(Non)Parallel developmental pathways to vertebrate appendage reduction

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May 18, 2021

Abstract

Appendages have been reduced or lost hundreds of times independently during vertebrate evolution. This suggests that selection routinely favors appendage reduction. How often are the same developmental and genetic pathways used during loss by independent lineages? We reviewed the developmental and evolutionary literatures of appendage reduction in 12 genera spanning fish, reptiles, birds, and mammals. We found that appendage reduction and loss resulted from modified gene expression in each case but one. However, the genes for which expression was modified were rarely shared. Our findings suggest that adaptive loss of complex traits might proceed relatively easily through changes in gene expression along multiple developmental pathways.

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`Swank_NonParallel_MS_05102021.pdf` available at https://authorea.com/users/414443/articles/522486--non-parallel-developmental-pathways-to-vertebrate-appendage-reduction