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MOTOR NEURON DISEASE

Brain–computer interface unlocks the mind of a patient with ALS

A fully implanted brain–computer interface (BCI) has provided a novel means of communication for a woman who was in a 'locked-in' state as a result of amyotrophic lateral sclerosis (ALS). As highlighted in a report in *The New England Journal of Medicine*, the portability of the new device enables it to be used in the home environment.

"I got interested in BCI research in 2004, and since then I have managed to build a team to gather evidence for decodability of cortical brain signals," explains lead author Nick Ramsey. "The reason for me to pursue this research is the strong conviction that neuroscientists should seize opportunities to translate state-of-the-art knowledge on human brain function to people in need."

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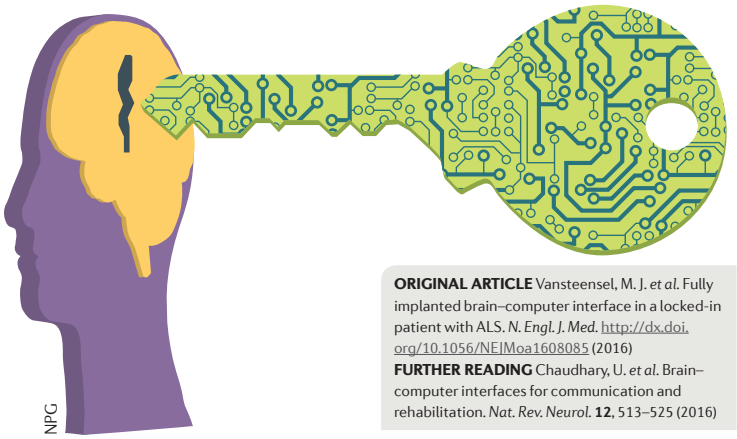
The researchers implanted an array of four electrodes over the hand region of the patient's motor cortex. These electrodes were connected to a decoding device, which translated electrical activity in this region into 'brain clicks'. By attempting to move her right hand, the patient learned to generate brain clicks that could be used to select letters on a computer screen, thereby enabling her to spell out words.

By the end of the study, the patient could select three letters per minute. "Although this is fairly slow, it is a huge step from not being able to communicate at all," says Ramsey. In this particular case, the patient was still able to communicate via an eye tracker, but this device was ineffective in outdoor light conditions, so the new BCI gave her more freedom to venture outside.

"We have shown that brain signals can be used for communication in a severely paralyzed patient, and that this can be done with a relatively simple, fully implantable device," concludes Ramsey. "Having proven that BCI implants can work, we and others expect to start testing a new generation of more sophisticated prototype devices in the next 5 years or so."

Heather Wood



ORIGINAL ARTICLE Vansteensel, M. J. *et al.* Fully implanted brain–computer interface in a locked-in patient with ALS. *N. Engl. J. Med.* http://dx.doi.org/10.1056/NEJMoa1608085 (2016)

FURTHER READING Chaudhary, U. *et al.* Brain–computer interfaces for communication and rehabilitation. *Nat. Rev. Neurol.* **12**, 513–525 (2016)