

Current Topics in Zoology and Botany

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Seminarraum Zoologie



The molecular basis of caste development and evolution in ants

In ants, epigenetic signals, including social interactions, nutrition, and maternal effects, cause developing larvae to differentiate into distinct morphological castes as adults. These individuals cooperate to form a coherent social unit, analogous to the epigenetic processes of cell differentiation and cell signaling that underpin the development of unitary organisms. Also similar to cells, the ants in a colony typically differentiate into a germ line, the reproductive queen caste, and a soma, the non-reproductive worker caste(s). Caste development in ants thus provides an opportunity to understand how epigenetic information can induce alternative developmental programs at the level of an entire animal.

In this presentation, I will discuss our recent research into the molecular mechanisms of caste development, with a particular focus on a parasitic strain of mutant ants that is providing new insights into the differentiation mechanisms that coordinate the caste-specific growth of multiple tissues. I will argue that our understanding of caste development can be advanced by new empirical results, but an equal emphasis should be placed on developing a formal mathematical framework to interpret existing data and design new experiments. In this sense, the broader aim of this research is to use ant castes to develop a reproducible approach to understand phenotypic plasticity in biological systems, including the interplay between developmental plasticity and phenotypic evolution

Host: Dr. Eva Schultner