

In Silico Analysis of *TYR* Gene in *Corvus* species as Potential Novel Genetic Models for Oculocutaneous Albinism Type 1 (OCA1)

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Structured Abstract

Background: Oculocutaneous albinism type 1 (OCA1) is a genetic pigmentation condition that is caused by mutation in *TYR* gene, leading to gradual reduced or complete absence of melanin production. Despite its rarity in avian species, albinism has been observed in *Corvus* species, suggesting natural genetic variability within this genus. This study aims to evaluate the potential of selected available and annotated genetic data of *Corvus* species using comparative bioinformatics approaches, as novel avian genetic models for OCA1.

Methods: A series of comparative bioinformatic analysis of the *TYR* gene in *H. sapiens* and five selected *Corvus* species: *brachyrhynchos*, *C. cornix*, *C. hawaiiensis*, *C. kubaryi*, and *C. moneduloides*. Local and multiple sequence alignments were used to assess genetic similarity and conservation at both nucleotide and protein levels. Further analysis included identification of conserved and variable sites and protein motifs, calculation of pairwise genetic distance, and construction of phylogenetic tree.

Results: Local and multiple sequence alignment showed a high degree of conservation between *H. sapiens* and *Corvus* species, with ~73.72% nucleotide identity, ~71.78% protein identity, and 71.72% highly conserved amino acids. All species shared four conserved tyrosinase protein motifs. Pairwise genetic distance revealed minimal divergence between *Corvus* species (0.001-0.005), and significantly higher divergence to *H. sapiens* (> 20280). The phylogenetic tree further supported these findings, showing all *Corvis* species within the same clade and separated from *H. sapiens*.

Conclusion: The strong genetic structural and functional conservation of the *TYR* gene in *Corvus* species supports their potential as a novel avian genetic model for OCA1. Their natural genetic variation, accessible genetic data, and worldwide distribution make them valuable for future pigmentation disorder research.

Keywords: Oculocutaneous Albinism Type 1 (OCA1), *Tyr* Gene, *Corvus* Species, Melanin

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