Artificial Retina

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It is estimated that there are more than 10 million people wordwide affected by retinal diseases that lead to the loss of vision. Diseasess sucs as retinitis pigmentosa and age related macular degeneration, attack the cell in the retina, rendering the rods and cones inoperative, thus causing either loss of peripheral vision or total blindness. Until very recently, there has been no cure for people suffereing from this disease, but technology breakthroughs are begging to give hope. The first hope came in 1998, when Dr. Mark Humayun demonstrated that a blind person could be made to see light by stimulating the nerve ganglia behind the retina with an electrical current. Dr. Humayun tests proved that the nerves behind the eye still functioned even if the person was blind. Based on this test scientists/engineers began looking for ways to create an artificial retina to replace the degenerated one.

Two companies in the United States have since developed artificial silicon retinas (Optiobionics, and a partnership between multiple colleges in the east).

ASR- created by optiobionics:

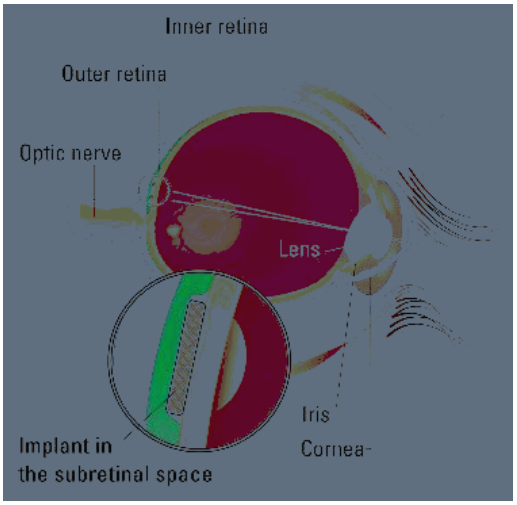
contraints included

- Small enough to be implanted in the eye (one shown on previous page has a diameter of 2 mm and is thinner than a human hair)
- Supplied with a continuous source of power
- Biocompatible with the surrounding eye tissue

Information on Retina: The ASR contains about approximately 5,000 microscopic solar cells (microphotodiodes). Clinical trials began in June 2000, Optobionics implanted microchip into subretinal space of ten patients with retinitis pigmentosa. Researchers wanted to study the chips safety and feasibility in treating retinal vision loss.At this time, no patient from this clinical trial has shown signs of implant rejection, infection, inflammation, erosion or retinal detachment related to the implanted microchip.

ARCC

- In development by a team of researchers from John Hopkins, North Carolina, North Carolina State, and University of North Carolina.
- Have currently the designed device that creates a 10 by 10 pixel images (quite blurry image, better than asr)
- Unlike the ASR which is placed between layers of retinal tissue, the ARCC is placed on top of the retina.
- However, this light is not the power source for the ARCC. Instead, a secondary device attached to a pair of common eyeglasses directs a laser at the chip's solar cells to provide power. The laser has to be powered by a small battery pack



pictured ASR inplented in eye