Neural Prosthetics

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Neural Prosthetics, also known as Nueroprosthetics, is the study of creating prosthetic parts that can be given orders by the brain in order to perform functions. These functions can be motor, sensory, or even cognitive and are usually used for patients who have lost the ability to perform such functions as a cause of a personal injury or disease.

In 1957, the first Cochlear implant was designed, which provides a sense of sound to someone who is severely hard of hearing. In 1961, the first motor prosthesis was designed which aided patients with foot drop, which is the inability to move the foot or toes upward via the ankle.

The most common thought when people think of Neuroprosthetics, is robotic arms or legs that can be controlled via the brain through signal processing, but neural prosthetics goes beyond this. The ability to regain motor functions for a paralyzed patient is one thing, but sensory functions can also be simulated, such as hearing or even vision.

"A visual prosthesis can create a sense of image by electrically stimulating neuro cells in the visual system. A camera would wirelessly transmit to an implant, the implant would map the image across an array of electrodes. The array of electrodes has to effectively stimulate 600-1000 locations, stimulating these optic neurons in the retina thus will create an image." (1)

Neuroprosthetics isn't only limited to a brain to robotic interface, but a breakthrough development, funded by the National Institutes of Health, has been made that allows monkeys with temporarily paralyzed arms to move their arms using the monkeys' brain activity. This is great news for people who are paralyzed as it provides opportunity to restore movement to one's arm or leg rather than replacing it with a prosthetic arm or leg.

This type of thing has been done by having a computer analyze the activity of neurons known to be associated with certain movements, and then translating these signals and sending them to the muscle which should move.

The future now holds a possibility for some type of implantable device that would safely translate cortical neuron activity and send the signal through some circuitry that can stimulate the desired muscle. There is much research to still be done but the research so far looks very promising.

Works Cited:

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