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UVS is rare in seabirds

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Abstract

Ultraviolet-sensitive vision (UVS), believed to have evolved from an ancestral state of violet-sensitive vision (VS), is widespread among terrestrial birds, where it is thought to play a role in orientation, foraging, and sexual selection. Less is known, however, about the distribution and significance of UVS in seabirds. To date UVS has been definitively demonstrated only in two families (Laridae and Sternidae), although indirect evidence has been used to argue for a more widespread occurrence. In this study we analyzed short-wavelength sensitive (SWS1) opsin DNA sequences to determine the distribution of ancestral (VS) and derived (UVS) amino acid spectral tuning sites in 16 seabird species representing 8 families with diverse ecological niches. Our results revealed sequences associated with UVS pigments (UVSs) in the Black-backed gull (*Larus dominicanus*), providing further evidence of its widespread occurrence within the Laridae. The Caspian tern (*Hydroprogne caspia*) and White-fronted tern (*Sterna striata*), however, were found to have VSs, suggesting an evolutionary reversion to the ancestral state within Sternidae. VSs were also detected in an additional six families. Our results raise

sterinae. VSS were also detected in an additional six families. Our results raise interesting questions about the functions of UV vision in marine environments.

Highlights

• SWS1 opsin sequenced in 16 seabirds from eight families with diverse ecological niches. • UVS was detected in an additional member of the Laridae. • We discuss why UVS is sparsely distributed among seabirds.



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Keywords

UVS; Seabirds; VS; Gulls; Albatross; SWS1 opsin; Phylogeny

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