

Color vision drove primates to develop red skin and hair, study finds

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You might call it a tale of "monkey see, monkey do." Researchers at Ohio University have found that after primates evolved the ability to see red, they began to develop red and orange skin and hair.

Humans, apes and Old World monkeys, such as macaques and leaf monkeys, all have trichromatic vision, which allows these primates to distinguish between blue, green and red colors. Primatologists have disagreed about whether this type of color vision initially evolved to help early primates forage for ripe fruit and young, red leaves among green foliage or evolved to help them select mates.

Now a new study published online this week in *American Naturalist* by Ohio University researchers Andre Fernandez and Molly Morris rules out an initial advantage for mating and suggests that red-color vision evolved for non-social purposes, possibly foraging. But once developed, trichromaticism drove the evolution of red skin and hair through sexual selection.

Fernandez, the study's lead author, first began to question the strict correlation of food choice and color vision while studying howler monkeys in Costa Rica. He recently compiled data on the color vision, social and sexual habits and red skin and pelage of 203 different primate species.

The researchers then used a phylogenetic tree representing the evolutionary relationships among all the primate species under study to

test hypotheses about the order in which the traits of red color vision, gregariousness (highly social behavior) and red coloring evolved. By comparing the traits of individual species in this evolutionary context, Fernandez and Morris could statistically deduce the probability of their ancestors having the same traits, as well if any of the traits were correlated with one another.

They found that the species that could discern red and orange hues were more likely to develop red and orange skin and hair, as well as highly social habits that make it easier to visually compare mates. In fact, the more social the trichromats are, the more red coloring they show.

"Neuroscience research has found some evidence of a perceptual bias for more brilliant colors," said Fernandez, an Ohio University doctoral student. "So, it is reasonable for primates with trichromatic color vision to respond more when they see bright colors."

So while foraging may have initially sparked red color vision, the new ability was likely "recruited" for social purposes.

"It looks like red skin and hair became a sexual preference," said Morris, a fish biologist who studies how physical traits such as coloring evolve through sexual selection. "So while the benefits in terms of eating may not apply anymore, the (red-color) vision in some groups is now relevant in social terms."

Source: Ohio University

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