

Cologne Evolution Colloquium

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The genetic and physical basis of a phylogeographically diverse trait: adaptive colour variation in reptiles

Vertebrate skin coloration provides a promising model system for exploring the link between genotypes and phenotypes in an ecological and phylogenetic framework. In particular, reptiles exhibit a broad range of pigmentary and structural colours generated by different types of chromatophores. Despite their crucial role in thermoregulation, photoprotection, camouflage, and visual communication, little is known about the genetic, morphological, and physical mechanism that generate variation in colour traits in this lineage. We address this problem via an integrated approach that combines the tools from 'classical' population and developmental genetics and microscopy with modern next-generation sequencing techniques, as well as spectroscopy and optical modelling. In this presentation, I will show the results of 1) linkage mapping of alleles affecting melanin-based pigmentation and colour pattern formation in the corn snake using whole-genome sequencing, 2) analysis of molecular phylogeography and colour variation in panther chameleons of Madagascar, and 3) comparative analysis of skin ultrastructure in relation to pigmentary/structural coloration and resistance to extreme sunlight exposure in a number of lizards. These results open up new perspectives on snakes and lizards as models in evolutionary developmental biology of coloration.

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