› NEWS UPDATES

Staying awake

In humans, sleep deficits have been shown to lead to cognitive impairments and an increased risk of obesity. New research in flies now shows that fasting might actually help diminish the cognitive impairment associated with sleep deprivation (*PLoS Biol.* **8**, e1000466; 2010).

Paul Shaw of Washington University in St. Louis and colleagues compared the cognitive abilities of flies that had been kept up all night (for 7 hours) by being bumped awake, flies that had stayed awake all night because they were starving and flies that had been able to sleep during the night. In contrast to the flies that had stayed awake due to sleep deprivation, the flies that stayed awake due to starvation were not sleepy and did not have impaired short-term memory.

The team then studied flies with mutated versions of genes that alter the response to starvation. Flies with a mutation in the *brummer* gene have excess fat and had a highly sensitive response to sleep loss. In contrast, flies with a mutation in the *Lipid storage droplet 2* gene are lean and were able to stay awake for prolonged time periods without showing impaired cognitive abilities. These results suggest that lipid enzymes might be involved in regulating both sleep and the response to sleep deprivation.

Nose drops: treatment for brain tumors?

A group of researchers in Japan has developed a new form of the anticancer drug methotrexate that can be delivered as nose drops. Tomotaka Shingaki of ADME Research Inc. in Osaka and colleagues found that administering these methotrexate nose drops in rats with brain tumors reduced brain tumor size (*Mol. Pharm.* **7**, 1561–1568; 2010).

Brain tumors are among the most lethal types of cancer. Due to the low permeability of the blood-brain barrier, most molecules cannot be easily transported from the bloodstream into the brain. Shingaki and colleagues note that there are currently no safe, robust and convenient methods available for delivering chemotherapy agents into the brain.

The researchers injected rat glioma (brain tumor) cells into the brains of rats. They then tested methotrexate nose drops in seven of these rats and administered methotrexate intraperitoneally to eight of these rats. The rats received these treatments three times at 2-day intervals. After treatment, the rats that had received methotrexate drops had significantly smaller tumor size in comparison to rats that had received methotrexate injections and rats that had received no treatment. The authors note that this direct nose-to-brain transport could also be used as a therapeutic delivery system for other central nervous system diseases, such as neurodegenerative diseases.

Handling lab mice

Though researchers know that laboratory animal handling impacts the anxiety levels and stress responses of animals, they understand little about the effects of the handling method. New research now suggests that the method used to pick up a lab mouse influences the mouse's anxiety and stress levels (*Nat. Methods* **7**, 825–826; 2010).

To move a lab mouse, personnel most commonly pick up the mouse by the base of the tail. Jane Hurst and Rebecca West of the University of Liverpool in Neston, UK compared this standard handling method with two alternative methods: carrying the mouse in a clear tunnel or cupping the mouse in the hand. They assigned male and female mice from three mouse strains to be picked up using one of these three methods throughout the study.

The mice that were carried in tunnels or were cupped had increased voluntary interactive behavior when compared with mice that were picked up by the tail. In contrast, the mice that were picked up by the tail were more likely to urinate or defecate (signs of anxiety or stress) during handling than the mice handled with other methods. The authors suggest that using the appropriate handling method for the purposes of a study would provide more robust scientific results and may also improve animal welfare.