Comparative musculo-skeletal ontogeny of tetrapods

Summary / Zusammenfassung

The importance of evolutionary developmental biology (evo-devo) in bringing embryology to the evolutionary synthesis cannot be underestimated. However, the field is largely dominated by experimental approaches using model species and by molecular biology. More organismic and comparative approaches to study ontogeny are also experiencing a revival, addressing the old question of the impact of developmental studies in systematics. This kind of work is also benefiting from advances in experimental techniques and the incorporation of palaeontological data, and is in part inspired by the growing realization that the study of complex structures in time is fundamental to generate solid phylogenetic hypotheses based on morphological characters. This project aims at addressing this issue by studying heterochronies (changes in developmental timing) in the late development of selected Recent and fossil amniotes.

Examination of skeletal heterochronies in tetrapods are restricted to few taxa and have sampled either the skull or the postcranium. Already patterns were discovered, but they require testing with a wider sampling. The phylogenetic breadth examined in this project and the new methods employed would address questions such as: How conserved are ossification sequences among amniotes? Are heterochronic shifts connected to functional/ecological traits? How are these shifts related to morphological diversification?

The specific aims of this project can summarized as follows: (1) clear and stain and/or CT scan ontogenetic series obtained from Museum collections and experimental labs, including most major clades of mammals and turtles and representatives of most other major tetrapod clades; (2) produce the first comprehensive analysis of changes in developmental timing of the mammalian skeleton in a phylogenetic framework, as well as several other selected tetrapod clades; (3) test the utility of developmental timing data in reconstructing evolutionary relationships; (4) Describe the growth patterns in selected reptilian taxa from the fossil site of Monte San Giorgio.

Publications / Publikationen


and new data with emphasis on island forms. PeerJ 3:e1358


Keywords / Suchbegriffe
Ontogeny, phylogeny, heterochrony, skeleton, muscle

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Funding Source(s) / Unterstützt durch
SNF 31003A-149605 (PI); previous funding: SNF 3100AO-116013/1 (PI); Leverhulme Foundation, UK (co-PI; PI: Dr. R. Asher, Cambridge)

In Collaboration with / In Zusammenarbeit mit
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Duration of Project / Projektdauer
Mar 2007 to Sep 2019