

ARTIFICIAL RETINA

ASR® Device

By
Aaron Ball
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There are two main diseases that affect the retina, **retinitis pigmentosa** and **age-related macular degeneration**. Both of these diseases attack the rods and cones, causing either loss of peripheral vision “tunnel vision” or vision from their center field-of-view.

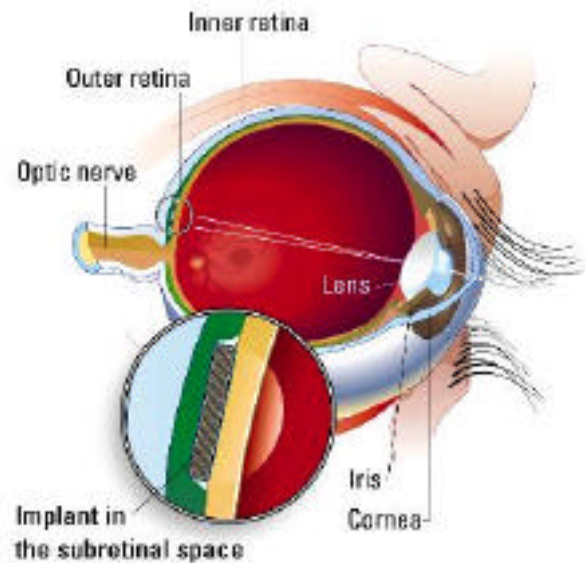
But fortunately neither of these diseases affects the ganglion cells or the optic nerve. So it is conceivable to develop artificial rods and cones to stimulate the remaining functional retinal cells **not the nerves** which in turn then send signals via the optic nerve to the brain for interpretation.

Basically the implant consists of an array of tiny solar cells (photodiode) thinner than a human hair with a diameter of just 2 mm. These are capable of converting light into electric current. And a small micro-electrode located on each micro-photodiode to transfer the current to the adjacent tissue.



2mm ASR® device lying on a penny

The main problem besides the fact that the tissue could be affected by the implant, the implant itself must withstand the biological environment, Unfortunately the oxide layer can withstand the biological environment for up to about six months only. Then it begins to corrode through the oxide and the silicon.



The device is implanted in a small pocket in the sub-retinal space. The retina is then resealed over the ASR.

Sources:

<http://www.optobionics.com>

<http://health.howstuffworks.com>

<http://www.eye-chip.com/>

<http://www.electronics-lab.com/>

<http://library.thinkquest.org/>