Green light found to ease the pain of migraine

Time to go green

People who experience migraines that are made worse by light might be better off seeing the world in green. While white, blue, red and amber light all increase migraine pain, low-intensity green light seems to reduce it. The team behind the finding hope that specially developed sunglasses that screen out all wavelengths of light except green could help migraineurs.

Many people experience sensitivity to light during a migraine. Photophobia, as it is known, can leave migraineurs resorting to sunglasses in well-lit rooms, or seeking the comfort of darkness.

The reaction is thought to be due to the brain's wiring. In a brain region called the thalamus, neurons that transmit sensory information from our retinas cross over with other neurons that signal pain. As a result, during migraine, light can worsen pain and pain can cause visual disturbance, says Rami Burstein at Harvard University. But not all colours of light have the same effect. Six years ago, Burstein and his colleagues studied migraine in sufferers who are blind, either due to the loss of an eye or retina, or because of retinal damage. They found that people who had some remaining retinal cells had worse migraines when they were in brightly lit environments, and that blue light seemed to have the strongest impact.

The finding caused a flurry of excitement, and the promotion of sunglasses that filter out blue light. But since then, a special class of cells has been discovered in the retina that process only blue light – and seem to be saved from some types of retina damage that can cause blindness.
So there was nothing special about blue light in Burstein’s study – it was just that it was the only type of light his volunteers’ eyes could process.

**Serene green**

In a new study, Burstein and his colleagues sat sighted volunteers in the throes of a migraine in a dark room and gradually raised the intensity of white, blue, green, amber and then red light. As well as recording how the volunteers said the light affected their pain, Burstein’s team recorded the activity of neurons sending signals from the eye to the brain using a tiny electrode placed on the eyelid. They also measured the volunteers’ brain activity using electrodes placed on their heads.

“We were surprised to see that blue light was no more painful than white or amber or red,” says Burstein. “They were all painful.”

But even more surprising was the finding that low intensities of green light did not increase migraine pain – in fact, it lowered the volunteers’ suffering. “I’ve thought long and hard about it, but I have no idea why green light might be more pleasant,” says Burstein.

The brain and eye recordings taken from volunteers revealed that green light created a smaller amount of electrical activity, both in the eye and the brain, than any other colour of light. Tests on rats with electrodes inserted into their thalami also showed that green light triggered the least amount of electrical activity.

“Anything that can help the migraineur find relief from their headaches is useful, and this suggests that green light, at least, might not worsen their headache intensity due to photophobia, as much as other waveforms,” says Simon Ackerman at New York University, who was not involved in the research. “It does explain why certain wavelengths are worse than others.”

Burstein hopes that green lighting, or sunglasses that filter out all wavelengths of light except for green, might be useful for people with migraines.