mechanical allodynia. Patients received a one-time intradermal injection of BTX-A ($n = 15$) or saline placebo ($n = 14$) in the painful area. Pain intensity was measured and allodynia tests were carried out at baseline and at 4, 12, and 24 weeks after administration of the treatment drug or placebo. Average weekly self-reported pain intensity decreased throughout the study in patients treated with BTX-A (40% reported their pain as much or very much improved after 12 weeks), whereas those who received placebo reported an increase in pain intensity (78% reported their condition as unchanged or worse at 12 weeks). BTX-A treatment also improved allodynia symptoms and some quality of life measures.

This study indicates that BTX-A has favorable efficacy, long-term analgesic effects, and is well tolerated in patients with neuropathic pain, and might, therefore, be a more suitable treatment than currently available therapies.

Original article Ranoux D *et al.* (2008) Botulinum toxin type A induces direct analgesic effects in chronic neuropathic pain. *Ann Neurol* [doi:10.1002/ana.21427]

Bright light improves cognitive and noncognitive function in patients with dementia

Elderly patients with dementia often experience mood, behavioral and sleep disturbances, all of which are affected by the circadian system. To investigate whether these disturbances can be attenuated by long-term exposure to melatonin and/or bright light, Riemersma-van der Lek *et al*. conducted a double-blind, randomized trial in a cohort of elderly individuals.

Twelve assisted care facilities were randomly assigned to have bright or low light installed in their common rooms, such that each patient would receive either 1,000 lx or 300 lx throughout the day, respectively. The participants ($n = 189$; mean age 85.8 years; 63% with probable Alzheimer's disease, 24% with other types of dementia) were randomly allocated to receive either 2.5 mg melatonin or placebo every evening and were monitored for up to 3.5 years (mean 15 ± 12 months).

Exposure to light, without melatonin administration, improved cognitive decline by 5% (Mini Mental State Examination) and depressive symptoms by 19% (Cornell Scale of Depression in Dementia), and reduced the decline in functional abilities by a relative 53% (nurse informant adaptation of the activities of daily living scale). Melatonin alone decreased positive mood and increased withdrawn behavior, but improved sleep. In those patients who received both bright light and melatonin, the negative effects of the hormone were suppressed and the positive effects were more pronounced.

Bright light therapy is a simple measure that can be initiated at assisted care facilities in order to improve psychological disturbances in the elderly; however, in this population, long-term melatonin treatment should be administered only in combination with light therapy.

Original article Riemersma-van der Lek RF *et al.* (2008) Effect of bright light and melatonin on cognitive and noncognitive function in elderly residents of group care facilities: a randomized controlled trial. *JAMA* **299:** 2642–2655

Head nodding syndrome—an onchocerciasis-related epilepsy syndrome?

A possibly new seizure disorder characterized by head nodding and, in some cases, mental retardation was first observed in southern Tanzania in 1962. A connection between this 'head nodding' syndrome and onchocerciasis (river blindness) has been postulated, but the results of various studies are conflicting and the disorder has not been classified. Winkler and colleagues have now provided a comprehensive clinical and analytical description of this syndrome.

The authors recruited 62 patients (average age 14.9 years, range 8–32 years; 40% with mental retardation) from a clinic in southern Tanzania. In all, 28 (45.2%) patients had head nodding syndrome only and 34 (54.9%) had head nodding plus other types of seizure. A total of 31 patients (50.0%) had their first seizure when they were 11–15 years old, and 52 (83.9%) had at least one family member with epilepsy of any kind. Polymerase chain reaction analyses of skin snips showed that 52 patients (84.3%) were carriers of the worm that causes river blindness (*Onchocerca volvulus*), but all cerebrospinal fluid analyses were negative for presence of the parasite. Of the 10 patients who underwent MRI, 8 had hippocampus sclerosis, gliotic lesions or both; lesions on MRI were significantly associated

with positive results for *O. volvulus* on skin analysis ($P = 0.023$).

The authors conclude that the causes for head nodding might be multifactorial. The absence of *O. volvulus* in the patients' cerebrospinal fluid despite the link between positive skin snips and lesions on MRI deserves further investigation.

Original article Winkler AS *et al.* (2008) The head nodding syndrome—clinical classification and possible causes. *Epilepsia* [doi:10.1111/j.1528-1167.2008.01671.x]

Cerebral or meningeal vasodilatation does not occur during migraine headaches

On the basis of the assumption that vasodilatation of intracranial blood vessels is part of the pathologic mechanism underlying migraine headaches, many current antimigraine treatments include agents that constrict these vessels. Such vasoconstrictors are, however, contraindicated in some patients, particularly those with vascular disease. Recent findings by Schoonman and colleagues in fact argue against a prominent role for vasodilatation in the etiology of migraine headaches.

The Dutch study recruited 32 patients (age 18–55 years) who experienced frequent migraines. Nitroglycerine, which reliably induces migraine headaches in susceptible individuals, was intravenously administered to 27 patients (0.5 μg/kg per min for 20 min), 20 of whom experienced a migraine 1.5–5.5 h after infusion. None of the 5 patients who received placebo infusions developed a migraine. Intracranial vasodilatation and blood flow was assessed by use of 3 T magnetic resonance angiography at baseline, during infusion of nitroglycerine or placebo, and during a migraine attack (or 6 h after infusion if no migraine had occurred). An increase in blood-vessel diameter (6.7–30.3%) was observed during nitroglycerine infusion; during migraine, however, blood-vessel diameter and blood flow were not significantly different to baseline measurements, nor was there a difference between headache and non-headache sides of the brain in the 18 patients who experienced unilateral headache.

These findings suggest that intracranial vasodilatation does not have a major causative role in migraine headaches. Consequently, vasoconstrictor action might not be an essential requirement for migraine treatments developed in the future.

Original article Schoonman GG *et al.* (2008) Migraine headache is not associated with cerebral or meningeal vasodilatation—a 3 T magnetic resonance angiography study. *Brain* [doi:10.1093/brain/awn094]

Cortical signals can control movement of a prosthetic arm

Brain–machine interfaces can control simulated actions in a virtual environment, but the capability of these interfaces in a physical setting has not yet been demonstrated. Velliste *et al*. now report that monkeys can perform a continuous feeding task by use of a brain–machine interface in which cortical signals control a human-like prosthetic arm.

Two *Macaca mulatta* monkeys were implanted with intracortical microelectrode arrays in their primary motor cortices. Following a training period, the animals were placed in a seated position in which their arms were gently restrained, and a prosthetic arm was positioned next to one of their shoulders. The prosthetic arm contained a two-fingered gripper and had multiple degrees of freedom that enabled human-like movement at the shoulder and elbow. A simple algorithm was used to translate the animals' cortical command signals into arm movements.

During a continuous feeding task, the animals each used the prosthetic arm to reach for food, grab it and place the food in their mouth. The delay between cortical spike signals and arm movement was about 150 ms, similar to that in a natural arm, but the duration of the arm's movements was a few seconds longer than natural movement. Both animals were capable of adjusting the arm's movements as they learned the task (e.g. not gripping sticky food too tightly and changing the arm's trajectory to avoid obstacles) and could use the arm for natural gestures (such as licking the gripper fingers).

The authors state that this experiment paves the way for attaining near-natural function in prosthetic devices.

Original article Velliste M *et al.* (2008) Cortical control of a prosthetic arm for self-feeding. *Nature* **453:** 1098–1101