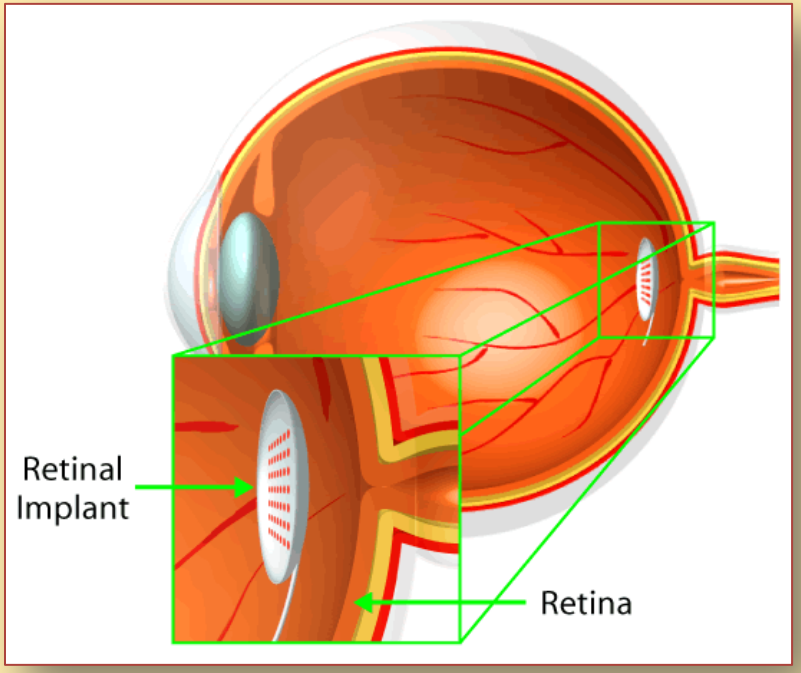
RETINAL PROSTHESIS



Overview

The FDA approval was based on data that included a clinical trial of 30 people that had received the Argus II. Results showed that most participants were able to performed basic functions better with the device than without it.

[FDA News Release, February 14, 2013, U.S. Department of Health and Human Services]

SEE LETTERS

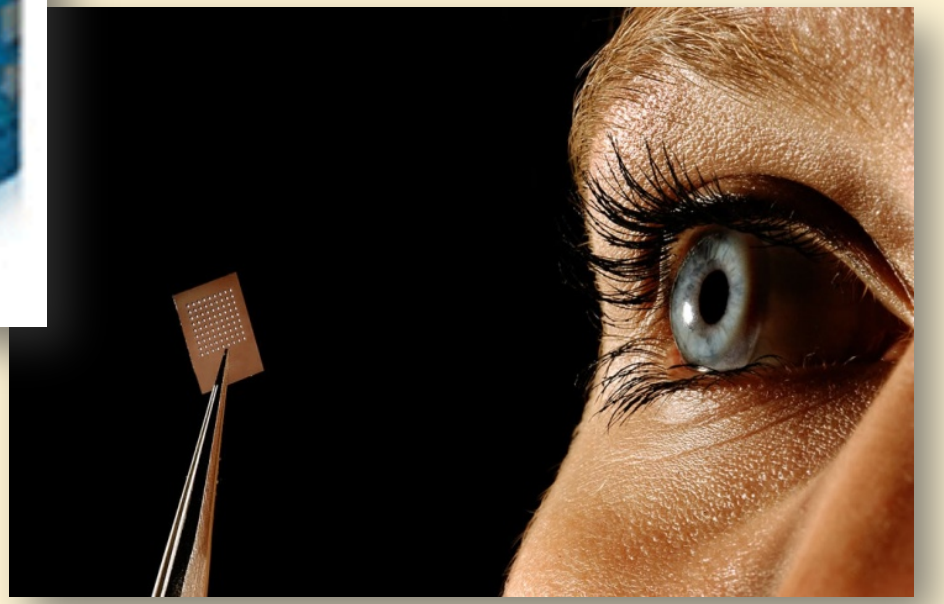
Artificial Retinal Prosthesis

Argus Retinal Stimulation System

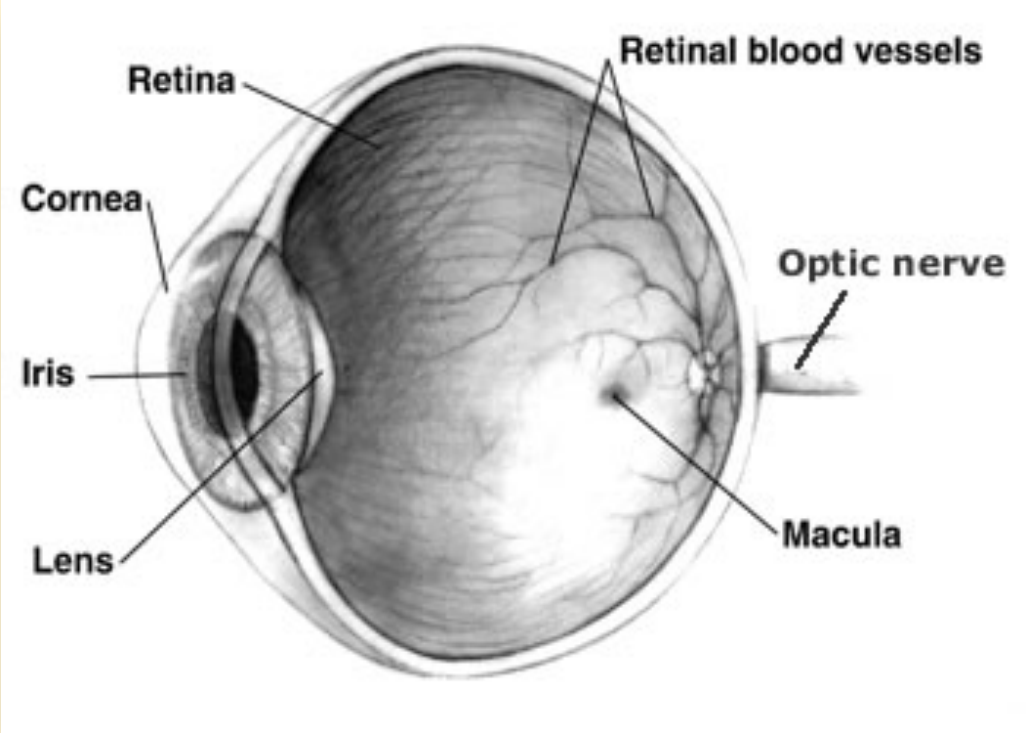
- Glass with video camera
- Video processor

Prototype of a Retina Implant

[Photo by Randy Montoya. Courtesy of Sandia National Laboratories]



The Human Eye



The Human Eye
[Public Domain: National Eye Institute]

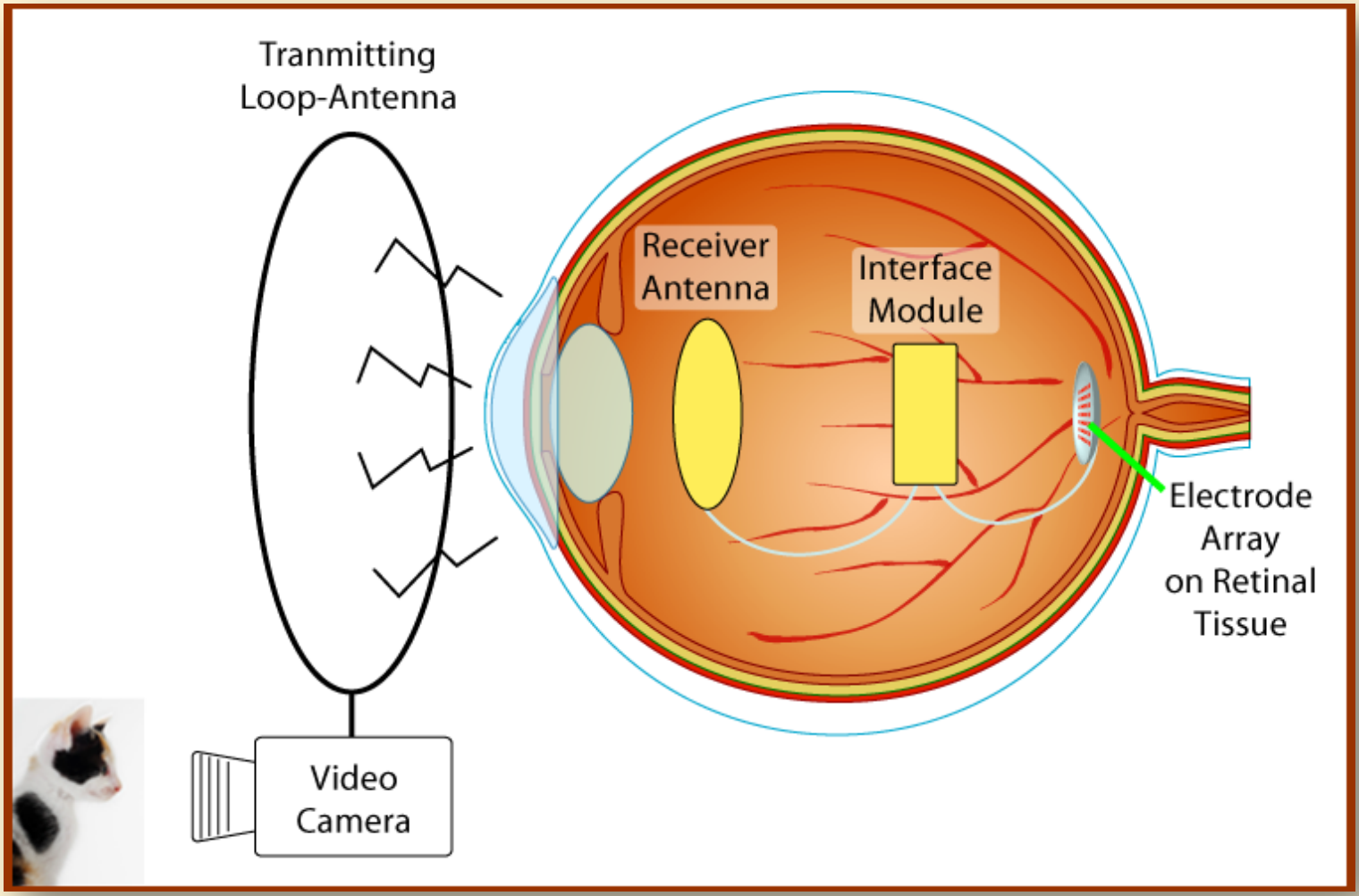
Normal vision - light enters the eye through the cornea then the lens.

The lens focuses the light on the retina.

The retina contains photoreceptors cells which convert the light to electric impulses.

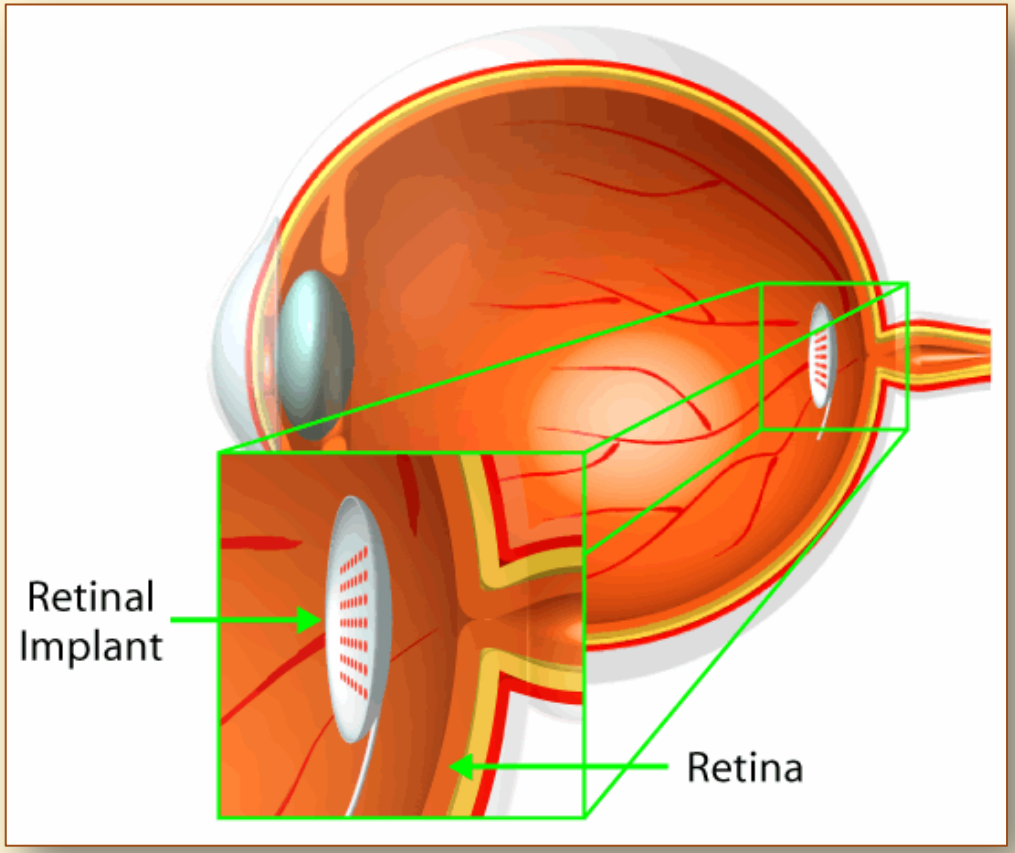
Impulses travel into the optic nerve to the brain where the information is processed.

Restoring Sight



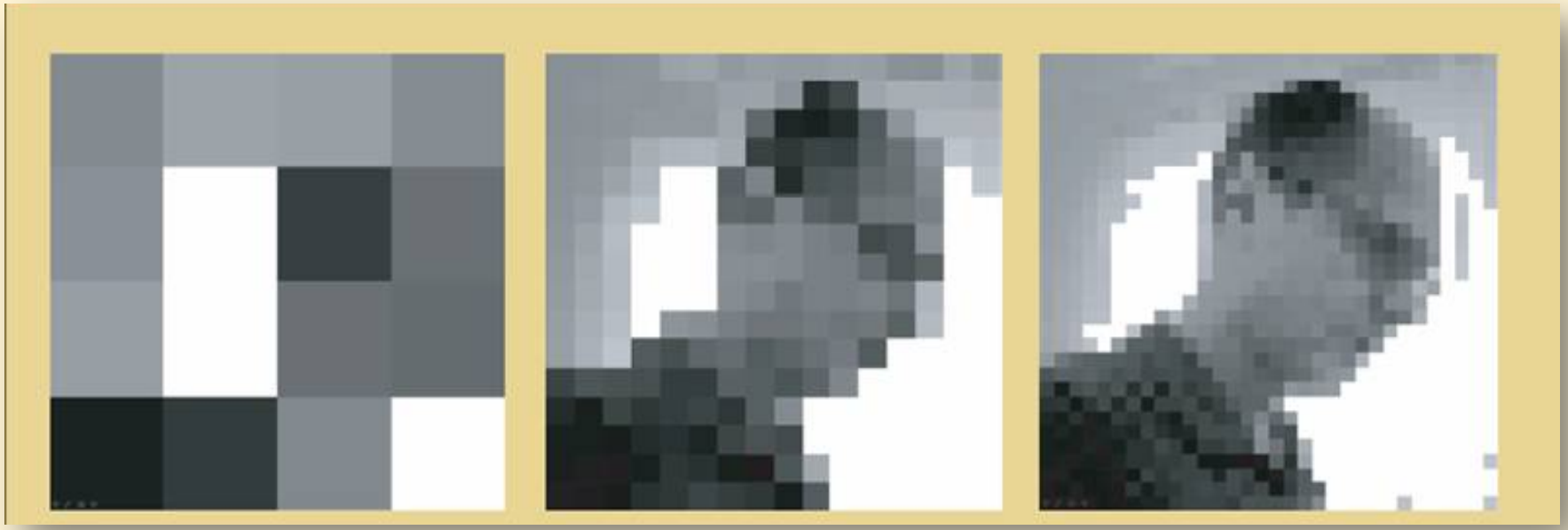
MEMS Artificial Retina

- Bypasses photoreceptor cells and transmits signals to the optic nerve.
- Light hitting the array is converted to electric impulses.
- These electric impulses travel into the optic nerve then to the brain.



MEMS Artificial Retinal Implant

What Does a Patient See?



Argus I
16 pixels → Argus II
60 pixels → Argus III
200+ pixels → Argus IV
1000+ pixels

[Images generated by the DOE-funded Artificial Retinal Implant Vision Simulator devised and developed by Dr. Wolfgang Fink and Mark Tarbell at the Visual and Autonomous Exploration Systems Research Laboratory, California Institute of Technology. Printed with permission.]

Goals and Challenges

Increasing resolution.

Designing the implant to be more flexible and compatible with the curvature of the eye.

Making ALL components internal.

Creating biocompatible, batteries for long lasting use in vivo.

For more information on BioMEMS therapeutic devices, download the BioMEMS Therapeutic Learning Module from scme-nm.org – educational materials. – bioMEMS.

Acknowledgements

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