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ADAPTIVE FUNCTIONS OF MELANIN-BASED COLORATION, THE ROLE OF MELANOCORTINS

Guillaume Emaresi [1], Anne-Lyse Ducrest [1], Céline Simon [1], Alexandre Roulin [1]

[1] *University of Lausanne, Department of Ecology and Evolution, , Switzerland*

Guillaume.Emaresi@unil.ch

Understanding the mechanism that generate phenotypic diversity, and most importantly, maintain the underlying genetic variation over time, is of fundamental importance to our comprehension of how evolution proceeds. An interesting case of polymorphism is when genetic diversity causes variation in individual morphology such as coloration, especially in traits for which variation is due to the deposition of melanin pigments. In vertebrates, inter-individual variation in melanin-based coloration exhibits a strong genetic component and is often associated with life-history traits. Recently, it was proposed that the melanocortin system could account for the covariance between melanin-based coloration and physiological, morphological and behavioral traits in wild vertebrates, as a consequence of their pleiotropic effects. However, in wild animals, little progress has been done to determine the underlying genetic mechanism for such association. The present study aims at identifying whether the key regulators of the melanogenesis are responsible for variation in melanin-based coloration in two wild owls species, *Tyto alba* and *Strix aluco*. We address the following questions: does the activity of the melanocortins regulators covary with different color morphs and does it explain the variation in the eu- to phaeomelanin balance between individuals in both species? Our idea is to assess which molecular level (e.g. nucleotides sequence, gene expression or protein activity) is responsible for inter-individual variation in melanin-based coloration. Preliminary results suggests an association between a microsatellite of 10 to 18 serine repeats within the coding sequence of *T. alba* γ_3-MSH and melanin-based coloration. Interestingly, the POMC prohormone was quantified in *S. aluco* plasma samples by ELISA and showed a negative relation to the amount of phaeomelanin. This points out the potential implications of polymorphisms at the melanocortin agonist (POMC) to generate different colorful phenotypes.