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Chasing genes behind carotenoid coloration

****MERCREDI 8 MAI à 12 h 30****

Pavillon Charles-Eugène Marchand, salle Hydro-Québec (1210)

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Résumé:

Linking the phenotype with genotype and investigating evolutionary processes shaping phenotypes help us to better understand biology. One of my traits of interest is coloration; I worked on various aspects of coloration, from acquiring pigment, controlling sexual dichromatism to ornamental coloration. I examined yellow, orange, and red carotenoid-based pigmentation, pivotal drivers of avian diversity, to understand how birds acquire color and how coloration differs between sexes. In order to establish an association between genotype and phenotype, I sequenced genomes of different canary breeds, identified candidate genes associated with difference in coloration and followed up with functional tests. Firstly, I investigated how birds acquire carotenoid coloration. I examined mechanisms of carotenoid uptake, taking advantage of the white recessive canary breed, which carries an autosomal recessive mutation causing white plumage. Biochemical analysis revealed a genetic defect in carotenoid uptake, then genomic analyses showed that the white recessive allele is caused by a splice-donor site mutation in the scavenger receptor B1 gene (SCARB1). Secondly, I analyzed the molecular mechanisms of sexual dichromatism in birds (differences in coloration between males and females). I showed that dichromatism in mosaic canaries is controlled by a small autosomal region that alters the expression of the BCO2 gene in males and females, but specifically in the integument. Finally, we showed that red coloration is regulated by two genes: CYP2J19 and BDH1L both in birds and fish. My work is a significant contribution towards a better understanding of the evolution of coloration in birds.

Hôte : Christian Landry