

OPSIN GENES IN NOCTURNAL MAMMALS: IMPLICATIONS FOR PRIMATE EVOLUTION

E.B. Davion^{1,2}, R.D. Martin^{2,1}

¹ *Committee on Evolutionary Biology, University of Chicago, Chicago, Illinois USA*, ² *Anthropology, The Field Museum, Chicago, Illinois, USA*

Presenter's Email: edavion@uchicago.edu

It has long been accepted that mammals were generally small and nocturnal for the first two thirds of their evolution (210 to 65 mya). It has also been widely accepted that ancestral primates remained nocturnal, with some descendant lineages secondarily developing diurnal behaviour. Early terrestrial vertebrates seemingly had tetrachromatic vision: 4 colour opsin genes corresponded to 4 cone types for photopic vision and a rhodopsin gene corresponded to rods for scotopic vision. Extant mammals, including most primates, are typically dichromatic; 2 ancestral colour opsin genes (SWS2 and RH2) and corresponding cone types have been lost. Uniquely among placental mammals, humans, apes and certain diurnal monkeys are truly trichromatic. Nocturnal mammals consistently possess cones, previously thought to serve photopic vision exclusively. Surprisingly, two different cone types (Medium/Long-wave Sensitive M/LWS and Short-wave Sensitive SWS1) are commonly present in the retina of nocturnal mammals. But SWS1 opsins have been suppressed in several lineages, including 3 groups of primates (loris group, dwarf lemurs and owl monkeys). Retention of cone opsins in nocturnal primates led some authors to infer a diurnal ancestry. Here we examine these claims in light of phylogenetic analysis of opsin genes of representative genera of the supraordinal clade Euarchonta: colugos (Dermoptera) and treeshrews (Scandentia). These two taxa have been identified as the closest relatives of primates on morphological and genetic grounds, but relations between them remain unresolved.

Keywords: opsin, ancestral primate, Euarchonta, nocturnality