# SFB 680

MOLECULAR BASIS OF
EVOLUTIONARY INNOVATIONS


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## The Evolution of Arthropod Nervous System Development

My research interest is the evolution of the arthropod nervous system (insects, crustaceans, myriapods, chelicerates, onychophorans). We analyse the developmental processes that lead to the formation of the diverse nervous systems in arthropods in order (1) to understand how the developmental mechanisms have been modified in the individual arthropod groups to generate the diverse nervous systems, (2) to link evolutionary changes in developmental processes to adaptive changes in morphology and function of the nervous system, (3) to uncover derived characters of neurogenesis that can be used for resolving euarthropod relationships. We have performed comparative morphological, molecular and partially functional analyses of the development of the nervous system of representatives of all arthropod groups (insects: *Drosophila melanogaster, Tribolium castaneum*; crustaceans: *Daphnia magna;* chelicerates: *Cupiennius salei, Achaearanea tepidariorum* (spiders); myriapods: *Glomeris marginata, Archispirostreptus spec.* (millipedes), *Strigamia maritima, Lithobius forficatus* (centipedes)), and a representative of an outgroup to the euarthropods, the onychophoran *Euperipatoides kanangrensis.* Based on this comprehensive analysis and additional evidence, I will present a hypothesis that explains how neural precursors and neural stem cells have evolved in arthropods. Furthermore, I will discuss how conserved gene networks and signal transduction pathways have been evolutionary modified and/or coopted to regulate neural precursor identity in arthropods which in turn influences neuronal diversity and thus the complexity of neuronal networks.

## June 24, 15:00

**Biocenter, Zülpicher Str. 47b, Seminar room 3.003, 3rd floor**

Host: Siegfried Roth

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