news@nature.com
The best in science journalism

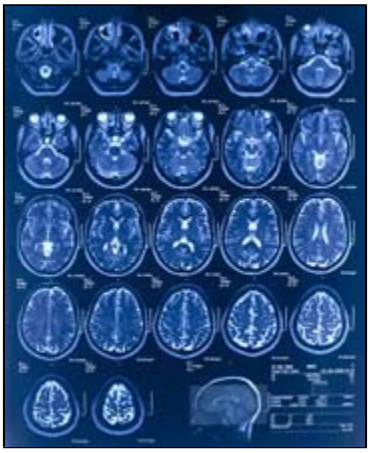
Published online: 3 July 2006; | doi:10.1038/news060703-5

'Miracle recovery' shows brain's resilience

Man who 'awoke' after 19 years shows how nerve cells can regrow.

Michael Hopkin

The amazing recovery of a man who had spent almost two decades in a barely conscious state has revealed the brain's previously unrecognized powers of recovery.



Brain scans can show how active the brain is, and how connections are re-growing.

© *Punchstock*

Terry Wallis became a media star in 2003 when he emerged from the minimally conscious state (MCS) in which he had spent 19 years, since suffering severe brain damage in a motor accident. At the time, his 'miracle' recovery was a mystery. Researchers who have examined his brain now think that his emergence was due to painstaking regrowth of the affected areas that ultimately allowed him to regain some of his faculties.

Patients in an MCS are 'awake', but cannot produce coordinated movements or speech, and are unable to express their thoughts and feelings. But after his recovery, Wallis regained the power of speech, and his movements, although still severely hampered, showed a dramatic and remarkable improvement.

It happened because his brain slowly regrew the nerve connections that were devastated as a result of his accident, say researchers led by Henning Voss of Cornell University's Weill Medical College in New York.

Get reconnected

Voss's team compared scans of Wallis's brain with those of another MCS patient who had shown no improvement during six years following traumatic brain injury, and of 20 healthy subjects. The results revealed levels of metabolic activity in specific parts of the brain's 'white matter', which is largely composed of cellular tendrils called axons that form connections between cells in different brain regions.

Although not up to the level of a healthy subject, activity in these areas was significantly higher in Wallis's brain than in the other MCS patient, suggesting that Wallis's brain cells had partially restored the connections that allow him to move and speak, the researchers report in *The Journal of Clinical Investigation*[1].

Among the regions that showed this improved activity was an area known as the precuneus, which is important for wakeful consciousness, the researchers add. In healthy brains, activity in this region declines during sleep and under general anaesthetic.

Without similar scans from earlier in Wallis's degenerative condition, the researchers don't

know at what rate his brain has recovered, or how much further recovery might be possible. However, the damage was so severe that Voss says "I think there is no prospect of a full recovery."

Road to recovery

The discovery highlights how much there remains to learn about the brain's response to trauma, comments Steven Laureys, a neurologist at the University of Liège in Belgium. Although Wallis had been in an MCS for almost two decades, the condition was only formally classified in 2002.

Doctors are often tempted to assume that the brain can only recover during the first few days or months after injury, leading them to give up on long-term patients. "They are thought to be hopeless cases," says Laureys. "But this forces us to revise the old dogma. Although this is clearly an exceptional patient, it shows that it is worth studying further." Patients with limited consciousness should not be denied care and therapy that could help them, Laureys argues.

Although the new discovery does not suggest any way to assist or accelerate the brain's recovery, it should remind doctors that such recoveries are possible, Laureys adds. "There's too much therapeutic nihilism," he says. "It's hard to find centres that are willing to accept patients and give them rehabilitation and aggressive therapy."

Long-term damage

It also remains unclear whether the brain is capable of similar resilience in patients with more serious conditions, such as coma or persistent vegetative state (PVS), in which the patient is completely uncommunicative and displays no more than reflex responses. "There's a big difference between these two conditions," notes Voss.

Neurologists are reluctant to declare that PVS, the condition at the centre of the controversial debate over US sufferer Terri Schiavo, can ever be truly permanent. Earlier this year, researchers made the bizarre discovery that some PVS patients could be roused with a simple sleeping pill (see 'Sleeping pills offer wake-up call to vegetative patients').

But the tendency is to assume that the chances of recovery trail off with time, an assumption that will be overturned by the latest discovery, Laureys hopes. "That's the real message," he says.

Visit our newsblog to read and post comments about this story.

Top

References

1. Voss H. U., *et al*. *J. Clin. Invest.*, **116**. 2005 - 2011 (2006).

Top