

# Cologne Evolution Colloquium

SFB 680  
Molecular Basis of  
Evolutionary Innovations

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## **Flexibility of temporal regulation as a basis for short- to long-germ evolution in insects**

The anteroposterior (AP) axis of most insects is segmented in two different phases, each with a drastically different morphology. First, anterior segments arise in a 'blastoderm', a structure with a fixed AP length. Then, more posterior segments form in a 'germband', whose AP axis grows by convergent extension. Insects differ in the number of segments that form in the blastoderm vs germband. In short-germ insect, most segments form in a germband; while in long-germ insects, most segments form in a blastoderm. Short-germ embryogenesis is thought to be the ancestral mode of insect development, but it is not clear how it evolved into a long-germ mode. Here I show that in the short-germ beetle, *Tribolium castaneum*, segmentation in both blastoderm and germband are based on the same core mechanism: sequential activation of gene expression, temporally regulated by a gradient. I also show that this 'temporal regulation' mechanism is so flexible that it can act interchangeably in both blastoderm and germband. This suggests a simple mechanism for short- to long-germ evolution in insects.

Wednesday, October 28, 2015, 17:00  
University of Cologne, Institute for Genetics  
Seminar Room 0.46

Hosted by Siegfried Roth