Engineering a Device to Improve Vision via Photoactivation

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Goal: To build a practical device capable of improving my vision by directing a controlled level of light into the eye (i.e. photoactivation.) Problem/Background: I have multiple eye conditions that leave my vision severely impaired. Last year, I tested an observation and determined it is possible to improve my vision by directing controlled amounts of light into my eye. I concluded that the light causes my pupil to get smaller which in turn causes images to be more sharply focused on my retina. The goal of my project is to engineer an ergonomic and portable device capable of directing a set amount of light into my eye. Engineering Process: 1) Research basic electronics, 2) Deconstruct light that was used for initial testing, isolate individual components (LED, circuit, rechargeable battery etc.), 3) Reassemble battery, circuit, 3.7 V rechargeable battery, touch-sensitive switch, LED, 4) Ergonomically mount device to window glasses utilizing 3D printed housing and 5) Test, improve, repeat! Conclusion and Applications: A device that can create a pupil/pinhole effect and does not remove peripheral vision has been engineered, meeting the established goal. The device is easy to use and does not require holding a light. With the encouraging results it is hopeful to enhance vision in normal eyes. The device will have application to diverse fields like education, medicine, and the military. Future Research: With increased knowledge of electrical engineering other improvements can be made to the device, such as an automatic environment adapter and to modify a ‘backyard brain’ circuit kit to control the light with a simple muscle twitch.

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