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# Retinal cells thoughts to be the same are not: study

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The old adage "Looks can be deceiving" certainly rings true when it comes to people. But it is also accurate when describing special light-sensing cells in the eye, according to a Johns Hopkins University biologist.

In a study recently published in *Nature*, a team led by Samer Hattar of the Department of Biology at the Krieger School of Arts and Sciences and Tudor Badea at the National Eye Institute found that these cells, which were thought to be identical and responsible for both setting the body's circadian rhythm and the pupil's reaction to light and darkness, are actually two different cells, each responsible for one of those tasks.

"In biology, as in life, you can't always trust what you see," said Hattar. "You have to delve deep to find out what's really going on. This study has shown that two structurally similar neurons are actually quite different and distinct, communicate with different regions of the brain and influence different visual functions."

The findings are significant, Hattar said, because doctors sometimes use pupillary light reflex (the pupil's response to light and darkness) as a way of diagnosing patients who may have sleep problems, and those clinicians now must recognize that the cells controlling pupillary response and those controlling the sleep-wake cycle are different.

"Although the diagnosis may still be valid most of the time, it is important to remember that disrupted pupillary light response with

normal sleep wake cycles or the opposite is possible, and caution should be exercised if clinicians only use pupillary light reflex for diagnosis purposes for deficits in non-image forming visual functions," explained Shih-Kuo (Alen) Chen, a post-doctoral fellow in the Department of Biology and co-author of the *Nature* article.

Hattar's research focuses on these special light-sensitive cells and how they regulate the physiology and behavior of mammals.

"In human beings, light has an impact on many of our physiological functions, including sleep and mood," he explains. "We are interested in the cellular, molecular and behavioral pathways by which light has an impact on us, independent of how and what we literally 'see' with our eyes. This includes setting our internal, biological clock to the day and night and constricting our pupils to control the amount of light coming through to our retinas."

In a previous study, Hattar's team revealed that these cells -- called "intrinsically photosensitive Retinal Ganglion Cells" -- also play a role in image formation. Formerly, it was thought that the ipRGCs' role was limited to sleep-wake cycles and pupillary responses.

**More information:** www.nature.com/nature/journal/ … ull/nature10206.html

Provided by Johns Hopkins University