

McLean *et al.* conclude that memantine and gabapentin are useful in the treatment of congenital nystagmus, and call for further studies to determine optimum dosage and duration of effect.

**Original article** McLean R *et al.* (2007) Congenital nystagmus: randomized, controlled, double-masked trial of memantine/gabapentin. *Ann Neurol* **61**: 130–138

## Neural stem cell grafts differentiate in adult rat spinal cord

Rehabilitation of spinal cord injury through neural grafts is an exciting area of research; however, experiments have produced conflicting evidence regarding the differentiation of transplanted neural stem cells (NSCs) in the host tissue. In a recently published study, Yan and co-authors report extensive neuronal differentiation achieved following grafting of human NSCs into adult rat spinal cord.

Human embryo-derived NSCs were cultured and then implanted into 37 intact or injured nude rats. Survival times for the 37 rats ranged from 3 weeks to 6 months. The survival, propagation and differentiation of the grafted cells were assessed with immunocytochemistry. NSC migration was observed as early as 3 weeks after grafting, and by 3 months NSC-derived neurons had developed axons and synapses and formed contacts with the host spinal cord neurons. The fate of grafted cells seemed to depend on signals from the host microenvironment: meningeal sites encouraged NSCs to remain undifferentiated (40–53%) or to become astrocytes (30–50%), whereas the vast majority of cells in parenchymal sites (75%) differentiated into neurons. There was little or no apparent inhibition from the host environment to axonal growth and elaboration.

The nature of the lesions and the use of immunosuppressed rats might have influenced these results, but this study is consistent with other recent work that has shown that differentiation of NSC grafts is possible in the mature spinal cord. The authors did not demonstrate functional improvements following NSC transplantation, but the promising results of this study have implications for research into spinal cord repair following injury.

**Original article** Yan J *et al.* (2007) Extensive neuronal differentiation of human neural stem cell grafts in adult rat spinal cord. *PLoS Medicine* **4**: 318–332

## Targeted reinnervation enhances control of prosthetic limb

Current myoelectric prostheses give slow and awkward movements and little sensory feedback. A new nerve transfer procedure has given a woman much improved control of her prosthetic arm, as well as sensory feedback to the missing limb.

The patient had previously undergone left arm amputation at the humeral neck following a motorcycle accident. Using a procedure known as 'targeted reinnervation', surgeons have rerouted motor nerves that originally went to her amputated limb (the ulnar, median, musculocutaneous, and distal radial nerves) to the pectoral and serratus muscles in her chest. Now, when she thinks about moving her arm, an electrical signal is sent along the rerouted nerves, activating the surface muscles. Electrodes resting on the skin over the reinnervated muscle pick up this signal and send it to the artificial limb so that it moves. The patient quickly learned 'intuitive' control of the arm, with simultaneous movement in the hand, wrist and elbow. Dexterity and coordination were both much better than with her previous myoelectric prosthesis.

In a second part of the procedure, the distal ends of two sensory nerves to chest skin overlying the reinnervated muscle were cut and connected to the amputated nerves allowing the hand sensory nerve fibers to reinnervate this skin. When pressure was applied to different areas of the chest skin, the patient then perceived this as being to different digits of her missing hand; she also had some sensations of vibration and temperature. Further development of this technology—for example, placement of sensors on the digits of the artificial limb—could provide patients with a sense of pressure and temperature in their prosthetic limbs.

**Original article** Kuiken TA *et al.* (2007) Targeted reinnervation for enhanced prosthetic arm function in a woman with proximal amputation: a case study. *Lancet* **369**: 371–380

## Prion disease: recovery of cognitive deficits following early intervention

The characteristic diagnostic signs of prion disease in humans and animals, such as changes in behavior and mobility, result from