Addendum

Schedule

Sean Roberts will no longer be giving a talk at 14.20.

Talk abstract

09:30
KEYNOTE: Integrating integration from development to deep time and why it matters
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Variation is the raw material of evolution, but there is little understanding of how variation on a microevolutionary scale relates to large-scale evolutionary patterns. In particular, trait correlations have often been invoked as a possible constraint on variation, and thus a major influence on evolutionary change, but there are few empirical studies of the relationship between trait correlations and morphological evolution. The study of modules, semi-autonomous sets of highly-correlated traits, allows for broad comparisons of trait correlations across large clades and across scales of evolutionary study, from genetics to palaeontology.

We have used a quantitative framework, 3-D morphometrics, to assess cranial modularity in embryonic, juvenile, adult and fossil mammals, including monotremes, marsupials and placentals, to assess how patterns of modularity integchange during ontogeny, vary across phylogeny, and relate to morphological disparity. Analysis of Recent and fossil adult mammals has demonstrated that therians display six consistent cranial modules. However, there are significant differences among modules and across taxa in the strength of within-module correlations. We present new data from postnatal Macaques, *Macaca fuscata* (Placentalia: Primates) and embryological series of shrews, *Cryptotis parva* (Placentalia: Eulipotyphyla), and opossums, *Monodelphis domestica* (Marsupialia: Didelphidae) to test if trait correlations and cranial modularity change significantly during ontogeny, as has been suggested by previous studies. Our preliminary results suggest that modularity changes significantly during early postnatal ontogeny but stabilizes during late ontogeny.

Differences in taxa show that modularity evolves, but it leaves open the question: "What is the evolutionary significance of modularity?" Modularity may constrain variation or facilitate transformations. We address the specific question, "Do modules show significant differences in morphological disparity?" As mentioned above, some modules are highly integrated (high trait correlations), and others are more weakly integrated. If trait correlations constrain variation, it may be expected that highly-integrated modules show lower disparity, and vice versa. We use data from over 100 species from the therian orders Primates, Carnivora, Dasyuromorphia, Peramelia, and Diprotodontia to measure disparity, measured as Procrustes distance, in each of the six modules observed in therians. There is some support within Placentalia that high correlations within modules constrain morphological disparity, but this pattern is not supported within Marsupialia.

Additional Delegates

Ashby, Jack	University College London
van Heteren, Anneke	Roehampton University
Jolly, William Roy	Queen Mary University of London
Lawrence, Julie	Cambridge University
Sarkol, Vera	Queen Mary University of London
Spencer, Robert	Brunel
Strandmark, Julia	Queen Mary University of London
Ward, Helen	Queen Mary University of London