3-D movie shows what happens in the brain as it loses consciousness

For the first time researchers have been able to watch what happens to the brain as it loses consciousness. Using sophisticated imaging equipment they have constructed a three-dimensional (3-D) movie of the brain as it changes while an anaesthetic drug takes effect.

Professor Brian Pollard, Professor of Anaesthesia at the University of Manchester, told the European Anaesthesiology Congress in Amsterdam that the real-time 3-D images seemed to show that losing consciousness involves a change in electrical activity deep within the brain, changing the activity of certain groups of neurons and hindering communication between different parts of the brain.

He said the findings appear to support a hypothesis put forward by Professor Susan Greenfield, of the University of Oxford, about the nature of consciousness itself. Professor Greenfield suggests consciousness is formed by different neural assemblies which work efficiently together, or not, depending on the available sensory stimulations, and that consciousness is not an all-or-none state but more like a dimmer switch, changing according to growth, mood or drugs.

Professor Brian Pollard, Professor of Anaesthesia at the University of Manchester, Manchester

When someone is anaesthetized it appears that small neural assemblies either work less well together or inhibit communication with other neural assemblies.

'Our findings suggest that unconsciousness may be the increase of inhibitory assemblies across the brain's cortex. These findings lend support to Greenfield's hypothesis of neural assemblies forming consciousness,' said Professor Pollard.

The team use an entirely new imaging method called functional electrical impedance tomography by evoked response (fEITER), which enables high speed imaging and monitoring of electrical activity deep within the brain and is designed to enable researchers to measure brain function.

Professor Pollard said that a huge amount of research still needed to be done to fully understand the role that electrical impedance tomography could play in medicine.

'If its power can be harnessed, then it has the potential to make a huge impact on many areas of imaging in medicine', he stated 'It should help us to better understand anaesthesia, sedation and unconsciousness, although its place in medicine is more likely to be in diagnosing changes to the brain that occur as a result of, for example, head injury, stroke and dementia.'

Professor Pollard concluded: 'The biggest hurdle is working out what we are seeing and exactly what it means, and this will be an ongoing challenge.'

Ivabradine improves quality of life in patients with heart failure

Ivabradine (Procoralan, Servier) significantly improves the quality of life in patients with heart failure, according to the latest sub-study of the SHIFT trial, presented at the European Society of Cardiology Heart Failure Congress, 21–24 May 2011, in Gothenburg, Sweden.

The main SHIFT study (Systolic Heart failure treatment with the I_f inhibitor ivabradine Trial), presented at the European Society of Cardiology Congress in Stockholm 2010, showed that when ivabradine was added to optimal guideline based treatment it reduced the composite end point of cardiovascular death and hospitalization for worsening heart failure at 18 months by 18% (P<0.0001), and the incidence of heart failure hospitalization by 26% (P<0.0001).

Launched in the UK in 2006, ivabradine selectively lowers heart rate by inhibiting pacemaker currents. It is currently indicated for the symptomatic treatment of chronic stable angina pectoris in patients who have a contraindication or intolerance to beta blockers.

In the current sub-study of SHIFT, 1944 patients with New York Heart Association class II–IV heart failure from 23 countries with heart rates of at least 70 beats per minute were randomized to ivabradine (n=968) or placebo (n=975). Quality of life assessments were conducted at baseline, 4, 12 and 24 months after randomization using a 23-item, self-administered questionnaire (the Kansas City Cardiomyopathy Questionnaire) that quantified physical function, symptoms, social function and quality of life.

Results of the study, presented by Professor Inger Ekman, from the University of Gothenburg, showed that by the last assessment overall quality of life had risen by 5.3 points for patients randomized to the drug *vs* 3.0 points for those randomized to placebo (P<0.001). When people who died were introduced into the analysis (awarded scores of 0), the scores declined to -2.8 for ivabradine *vs* -6.4 for placebo (P=0.004).

Professor Martin Cowie, from the Royal Brompton Hospital, London

'We have a new treatment for heart failure that not only helps prevent death or the need to be admitted to hospital with heart failure, but also makes people feel better and helps them to do more in their daily lives,' said Professor Martin Cowie, from the Royal Brompton Hospital, London, the UK lead investigator for the SHIFT study.

Janet Fricker