

Scientists find color vision system independent of motion detection

March 19 2008

The vision system used to process color is separate from that used to detect motion, according to a new study by researchers at New York University's Center for Developmental Genetics and in the Department of Genetics and Neurobiology at Germany's University of Würzburg.

The findings, which appear in the latest issue of the *Proceedings of the National Academy of Sciences*, run counter to previous scholarship that suggested motion detection and color contrast may work in tandem.

The study's authors are: Claude Desplan of NYU's Center for Developmental Genetics; Reinhard Wolf and Martin Heisenberg of the University of Würzburg; and Satoko Yamaguchi, who holds appointments at both institutions.

Whether motion vision uses color contrast is a controversial issue that has been investigated in several species--from insects to humans. In human vision, it had been widely believed that color and motion were processed by parallel pathways. More recently, however, the complete segregation of motion detection and color vision came into question.

To explore this matter, the NYU and University of Würzburg researchers examined the fruit fly *Drosophila*. Fruit flies' development is well-understood by biologists and therefore serves as an appropriate focus for analyses. Specifically, they monitored *Drosophila*'s optomotor response to moving color stimuli in both normal and mutant flies, with some of the mutant flies lacking the photoreceptors necessary for motion

detection and others without the photoreceptors needed to process color.

The results showed that flies lacking the photoreceptors for detecting color showed the same ability to detect motion as normal flies. The researchers then concluded that the color channel does not contribute to motion detection.

“The finding that motion detection is independent of color contrast is somewhat counterintuitive,” said NYU’s Desplan. “Color is thought to increase the salience of objects, such as red fruits in the green foliage of trees.”

“However, our results in the fly demonstrate that color is strictly excluded from processing directional motion information, which suggests two separate functional pathways,” he added. “Whether, inversely, the motion detection system is involved in color vision in *Drosophila* remains to be determined.”

Source: New York University

Citation: Scientists find color vision system independent of motion detection (2008, March 19) retrieved 26 April 2024 from

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