GLOSSARY

CLINICAL DEMENTIA RATING SCORE

A measure of cognitive status based on the following six areas of cognitive and functional performance: memory, orientation, judgment, community affairs, home and hobbies, and personal care

ELISA

Enzyme-linked immunosorbent assay; an immunoassay in which antigen-coated plates are probed with serum samples, followed by an enzyme-linked detector antibody, to identify specific antibodies in the samples

azathioprine treatment. The patients were assessed for 6 months using monthly MRI alongside daily therapy with up to 3 mg/kg of azathioprine (evaluation period). The development of T2 lesions was measured during and 6 months after the evaluation period (extension period). MRI during the evaluation period showed that the treatment significantly reduced the median gadolinium-enhancing lesion volume and number ($P < 0.001$ for both); similar results were obtained for new T2 lesions. The number of gadolinium-enhancing lesions was reduced by $\geq 50\%$ in 12/14 patients and the number of new T2 lesion was reduced by $\geq 50\%$ in 9/14 patients ($P < 0.01$ for both). During the evaluation and extension periods, mean blood lymphocyte count was reduced to 57% of the baseline measurement.

The results show that, in addition to preventing relapse of disease, doses of azathioprine that reduce lymphocyte counts also suppress the development of new brain lesions in MS patients. Azathioprine might be a viable alternative to immunomodulatory agents such as interferon- β , which are not effective in all patients with MS.

Kate Matthews

Original article Massacesi L *et al.* (2005) Efficacy of azathioprine on multiple sclerosis new brain lesions evaluated using magnetic resonance imaging. *Arch Neuro* 62: 1843–1847

Tau protein abnormalities correlate with the severity of dementia in Alzheimer's disease

Neurofibrillary tangles (NFTs) are neurobiological lesions that are found in brain cells of patients with Alzheimer's disease (AD). They consist of aggregates of abnormally phosphorylated tau proteins that are altered in conformation. Conformational changes in tau proteins are thought to be the earliest neurobiological changes in AD, but it is unknown whether they indicate cognitive decline and contribute to the severity of dementia. Haroutunian *et al.* investigated whether altered tau proteins were an early indicator of AD, by measuring the concentrations of these proteins in multiple regions of the brains of people at different stages of dementia.

In a postmortem analysis, 81 patients who either had no neuropathology or only had neuropathology indicative of AD were grouped

according to their cognitive status at the time of death, based on their CLINICAL DEMENTIA RATING SCORE. The concentrations of conformationally altered tau proteins in homogenized dissected areas of the brain were measured by ELISA using two different antibodies specific for tau protein alterations. The authors showed that increasing concentrations of altered tau proteins in the frontal gyrus, entorhinal cortex and superior parietal lobe correlated significantly with increased severity of dementia ($P < 0.00001$ for all). In patients with mild dementia, tau protein abnormalities were detected before the appearance of histologically identifiable NFTs, indicating that protein alterations and initiation of the associated cognitive decline occur before the development of NFTs in AD.

In summary, conformational changes in tau proteins occur early in the development of AD before NFTs can be identified, and these changes correlate with the severity of dementia.

Kate Matthews

Original article Haroutunian V *et al.* (2005) Tau protein abnormalities associated with the progression of alzheimer disease type dementia. *Neurobiol Aging* [doi: 10.1016/j.neurobiolaging.2005.11.001]

Computational models characterize cerebral aneurysms and assess risk of rupture

Rupture and intracranial hemorrhage of cerebral aneurysms into the subarachnoid space is associated with high mortality and morbidity. Such events could be prevented through improved understanding of the interaction of hemodynamic factors in the development of aneurysms. A group from George Mason University in the US has constructed patient-specific computational fluid dynamics (CFD) models, which show interesting trends in the association between hemodynamic factors and aneurysmal rupture.

Using specialized software, the authors constructed 62 CFD models of cerebral aneurysms, based on 3D rotational angiographic images taken from 57 patients. Of the aneurysms (size 2–25 mm; average 8.4 mm) 25 were ruptured, 34 unruptured, and 3 of unknown history. Although each aneurysm had a unique flow pattern, certain correlations were seen between flow patterns and the type of aneurysm, with 72% of ruptured aneurysms having a complex