

Electronic implant allows a blind patient to recover some vision

Warning citizens of environmental health risks is the project of APNEE, that has evaluated and designed customizable information for channels like the text services of mobile phones, Internet portals and street panels.

At A Glance

Project: OPTIVIP

Optic nerve visual prosthesis

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Partners:

NeuroTECH S.A. (Belgium)

Matra Electronique (France)

Commissariat à l'énergie atomique, LETI (France)

Duration: January 2000 - June 2005

Total Cost: 2.79 M€

Programme: IST Research

Framework Programme 5

Persons with special needs, including the disabled and the elderly

Further Information:

European Commission

Information Society and Media DG
eInclusion Unit

info-h3@cec.eu.int

http://europa.eu.int/information_society/soccul/eincl/index_en.htm

Europe's Information Society: Thematic Portal:

http://europa.eu.int/information_society/

300.000 people throughout Europe suffer from retinopathies, conditions where blindness results from degeneration in cells in the retina, which lies at the back of the eye. Certain retinal cells convert light into signals to the optic nerve. When these light-receptor cells degenerate, the visual system cannot function. The result is partial or total blindness, even though the optic nerve itself may still be quite healthy.

Implanting electronic communications

The OPTIVIP project explores the possibility of compensating for retinopathies by bypassing the damaged retinal cells and artificially stimulating the optic nerve directly. This is done by implanting an electrode around the nerve. The electrode can automatically expand and contract with the natural movements of the nerve. The device processes images filmed by a tiny camera housed in the patient's glasses and transmits them to the optic nerve. The patient can then extract visual information from what the camera transmits.

The communications between camera and electrode require highly efficient transmission systems, which function effectively within living flesh and blood.

Implant surgery: recovery in two days

OPTIVIP built on the results of an earlier European research project called MIVIP. MIVIP achieved a world "first" for Europe by implanting the first electronic prosthesis of this kind in 2000.

The OPTIVIP team at the Université catholique de Louvain and the Saint-Luc University Hospital in Brussels developed a less invasive surgical technique. The implant was placed in the orbital area – behind the eye – rather than deep within the cranium. The patient recovered after only two days in hospital, compared with nine days for the original intracranial implant.

Results for the patient

After surgery, the previously totally blind patient was able to perceive light patterns transmitted from the camera. With practice and training, she learned to interpret the signals and recognize objects. In tests in the laboratory environment, the patient correctly identified patterns and objects in 87% of cases. She was able to judge distances and grasp objects in her environment. The patient tolerates the implant very well; there are no unpleasant side effects.

The research team has investigated a number of mechanisms for understanding the attributes of visual perception in humans. In the meantime, it is expected that the patient will soon be able to use the device at home in her everyday environment.

Worldwide leadership for Europe

Europe already has a track record in this field of research, as witnessed by the promising results of the earlier MIVIP project. Although a number of teams worldwide are working in the same research area, only two American projects have so far performed implants similar to OPTIVIP. The results achieved there were mixed, and not as striking as in the case of OPTIVIP.

This multidisciplinary European collaborative effort exploited the specialized expertise of the various partners in different European countries. Electronics laboratories in France and Belgium worked together with firms in Germany and the Saint Luc University Hospital in Brussels to achieve these remarkable results.

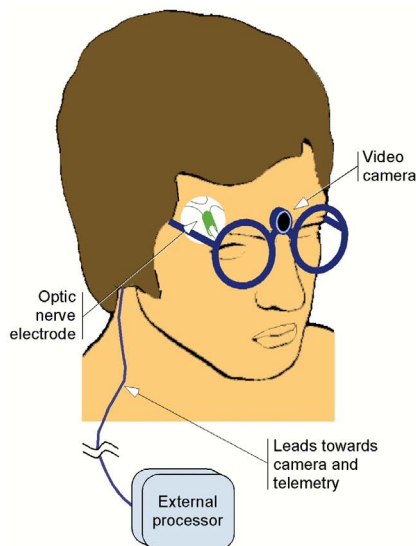
Extending the benefits beyond the experimental stage

An international clinical study of optic nerve visual prosthetics is foreseen and will assess the

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achievements of the OPTIVIP technique. If the study validates the positive results observed so far, a progressive introduction of the prosthesis into regular clinical treatment can be expected.

Furthermore, the benefits of the project are not necessarily limited to visual prosthesis. Discoveries made may well prove applicable to implanted devices in a whole range of medical treatments.



The MIVIP Concept

