which leads to T-cell evasion, is required for 'superinfection' in rhesus monkeys that are already infected with CMV. In animals never previously exposed to CMV, however, the virus caused long-term infection regardless of whether it was able to block T-cell activation.

CANCER DETECTION

Tracking roving cancer cells

Sci. Trans. Med. **2,** 25ra23 (2010)

Tumour cells circulating in the bloodstream of patients with prostate cancer can be imaged automatically using a microfluidic system developed by researchers in Boston.

The team had previously devised a microfluidic chip that detects certain types of tumour cell in the blood by capturing cells carrying a key surface marker. Daniel Haber and his co-workers at the Massachusetts General Hospital have now automated their imaging system to enable fast, standardized cell characterization. They tested the device on prostate cancer cells, which carry the marker prostate-specific antigen.

By monitoring levels of circulating tumour cells in patients before and after surgery, the authors were able to estimate the half-life of the cells in the blood. They also identified subsets of cancer cells with other key markers, including one for cell proliferation. They say that clinical trials are needed to test whether these circulating cells can serve as a reliable indicator of disease progression and clinical outcome.

PLANT BIOLOGY

Seeking enlightenment

Proc. Natl Acad. Sci. USA doi:10.1073/pnas.0911635107 (2010)

Chemicals in wildfire smoke enhance the light responsiveness of seedlings of the model plant *Arabidopsis thaliana*.

Researchers already knew that chemicals called karrikins, which are found in such smoke, can promote seed germination. Steven Smith and his colleagues at the University of Western Australia in Perth have now found that a karrikin known as KAR_1 also affects the expression of several light-responsive genes. Treating *A. thaliana* seedlings with KAR_1 increased their responses to light by promoting the growth of seedling leaves while suppressing growth in the seedling's embryonic stem, called the hypocotyl.

This effect on the hypocotyl was diminished in plants with a mutation in the *HY5* gene, which regulates light responses. The results suggest a new way in which plants respond to karrikins to adapt to the drastic environmental changes caused by fire.

ANIMAL BEHAVIOUR

Tortoise see, tortoise do

Biol. Lett. doi:10.1098/rsbl.2010.0092 (2010)

Learning by watching others eliminates time-wasting trial and error. Because this adaptive behaviour has been observed in social animals, it has been suggested that such learning is an adaptation for group living.

To see whether 'social learning' might instead be a reflection of an animal's general ability to learn, Anna Wilkinson and her colleagues at the University of Vienna experimented with eight naturally solitary red-footed tortoises (*Geochelone carbonaria*; pictured below).

To obtain food on the far side of a V-shaped fence, they had to detour around this barrier. None of the control tortoises navigated around the fence but, after watching a trained tortoise's demonstration, all of the 'observer' tortoises reached the food. This shows that non-social animals can use social cues to solve problems.

A. WILKINSON/UNIV. VIENNA

NEUROBIOLOGY

Entangled diseases

J. Neurosci. **30,** 4528–4535 (2010)

Misfolded proteins implicated in Alzheimer's disease and prion disorders such as Creutzfeldt–Jacob disease may interact, making each disease worse.

Claudio Soto at the University of Texas Medical School at Houston and his colleagues introduced prions into normal mice and mice genetically predisposed to developing symptoms of Alzheimer's disease, such as amyloid plaques in the brain.

They found that prion disease developed more aggressively in Alzheimer's mice than in normal mice. Inoculated Alzheimer's mice also had many more plaques than did non-inoculated Alzheimer's animals. The results suggest that the presence of one protein-misfolding process increases the risk of a similar process being triggered for another protein.

JOURNAL CLUB

C. Oliver Kappe
University of Graz, Austria

A chemist muses on the technique of microwaving flowing chemical reactions.

A hot topic in synthetic chemistry is continuous-flow processing involving 'microreactors' or related devices. Making molecules using a continuous-flow process has several advantages over the more conventional batch approach: for example, reaction conditions can be easily scaled up to production capacities without the need for further optimization.

Chao-Jun Li at McGill University in Montreal and Michael Organ at York University in Toronto, both in Canada, and their colleagues combined continuous-flow processing, using standard glass capillaries, with microwave irradiation to perform extremely fast chemical reactions (G. Shore *et al. Chem. Eur. J.* **16,** 126–133; 2010). The team generated propargyl amines, which are important synthetic intermediates, using a three-component reaction.

To achieve efficient microwave heating, the researchers coated the insides of the flow tubes with thin films of metals such as gold and copper. Analysis by scanning electron microscopy showed that these metal films typically consisted of clusters of metal nanoparticles, which have been shown to catalyse a variety of valuable synthetic transformations.

What struck me in this study was the achievement of such high reaction temperatures — in excess of 900 °C on the outer surface of the glass tube — with comparatively low levels of 2.45-gigahertz microwave irradiation.

Reactions at such high temperatures are extremely fast. One could speculate that, in these conditions, some chemical transformations might occur in the gas phase, as seen in flash vacuum thermolysis, a technique that is used to perform high-temperature organic reactions in the gas phase. This could potentially open up an easy way to perform high-temperature gas- or liquid-phase reactions in a scalable manner.

Discuss this paper at **http://blogs.nature.com/nature/journalclub**

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