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Blush may be key to rise of color vision

By Elise Kleeman Staff Writer

PASADENA - A blush can be embarrassingly revealing, but it can also convey important information to those who notice it. In fact, Caltech researchers now believe color vision evolved in primates with the purpose of distinguishing these emotional hues.

For decades, scientists had theorized monkeys evolved to see in color to locate the fruits and leaves they fed upon.

Caltech neurobiologists recently found, however, that the vision of Old World primates including baboons, gorillas and humans is most sensitive not to vegetation but to the color changes caused by a rush of emotion.

In effect, our eyes are "optimal for color signaling," said Mark Changizi, who published the findings with Qiong Zhang and Shinsuke Shimojo in the scientific journal Biological Letters.

Unlike the eyes of birds and bees, whose three types of color receptors are sensitive to very different hues, two of the three color receptors in the eyes of Old World primates are almost identical, Changizi said.

"It seems redundant," he said of the similarity. But his work shows that it makes those apes and monkeys "maximally sensitive" to the changes in the blood's oxygen content that result from arousal, embarrassment or anger.

This could also have something to do with why humans have no fur, he said. "There's no good in having this special power to read emotions on primate's skin if you can't see the skin," he said.

He and his colleagues showed that bare-faced or bare-rumped monkeys had color vision, while other primates didn't.

"There is a tremendous amount of rump signaling among Old World monkeys," he said. Humans, being almost entirely bare, have even more signalling potential.

Redundant color receptors, blushing, bare skin - "all these things kind of fall into place," Changizi said.

Color vision could still be important in a primate's search for food, he said, but perhaps was a useful side effect of its development for emotional signaling.

George Washington University anthropologist Peter Lucas, who for many years has advocated the connection between color vision and leaf foraging, isn't so sure. He suggested that the hunt for food could have kick-started the evolution of primate's color vision, which in turn adapted over time for social purposes.

Lucas also noted, as did Changizi, that the correlation between color vision and bare skin wasn't as straightforward among New World monkeys, some of which can see the blushing hues while others can't.

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