

Leaders from Biology

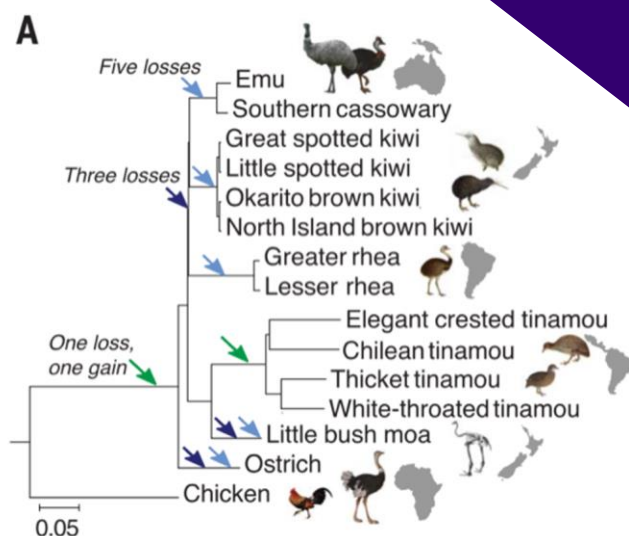
Endowed Biology Seminar

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Wings, feathers, flight: the PhyloG2P approach to bird evolution



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The genotype-to-phenotype (G2P) map is of ongoing interest in evolutionary biology. Comparative genomics is now allowing us to map genes for traits using phylogenetic approaches (PhyloG2P; Smith et al. 2020 TREE). By taking advantages of phenotypically unique lineages or convergent

evolution, PhyloG2P can provide surprisingly precise identification of coding and noncoding loci underlying evolutionarily labile traits. I illustrate this approach with two examples that focus on whether traits such as the origin of feathers or loss of flight were driven primarily by gene sequence evolution or gene regulation. The second example applies multiple 'omics approaches to study the convergent loss of flight in paleognathous birds, which include the ostrich, emu, kiwis and relatives. In both cases, regulatory evolution seems to have played an important role in the gain and loss of fundamental avian traits. Overall our results suggest a strong role for non-coding regulatory evolution in the origin of key adaptations of birds.