subdural or intracerebral electrodes placed according to the probable location of the epileptogenic region. Patients were followed up for at least 1 year.

'Early' responses to SPES were recorded in all patients and were considered normal, whereas delayed or repetitive 'late' responses—found in 32 patients—were thought to correspond to abnormal areas of tissue. Subsequent analysis showed that complete removal of the abnormal SPES areas was significantly more likely to lead to a favorable outcome than partial or no resection ($P=0.006$). Furthermore, examination of the resected specimens showed that most of the abnormal SPES regions bore structural abnormalities.

The researchers conclude that abnormal responses to SPES correspond to epileptogenic abnormalities and can therefore predict surgical outcome. Longer follow-up might be required to confirm these observations.

Ruth Kirby

Original article Valentín A *et al.* (2005) Single pulse electrical stimulation for identification of structural abnormalities and prediction of seizure outcome after epilepsy surgery: a prospective study. *Lancet Neurol* 4: 718–726

Biochemical marker for childhood migraine

The results of a recent clinical trial in Greece indicate that glia-derived S100 β protein could be used as a biochemical marker for migraine in children with acute recurrent headache.

From their headache clinic, the researchers randomly recruited 25 patients (9 male, 16 female; mean age 10.6 years) who were experiencing migraine headache with or without aura (Group A) or tension-type headache (Group B) and were not receiving medication for their condition. A total of 23 healthy, headache-free children of similar age were also recruited as controls. Blood samples were taken from participants during, or up to 2–3 hours after, headache attacks, and serum S100 β protein levels were analyzed.

Children who experienced migraine headache demonstrated a twofold increase in their mean serum S100 β protein concentrations compared with controls. By contrast, levels of serum S100 β protein in patients with tension-type headaches were similar to those of controls.

The authors propose that this study is the first to demonstrate a direct link between childhood migraine attacks and increased serum S100 β protein concentrations. They suggest that further studies are needed, to compare migraine patients with and without aura, and to obtain serum measurements at additional times such as the interictal period, to validate whether serum S100 β protein concentrations can be used as a laboratory marker for migraine in children.

Christine Kyme

Original article Papandreou O *et al.* (2005) Serum S100 β protein in children with acute recurrent headache: a potentially useful marker for migraine. *Headache* 45: 1313–1316

Increased risk of stroke associated with hyperglycemia

Increased levels of glycated hemoglobin (Hb A_{1c}) are an indicator of long-term hyperglycemia, which has been implicated in the development of cardiovascular disease. Diabetics have an increased risk of experiencing stroke, but it is not clear whether hyperglycemia contributes to this risk. Selvin *et al.* examined the effect of Hb A_{1c} levels on the relative risk of stroke in people with and without diabetes, and found that higher levels increased the risk in both groups.

The relationship between Hb A_{1c} concentration and incident ischemic stroke was assessed for 10,886 nondiabetic and 1,635 diabetic participants in the Atherosclerosis Risk in Communities (ARIC) study, with an 8–10 year follow-up. Participants in both groups were analyzed in tertiles based on their Hb A_{1c} concentration. Those found to be most at risk were diabetics with high Hb A_{1c} levels, who were more than four times more likely to suffer stroke than nondiabetics with the lowest blood glucose levels. For nondiabetics, strokes were approximately 1.5 times more likely in participants with high Hb A_{1c} levels than in those with low levels. No clear separation was found between risk for those in the lowest diabetic category and those in the highest nondiabetic category, suggesting that the risk relates more to blood glucose levels than to diabetes itself.

The authors conclude that hyperglycemia could be an independent risk factor for cerebrovascular events in both diabetics