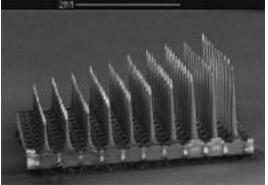
Tapping Into Nerves Thomas Cavaliere ELE 282 Biomedical Engineering Seminar I Biomedical Engineering, University of Rhode Island Kingston RI 02881 April 8th 2002

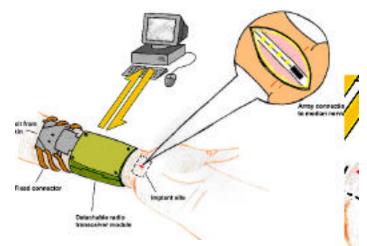
A new microelectronic implant has been developed by Professor Kevin Warwick and a team of scientists, that allows a two-way connection to the nervous system. In one direction, the activities of nerves are recorded and in the other, nerves can be stimulated by sending electrical signals.

The implant is made up of an array of spikes with sensitive tip electrodes. They can safely penetrate nerve tissue and allow the activity of axons close to each tip to be recorded or stimulated. In March 2002, the device was implanted into the median nerve of Kevin Warwick.



Implanted array will tap into median nerve

The median nerve contains many individual sensory and motor axons. The sensory axons conduct signals generated by skin receptors in response to temperature and pressure changes applied in the region of the thumb, index and middle fingers and palm. Motor axons that are located within the median nerve conduct signals from the spinal cord to muscles. The array was inserted so that the sensitive tips of the microelectrodes were distributed within the nerve trunk. Some electrodes can pick up signals from sensory axons and others can pick up motor signals. The array is connected to an external amplifier and signal processing system through fine wires passing through the skin.



The array is implanted in the wrist. Wires are tunneled through the arm connecting the array to an external radio transceiver, which sends the information to a nearby computer.

They plan to record movements, such as a wiggling finger, and then play back the signal in hopes of reproducing the same movement. If this works, researchers could go on to experiment with other applications, such as electronic medicine: sending antidepressant stimulation or even contraception or vaccines in a similar Cyber-drugs manner. and cvbernarcotics could cure cancer, relieve depression, clinical or even be programmed as a pick-me-up on a bad day. Spinal injuries and amputees could also benefit from this technology. New senses could be added or enhancement of current senses could be produced. For ultraviolet, X rays, example, and ultrasound signals can't normally be processed. If infrared signals were fed into the nervous system would you be able to learn how to perceive them? Would you feel or even "see" the warmth? These are all questions that could be answered within the next few months as Professor Warwick continues his experiments on the nervous system.