STIMULATING VISION

Prostheses can be placed anywhere along the visual pathway, from just behind the photoreceptor cells—the rods and cones—to the brain itself. Subretinal devices stimulate the bipolar cells and other neurons downstream of the eye’s rods and cones from between the retina and the pigment epithelium 1, while suprachoroidal prostheses stimulate these same cells from between the choroid, the vascular layer that supports the retina, and the sclera, the protective outer layer of the eye 2. Both types of devices take advantage of the remaining intact retinal neural network that leads to the ganglion cells, whose axons form the optic nerve that transmits visual information to the brain. Epiretinal prostheses, on the other hand, directly stimulate the ganglion cells 3, which can also be activated via the electrodes placed near the optic nerve 4. And when the optic nerve itself is damaged, devices can be implanted in the brain, either in the lateral geniculate nucleus (LGN) 5, or the visual cortex 6. Prostheses targeting each these areas has shown varying success in restoring sight to the blind.