Researchers use phylogenetics to untangle convergent adaptation in birds
23 June 2021

Researchers from Skoltech and their colleagues have shown that adaptation to similar environments hardly involves similar genomic positions when species are distantly related. The team investigated recurrent adaptations of wildlife birds' mitochondria to high altitude, migration, diving, wintering, and flight. Repeatable substitutions are rather a coincidence than adaptation, which confirms the scientific opinion that distant species "choose" different ways of similar trait evolution. The paper was published in the journal Genome Biology and Evolution.

"Mitochondrial genome was chosen for the study as it is small and thus sequenced for many species, yet full of extremely important genes. Mitochondrial genes are responsible for hypoxia and metabolism level tuning: this guided our selection of phenotypic traits of interest," Burskaia notes.

The team looked at birds who live at high altitudes and diving birds (likely to face hypoxia). To study adaptations which affect metabolism rate changes, scientists considered four groups of species: birds with outstanding flight abilities, long-distance migrants, flightless birds and wintering birds. By running powerful phylogenetic methods, where species are placed on a "tree" and coincident changes in phenotype and genotype are counted, the researchers were able to show that the majority of convergence events can be explained by random coincidences rather than adaptation.

The study, being conceptually close to recent attempts to search for single-position convergences in echolocating bats and marine mammals, confirms that evolutionary landscape at between-order distances is too different for single-position
adaptive convergence.


Provided by Skolkovo Institute of Science and Technology


This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.