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Disease Ecology

Universität Edinburgh

Born in 1991 in Southend-on-Sea, United Kingdom

Studied Zoology at Bangor University, Medical Parasitology at the London School of Hygiene, and Evolutionary Ecology at the University of Edinburgh

FELLOWSHIP
College for Life Sciences

ARBEITSVORHABEN

The Role of Circadian Rhythms During Infection

I want to continue to explore the intersection of disease ecology, chronobiology and evolutionary ecology. I have so far been investigating how malaria parasites synchronise to the daily rhythms of the host and how rhythms help the parasite establish and maintain infections.

I plan to use the fruit fly, Drosophila, to investigate how the host's circadian clock, immunity and metabolism interact during infections. There are differences in survival rates when infection occurs at different times of day. This is thought to be under the control of the circadian clock, with time-of-day differences in infection outcome disappearing in mutant flies lacking circadian rhythms. Differences occur due to tightly controlled rhythms in host physiology, which follow a 24h pattern (e.g. immune activation), but how these rhythms are affected and interact to control the infection once an organism is infected is an understudied area of research. Specifically, I want to explore whether different circadian clocks and rhythms within an individual continue to act together during infections or if rhythms fall apart. If so, is this adaptive and does it enable infections to be cleared faster, or is it merely a consequence of virulence? I will first ask if aligned rhythms are important for determining infection outcome and second ask if circadian regulation of the immune response is only important prior to acquiring infection.

I am looking forward to interacting with Fellows of the Wissenschaftskolleg and, to consolidate my ideas, gleaning the insight and expertise from colleagues at the Freie Universität and the Max-Planck-Institut für Infektionsbiologie in Berlin, as well as other labs further afield. I will use my time at Wiko to make connections and find collaborators in Germany while developing a hypothesis-driven fellowship proposal.

Recommended Reading

Prior, K. F. et al. (2018). "Timing of host feeding drives rhythms in parasite replication." PLoS Pathog e1006900.

Schneider, P. et al. (2018). "Adaptive periodicity in the infectivity of malaria gametocytes to mosquitoes." Proc R Soc 285, 1888: 20181876.

Reece, S. E., K. F. Prior, and N. Mideo (2017). "The life and times of parasites: rhythms in strategies for within-host survival and between-host transmission." J Biol Rhythms 32, 6: 516-533.