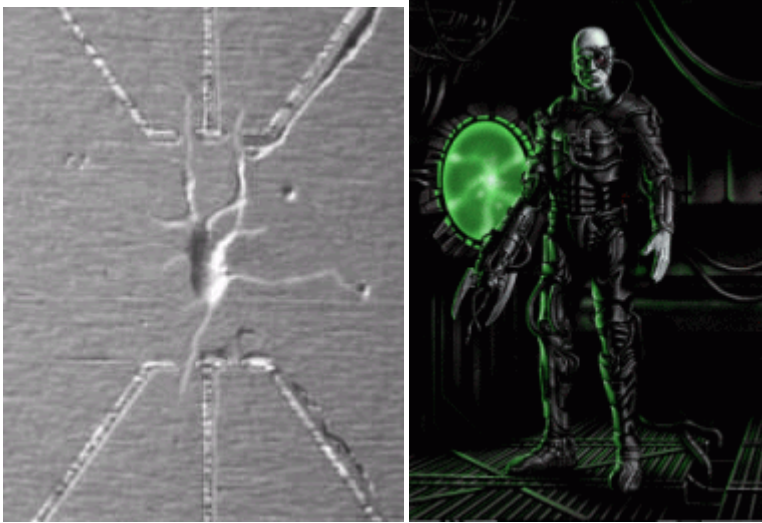


Cyborgs A Step Closer To Reality With Silicon Neurons?

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It's the stuff of [science fiction](#) as well as horror: half man, half machine. The fictional creature known as a "cyborg" - a human enhanced with silicon circuitry - has come a step closer to reality. Hopefully, the real-life applications of this development will be somewhat less sinister.

Scientists have connected silicon nanowires to individual neurons in biological brains, creating "artificial synapses" between brain cells. This may prove helpful in creating neural prosthetics that allow people to mentally control a [computer](#) or robotic limb.

Researcher Charles Lieber at Harvard University has constructed a chip with 20-nanometre-wide silicon wires running across its surface. Neurons from the brain of a rat - which include the transmitters and receivers known as axons and dendrites - were grown on the chip. Each neuron formed over fifty connections with the nanowires, and were no larger than naturally growing synapses. The research team was able to observe signals being passed down the axon, and were even able to control the stimulation of axons using electrical impulses. *"It will dramatically contribute towards clarifying the mechanisms of how neurons process information,"* commented one bioengineer who was not directly involved in the study.

The next challenge is to create a device that can be implanted into a live brain. Eventually, this research could have practical applications in treating paralysis. Electrodes are already implanted into the brains of patients, allowing them to control some simple devices. *"They're amazing advances, but it's still pretty crude,"* says Lieber. *"The electrodes are just poking in there, at the scale of the whole cell. If you could actually start to communicate with neurons in the way the brain itself does, you're going to be able to do much more."*

Lieber wants to extend his research to electronic devices, creating hybrid systems that may result in the construction of new types of biological-based computers. What they accomplished with the rat neurons and the silicon nanowire really amounted to a logic gate - which is the basic building block of a [computer system](#).

"These systems would take advantage of the strengths of biological systems and their ability to grow interconnections, and the power of nano-electronic devices, which are much faster," says Lieber. Can positronic [Artificial Intelligence](#) be far behind?

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