Microchip success for bionic eye

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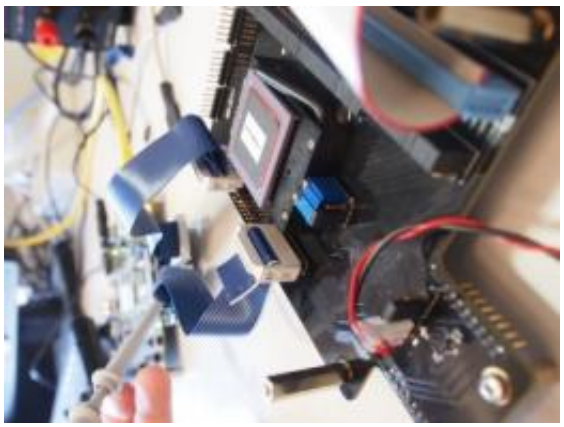

Microchip for the bionic eye

(Medical Xpress) -- Research to restore sight to the clinically blind has reached a critical stage, with testing underway of the prototype microchips that will power the bionic eye.

Electrical engineers from the Monash Vision Group (MVG) have begun trailling the microchips, with early laboratory tests proving positive, and pre-clinical assessment due to begin shortly.

The Director of MVG, Professor Arthur Lowery said the positive result meant the project was on track to deliver a direct-to-brain bionic eye implant ready for patient tests in 2014.

The bionic eye device will consist of a tiny camera mounted into a pair of glasses, which acts as the retina; a pocket processor, which takes the electronic information from the camera and converts it into signals enabling the brain to build up a visual construct; and cortical implants of several tiles which will be the portal for the stimulation of the visual cortex.

"The aim for this vision prosthetic is to be at least equivalent to a seeing-eye dog or a white cane. While it would initially complement existing aids such as these, we believe the device eventually will replace them, and as the technology is further refined, become sufficiently sensitive to discriminate large print," Professor Lowery said.

"The microchips we are testing will be implanted directly on the surface of a patient's visual cortex, located at the back of the brain. It's estimated that each patient will receive a grid of up to 14 eight-by-eight millimetre tiles," Professor Lowery said.

Each tile comprises a four-by-four millimeter microchip with some 500,000 transistors and 45 hair-thin electrodes. When fully operational, these tiles will receive low-resolution, black-and-white images from an external digital processing unit connected to a high-resolution camera.

Dr. Jean-Michel Redouté, MVG's Program Leader, Implantable Electronics, said one of the project's main challenges was harnessing and powering this array of electrically-charged devices in the brain.

"Achieving acceptable vision requires far more electrode capacity than the amount required to power a bionic ear. While the bionic ear requires approximately 15 electrodes, we'll need at least 600 to produce useful vision for patients," Dr. Redouté said.

Over 50,000 people in Australia are considered clinically blind. The number exceeds 160 million globally .

The MVG was established in April 2010, with an $8 million grant from the Australian Research Council. The MVG accommodates more than 20 leaders in physiology, neurosurgery, ophthalmology, electrical and electronic engineering, mechanical and materials engineering, mathematics and immunology.

Provided by Monash University