eimeria* are highly prevalent and relatively virulent in wild populations of house mice. We can therefore assume that they cause one of the most relevant parasitic diseases of mice.

Research bridging between wildlife and laboratory models is faced with with the challenge that we have to assume constant evolutionary change of parasite isolates once they are taken out of their natural hosts environments. This warrants comparison between isolates freshly obtained from the wild and laboratory isolates kept for years within laboratory animals by serial passage.

We questioned whether novel isolates, obtained from free living house mice, are differently virulent and progress in their lifecycle with the different dynamics compared to an isolate passaged in laboratory mice for many generations. As basic immunology is often in the focus of both laboratory and wildlife investigations, we especially questioned whether immunological parameters might differ between infections with wild-derived or laboratory parasite isolates.

We infected laboratory mice with three *Eimeria* isolates: One laboratory and one wild-derived isolate of the species *E. falciformis* and a third wild-derived isolate from *E. ferrisi*, a different species. We use the difference between *Eimeria* species as a background to compare between the two isolates of *E. falciformis*. We find that concerning lifecycle progression and pathogenicity laboratory and wild-derived isolates of the same species are still very similar, but immune reaction (cytokine expression) differs between laboratory and wild derived parasites.

We believe that our manuscript will attract broad interest both within and beyond the community of ecological and evolutionary immunology. In addition, we provide resources (new strains) for a specialized community of researchers working with *Eimeria* in rodents. More generally, we anticipate that our results are relevant for wildlife immunologists aiming to study aspects of their infection system in an experimental setting: Our study highlights parasite evolution under laboratory conditions. We can argue that it is necessary to consider parasite isolate effects – and in some studies needed to derive novel strains from the wild– when laboratory infections should be consolidated with those in wildlife.

We therefore hope that you consider our research article for review and eventual publication in the International Journal for Parasitology: Parasites and Wildlife.

On behalf of the authors,

A handwritten signature in black ink, appearing to read 'E. Heitlinger', with a stylized, flowing script.

Emanuel Heitlinger