

# The Artificial Silicon Retina Microchip

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The Artificial Silicon Retina Microchip, or ASR device, was developed by Vincent Chow and Dr. Alan Chow, the co-founders of Optobionics Corp. The chips development dates back to 1988 when the two brothers first developed the ASR's microstructure. This device was developed in the hopes to aid in the cure of degenerative retinal diseases.

The two main types of retinal degenerative diseases are Retinitis Pigmentosa (RP) and Age-Related Macular Degeneration (AMD). AMD and RP affect an estimated 30 million people in the world.

The silicon microchip is 2mm in diameter and 25 microns thick. It holds about 5,000 "microphotodiodes," which are microscopic solar cells containing a stimulating electrode. These specialized cells are designed to convert light images to electricalchemical impulses which in turn stimulate remaining functional cells of the retina. These cells rely on light as an energy source, and therefore are not burdened by batteries, wires, external devices or attachments.

Due to the fact that the ASR device relies on stimulating still functional cells in the retina, this device is limited to use by those with no serious retinal scarring. So far the chip is being tested on only those with AMD and RT, but this is not the limit of its usefulness.

So far the ASR device is in clinical trial and has been evaluated over a 10 person trial. Patient's ages ranged from early 40's to late 70's, and all were in the 20/800 range with little or no light perception. All 10 subjects experienced an increase in visual functioning, and even some unexpected improvements occurred in those cells not in contact with the microchip. These results lead Dr. Chow to believe that this chip could some day be used to not only improve vision but to stop retinal degenerative diseases in

their tracks. His hope stems from the device's positive influence on neurotrophic factors, which have a nourishing effect on photoreceptors in the retina. One downside discovered is that the device's performance seems to peak after about a year, and in some cases vision began to decline but remained an improvement.

Though there are many positives to come from this device the road ahead is a long one. The device still requires further clinical testing and possibly more development before it is put into commercial use. Currently a new trial is being conducted to determine the chips durability and long-term safety. Even then, the cost of such a device will be quite substantial.



2mm ASR® device lying on a penny

## Sources

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