

Exposing headache sufferers to pure-wavelength green light can lessen severity of migraines

Published on May 17, 2016 at 8:17 AM

Most migraine and post-traumatic headache sufferers find their headaches get worse in light, leading them to quit their most fundamental daily tasks and seek the comfort of darkness. A new study from Harvard Medical School reveals that exposing these headache sufferers to pure-wavelength green light significantly reduces their photophobia, or sensitivity to light, and can even reduce the severity of their headaches. The results publish today in *Brain*.

Photophobia, associated with more than 80% of migraine attacks, gives migraine sufferers little choice but to isolate themselves in dark rooms, unable to work, care for their family, or pursue everyday activities.

Although photophobia is not as incapacitating as the pain of the headache itself to migraine sufferers, "it is their inability to endure light that most often disables them," says Rami Burstein, Professor of Anesthesia at Beth Israel Deaconess Medical Center (BIDMC) and Harvard Medical School, and lead author of the study.

The new study shows that a narrow band of green light exacerbates migraine significantly less than all other colors of light and that at low intensities it can even reduce the headache itself.

Burstein and his colleagues devised a way to study the effects of different colors of light on headache in patients without visual impairment, after discovering that only blue light hurts blind migraine patients

They asked patients undergoing acute migraine attacks to report any change in headache when exposed to different intensities of blue, green, amber and red light. At high intensity of light (as in a well-lit office) nearly 80% of the patients reported intensification of headache - in all colours but green. Burstein and his colleagues found, unexpectedly, that green light actually reduced their pain by about 20%.

To understand why green light causes far less pain to these patients, the scientists devised experiments in which they measured the magnitude of the electrical signals generated by the retina (in the eye) and the cortex (in the brain) of these patients in response to each colour of light. They found that green light generated the smallest electrical signals in both the retina and cortex.

Next, they used animal models to show that the thalamus, a brain area that transmits information about light from the eye to the cortex, modifies the information in a way that explains why blue and red light are more painful than amber and why amber is more painful than green.

"My hope is that patients will be able to benefit directly from these findings one day very soon," says Burstein, who is trying to find a way to invent a low-cost light bulb that can emit "pure" (narrow band wavelength) green light at low intensity and sunglasses that block all but this narrow band of pure green light. However, he cautions the current cost of one such light bulb, and the technology, is astronomical.

Source:
Oxford University Press
