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Evolutionary Biology

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FELLOWSHIP

John Maynard Smith Prize-Fellow

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ARBEITSVORHABEN

Pathogen Detection in Ant Societies

Pathogens causing infectious diseases have a major impact on all organisms. To fight infection, hosts have evolved powerful immune systems that detect and neutralise pathogens entering their bodies. Social organisms like ants, bees and termites have further evolved elaborate "collective disease defences" to fight pathogens entering their societies.

Collective disease defences depend on the joint action by group members to avoid, control or eliminate disease outbreaks. This is reached through the interplay of behavioural, physiological and organisational adaptations, some of which are prophylactic while others are activated on demand. For antiseptic behaviours to work efficiently, rapid detection of pathogens and diseased individuals is required, followed by appropriate action. My recent work has revealed that ant workers are extremely efficient at detecting pathogenic fungal spores and react collectively and unambiguously by the (self-)exclusion of pathogen-exposed workers and/or removal of contaminated brood. Interestingly, these behavioural responses occur immediately after exposure to fungal spores, that is, before an infection has established itself. The objective of my current work is to unravel the mechanisms behind this amazing recognition capacity and to gain an understanding of how it has evolved.

My stay at the Wissenschaftskolleg will provide valuable time away from practical lab work, allowing me to fully focus on writing a paper based on what I have done so far. Moreover, I look forward to discussing my work in a broader context, as I believe that the ability to detect non-self-elements is one of the fundamental principles of complex life, and research increasingly shows that similar principles apply across the eukaryote multicellular and eusocial domains.

Recommended Reading

Ugelvig L. V. and S. Cremer. "Effects of social immunity and unicoloniality on host-parasite interactions in invasive insect societies." Functional Ecology 26 (2012): 1300-1312. doi: 10.1111/1365-2435.12013

Ugelvig L. V., A. Andersen, J. J. Boomsma, and D. R. Nash. "Dispersal and gene flow in the rare, parasitic Large Blue butterfly Maculinea arion." Molecular Ecology 21, 13 (2012): 3224-3236. doi: 10.1111/j.1365-294X.2012.05592.x

Ugelvig L. V. and S. Cremer. "Social prophylaxis: group interaction promotes collective immunity in ant colonies." Current Biology 17 (2007): 1967-1971. doi: 10.1016/j.cub.2007.10.029

PUBLIKATIONEN AUS DER FELLOWBIBLIOTHEK

Ugelvig, Line V. (2015)

Opposing effects of allogrooming on disease transmission in ant societies

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1041208049

Ugelvig, Line V. (2007)

Social prophylaxis : group interaction promotes collective immunity in ant colonies

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1047200279