## IN THE NEWS

**Robo-rat or ratbot?**
The media's attention — and imagination — was engaged by an article that appeared in *Nature* (2 May), describing how rats can be trained to respond to intracranial stimulation of somatosensory and reward centres in the brain, and can then be guided by remote control around mazes or more natural environments. Controversy threatened to erupt over whether the animals should be dubbed 'robo-rats' (preferred by, among others, *New Scientist* in the UK) or 'ratbots' (*CNN.com*). But wider issues also came to the fore.

Many media sources reported the story in the context of the suggestion by the paper's authors (Sanjiv Talwar and colleagues from the State University of New York) that such rats could be equipped with tiny cameras and used for search-and-rescue missions, particularly in tight spaces, such as collapsed buildings. Roger Highfield, writing in the *Telegraph* (UK), used a typically celebratory (if not terribly accurate) headline: "Meet Robo Rat… He can find an earthquake victim at the touch of a whisker." But some questioned whether the research was ethical. The *New Scientist* commented that "The idea of placing living creatures under direct human command is certainly raising concerns over the animals' welfare." Even Talwar admitted that the work is "sort of creepy" (*Telegraph*).

Animal-rights campaigners were universally opposed to the work. Some scientists who were interviewed also had their doubts. *CNN* quotes Randy Gallistel of Rutgers University: "Without the gee-whizzery, without the remote control and so on, that this kind of thing was possible has been obvious for decades." But Sandro Mussa-Ivaldi told the *Washington Post* that he "really likes the results … this is the first time where you have control of a whole complex animal."

*Rachel Jones*

PSYCHIATRIC DISORDERS

# Lateral thinking

**An electrophysiological abnormality that is specific to schizophrenia could be the direct result of anatomical deficits in a region of the left cerebral hemisphere that has been implicated in language and auditory processing. This is the conclusion of the latest in a series of papers from McCarley, Shenton and co-workers, published in *Archives of General Psychiatry*, on left-lateralized deficits in the P300 event-related potential (ERP) in schizophrenia.**

**The auditory P300, which is recorded through an array of scalp electrodes, is elicited when individuals detect infrequent target tones among standard tones of a different pitch. It is well known that the P300 ERP is reduced in amplitude in schizophrenia; in fact, this abnormality is the most replicated finding of electrophysiological studies of the disorder. Furthermore, there is strong evidence for a preferential reduction in P300 amplitude over the left temporal region. This observation is all the more striking when one considers that reduced volume of the left superior temporal gyrus (STG) — and of STG grey matter in particular — is one of the more robust findings of anatomical studies of schizophrenia. But are the two observations directly linked?**

**In patients with chronic schizophrenia, McCarley *et al.* have previously shown that left-lateralized deficits in the temporal P300 are specifically correlated with reduced grey matter volume of the left posterior STG. In a study of patients at the time of their first hospitalization (first-episode patients), they found a similar left-sided reduction in P300 amplitude in schizophrenia, but not in affective psychosis. So, abnormal asymmetry of the auditory P300 seems to be specific to schizophrenia, rather than a correlate of psychotic features in general. In their latest study, the authors attempted to replicate the latter finding, and to determine whether the association between left temporal P300 amplitude and left posterior STG volume is present in first-episode schizophrenia.**

**McCarley *et al.* recorded the auditory P300 from first-episode patients with schizophrenia or psychotic affective disorder, and from normal control subjects. For each individual, grey matter volumes of the STG and other temporal regions of interest, including the planum temporale (a language-related structure that is largely co-extensive with the posterior STG), were obtained by magnetic resonance imaging (MRI). As predicted, patients with schizophrenia showed a left-lateralized reduction in amplitude of the temporal P300 ERP and in grey matter volumes of the posterior STG and planum temporale. By contrast, no left-lateralized deficits were detected in patients with affective psychosis. The authors found a topographically specific association between the left temporal P300 voltage reduction and reduced volumes of the posterior STG and planum temporale in schizophrenia. However, neither patients with affective psychosis nor controls showed any region-specific correlation between P300 amplitude and MRI volumes.**

**These data point to a direct link between left-sided reductions in temporal P300 amplitude in schizophrenia and reductions in grey matter in the underlying temporal lobe. This functional/anatomical abnormality is specific to schizophrenia and is present at an early stage of the disease. But how does it relate to the clinical features of schizophrenia? As the planum temporale is a neural substrate of language comprehension, it is possible that abnormalities in this structure underlie the thought disorder of schizophrenia. Indeed, the P300 abnormality and posterior STG volume have been shown to be associated with thought disorder in chronic schizophrenia. Finding a link between basic electrophysiological and anatomical measures and the clinical symptoms of schizophrenia will be an important goal of future research.**

*Rebecca Craven*

### References and links

**ORIGINAL RESEARCH PAPER** McCarley, R. W. *et al.* Association between smaller left posterior superior temporal gyrus volume on magnetic resonance imaging and smaller left temporal P300 amplitude in first-episode schizophrenia. *Arch. Gen. Psychiatry* **59**, 321–331 (2002)
**FURTHER READING** Shenton, M. E. *et al*. Abnormalities of the left temporal lobe and thought disorder in schizophrenia. A quantitative magnetic resonance imaging study. *N. Engl. J. Med*. **327**, 604–612 (1992) | McCarley, R. W. *et al.* Auditory P300 abnormalities and left posterior superior temporal gyrus reduction in schizophrenia. *Arch. Gen. Psychiatry* **50**, 190–197 (1993) | Salisbury, D. F. *et al.* First-episode schizophrenic psychosis differs from first-episode affective psychosis and controls in P300 amplitude over left temporal lobe. *Arch. Gen. Psychiatry* **55**, 173–180 (1998)
**WEB SITES**
**Encyclopedia of Life Sciences:** http://www.els.net/schizophrenia