There's more to the eye than meets the eye

California last week designated a nearly 40,000-acre swath of Orange County as a parkland, hoping to encourage its preservation. Scientists consider the region, which features unusually shaped sandstone formations such as the one above, one of the world’s ecological “hot spots,” with large concentrations of species found nowhere else. (David McNew/Getty Images)

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VISION

When that first ray of sun rouses you from sleep in the morning, there’s a lot of information that light is carrying to your brain. First, the pattern of light and shadow helps you form an image and interpret your surroundings when you first open your eyes. Light also resets your internal clock so that your brain is ready and awake for the rest of the day, and can even affect your mood and behavior. Researchers have long tried to figure out how the eye decodes the information from light to create such varied responses. Biologist Samer Hatter, of Johns Hopkins University, and colleagues decided to find out, by genetically engineering mice that lacked a special set of cells in the eye that make a protein called melanopsin. Surprisingly, even without melanopsin cells, the mice had completely normal vision. However, the mice were confused about whether it was daytime or nighttime - suggesting that melanopsin cells are specifically important in setting our internal clock but seem to have little to no effect on normal vision. “This might help us better understand the effect of light on sleep disorders and even depression,” said Hatter.

BOTTOM LINE: The existence of different populations of cells in the eye, like melanopsin cells, explain how a single beam of light can trigger processes as diverse as seeing, setting the internal clock, and tuning behavior. CAUTIONS: Although the visual system of mice and humans are similar, more studies need to be performed to extend these results to humans. WHAT’S NEXT: “Light may also have an effect on learning and memory,” said Hatter, which are areas he plans to focus on in...
Reproduction

Fewer offspring yield longer lifespan

For more than 50 years scientists have believed that organisms that produce fewer offspring live longer, but they didn’t understand why this was so. Now a group of researchers at Brown University have conducted experiments on fruit flies that might explain the link between reproduction and lifespan. Researcher Thomas Flatt and colleagues, overactivated a gene that controls production of germline stem cell - cells that give rise to sperms and eggs. These flies ultimately lost the ability to produce eggs and sperms and became sterile. But the sterile fruit flies lived 20 to 50 percent longer than typical flies. This suggests that signals from the reproductive system regulate aging, something that has also been found in roundworms. Flatt also found an unexpected link between high insulin levels and longevity, suggesting that signals from the reproductive system probably regulate aging in part by changing the body’s response to insulin. **BOTTOM LINE:** “We now have some of the first insights into how the link between reproduction and lifespan might work,” said Flatt. **CAUTIONS:** More work is required before the results of this study can be applied to humans. **WHAT’S NEXT:** Flatt and colleagues want to identify the exact signals in the gonad that control reproduction and lifespan. **WHERE TO FIND IT:** Proceedings of the National Academy of Sciences, April 29 SENA DESAI GOPAL

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