

## THE BIONIC SENSE ORGANS

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**The Bionic Ear** is properly called a cochlear implant.

It is an artificial hearing tool which stimulates nerves, using electricity, in the inner ear.

The Bionic Ear helps a deaf person to hear another person speak. There are 2 parts to the Bionic Ear.

One part is placed under the skin behind a person's ear.

This is done in a hospital during an operation. The parts placed under the skin are the electronic equipment needed to control the flow of electricity into the ear and the equipment needed to change electrical signals into speech.

The second part is worn on the outside of the body. There is a microphone to pick up the voice of the person speaking. A speech processor which turns the voice sounds into electrical signals, a transmitting coil which sends the signals to the equipment inside the deaf person's ear.

**The Bionic Eye** researchers working for the Boston Retinal Implant Project have been developing a bionic eye implant that could restore the eye sight of people who suffer from age-related blindness. Although the bionic eye will only help individuals that were born with functional eyesight, the implant is expected to considerably improve their lives.

The implant is based on a small chip that is surgically implanted behind the retina, at the back of the eyeball. An ultra-thin wire strengthens the damaged optic nerve; its purpose is to transmit light and images to the brain's vision system, where it is normally processed. Other than the implanted chip and wire, most of the

device sits outside the eye. The users would need to wear special eye glasses containing a tiny battery-powered camera and a transmitter, which would send images to the chip implanted behind the retina. The new device is expected to be quite durable, since the chip is enclosed in a titanium casing, making it both water-proof and corrosion-proof. The researchers estimate that the device will last for at least 10 years inside the eye.

The scientists explain that the bionic eye will be affective for individuals who once had sight, since their brain knows how to process visual information. The unfortunate people who were born blind do not have the neurological capability to process the data received via the wire. Furthermore, the optic nerve must be at least partly functional. Otherwise, the data will not be fully processed. For many individuals that were born blind, this is a problem as well, since their optic nerve has never been used. However, most of these individuals have a natural compensation mechanism, in the form of enhanced senses, such as hearing and touch.

Although the device will not be able to restore the eye sight of the entire blind community, researchers are certain many people will benefit from the technology. The new technology will hopefully assist people suffering from this condition, and individuals suffering from retinitis pigmentosa (a genetic condition), but will not help glaucoma patients.

The researchers note the device has some limitations, and it will not restore perfect vision. However, they are sure it will give people the advantage of having a general sense of their surroundings. Hopefully, the technology may enable people to recognize faces and facial expressions.

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