GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN IN PUBLICA COMMODA SEIT 1737

Johann Friedrich Blumenbach Institute
Evolutionary Developmental Genetics
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I am looking for one **PhD TVL-E13 (65%) for 3 years**
Application until January 14th 2026 at https://uni-goettingen.de/de/556704.html
Online-Information-Session: December 19th 2pm at *uni-goettingen.zoom.us/my/meeting.with.gregor*

The Evolution of alternative Splicing and the Emergence of Insect Brains based on AI-supported annotations

The evolution of complete metamorphosis (holometaboly) represents one of the most successful innovations in insect evolution. A remarkable aspect of holometabolous development is the formation of two functionally distinct brains (found in the larva and the adult) from a single genome, raising fundamental questions about the molecular mechanisms underlying this phenotypic plasticity. Alternative splicing (AS) is a process, where new gene functions emerge by producing different proteins from one gene. This project makes use of a novel AI-tool for AS prediction to test the hypothesis that AS was a crucial evolutionary mechanism enabling the development of stage-specific brain architectures in holometabola.

You will employ comparative transcriptomics across the insect phylogeny, generating PacBio long-read brain transcriptomes from 26 species representing the insect phylogeny. This uniquely comprehensive dataset will reveal the evolutionary patterns of AS in a hyperdiverse clade. Extensive developmental profiling of AS in the red flour beetle Tribolium castaneum across development will identify candidate isoforms potentially involved in brain development. Using our functional genetics toolkit (RNAi, genome editing, transgenic imaging lines, immunohistochemistry, etc.) you will validate these hypotheses by RNA interference.

This project will provide comprehensive insights into the evolution of AS and its role in supporting the evolution of holometaboly, which is one of the most successful evolutionary innovations.

Environment: We will closely collaborate with a PhD student to be hired by Prof. Mario Stanke (Greifswald, Germany; developer of the AUGUSTUS and BRAKER annotation pipelines), who will develop an advanced deep learning tool to predict alternative splicing. This is based on the astonishing success with his novel AI-annotation tool Tiberius, the first version of which already performed extremely well. The project is realized in the framework of the **Priority Program "GEvol"** funded by the German Research Foundation, which offers networking and additional methods training. In addition, you can choose to join activities of students from the **IMPRS-GS and/or GönomiX** (https://www.uni-goettingen.de/de/624201.html), who combine expertise in organismic gene function studies and bioinformatics analyses.

Hope to see your application!
Gregor Bucher