

Introductory Remarks to Symposium 21

Social immunity as defense against diseases: from sensory biology to collective animal behavior

Giovanni Galizia and Valerie Kuklovsky, Konstanz

Eusocial insect colonies are highly challenged with diseases posing a major threat for their survival. Consequently, they have evolved collective immune defenses referred to as “social immunity.” Social immunity are behavioral, organizational and physiological adaptations to prevent pathogen infection and transmission. They include removing pathogens from nest mates (allogrooming), increasing nest temperature (social fever), removal of diseased brood (hygienic behavior) and wound care among others. A central aspect for the defense against pathogens is the identification of either the pathogen directly or of diseased individuals. Many studies suggest that diseased individuals are identified by hygienic bees via olfactory cues, although the identification of the specific odorants which the bees are detecting remain sparse. Furthermore, several research groups successfully bred highly hygienic colonies indicating a genetic component to hygienic behavior. However, the proximate mechanisms that underlie various aspects of social immunity remain understudied. Future research will be essential to understanding the underlying neuronal circuits and neurotransmitters associated with the perception and processing of disease-associated olfactory cues.

This symposium will address the general concept of social immunity in eusocial insect societies and illustrate the diverse aspects of these collective behaviors. We wish to clarify the complex interplay between different topics of biology including sensory biology, biochemistry, neurobiology, and evolutionary biology. This symposium includes lessons in sensory neurobiology by elucidating the implications of viral influence on perception in honey bees (Michael Simone-Finstrom), the molecular basis of hygienic behaviors in honey bees with the use of omics (Leonard Foster) and lessons from chemical ecology (Fanny Mondet) by studying how chemical detection triggers *Varroa*-sensitive hygiene in honey bees. Finally, the wound care behavior of ants will shed light on evolutionary aspects associated with social immunity (Erik T. Frank).

Symposium 21

*Friday, March 28, 2025
11:30 - 13:30, Lecture Hall 103*

Chairs: Giovanni Galizia and Valerie Kuklovsky, Konstanz

- 11:30 **Opening Remarks**
- 11:35 Michael Simone-Finstrom, Baton Rouge, USA
SOCIAL IMPLICATIONS OF VIRUSES ON GUSTATORY, OLFACTORY AND VISUAL PERCEPTION AND DIETARY CHOICES IN HONEY BEES (S21-1)
- 12:00 Leonard Foster, Vancouver, Canada
UNDERSTANDING AND SELECTIVELY BREEDING FOR SOCIAL IMMUNITY BEHAVIOURS IN HONEY BEES USING PROTEOMICS & GENOMICS (S21-2)
- 12:25 Fanny Mondet, Avignon, France
CONTRIBUTIONS OF CHEMICAL ECOLOGY TO A BETTER UNDERSTANDING OF SOCIAL IMMUNITY IN THE HONEY BEE (S21-3)
- 12:50 Erik T. Frank, Wuerzburg
EVOLUTION OF SOCIAL WOUND CARE BEHAVIOURS IN ANTS (S21-4)
- 13:15 **Discussion and Concluding Remarks**