

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## NEUROSCIENCE

### BOLD strides in brain imaging

To visualize brain activity, neuroscientists use functional magnetic resonance imaging (fMRI) to measure blood oxygen levels, known as BOLD signals, which are considered a proxy for cellular activity. However, it has been unclear which types of brain cell contribute to these signals.

Fritjof Helmchen and his colleagues at the University of Zurich in Switzerland have developed a method that tracks the activity of neurons and glial cells — support cells that might also contribute indirectly to neurotransmission — during an fMRI scan. They found that activation of both cell types correlates with BOLD signals.

The team used an optical fibre to record the activity of dye-loaded brain cells that fluoresce when calcium enters them — an indication of cell activation. This composite method will help scientists to interpret BOLD signals, the authors say.

*Nature Methods* <http://dx.doi.org/10.1038/nmeth.2013> (2012)

## PHYSIOLOGY

### Bladder under circadian control

Most adults produce less urine at night than during the day, and store more of what is made, thanks to the circadian regulation of daily urination patterns.

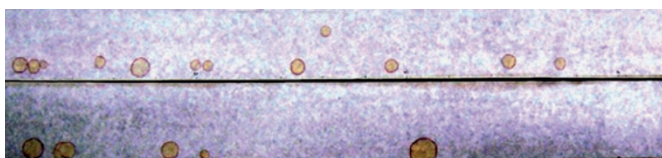
Hitoshi Okamura and Osamu Ogawa at Kyoto

University in Japan and their colleagues developed a machine that measures the urine discharges of mice, as stains on paper (**pictured**), over time. They focused on a protein, connexin43, which increases the frequency of urination by making the bladder muscles more sensitive to neural signals. They found that connexin43 levels peaked

during the night when the nocturnal creatures were active. Mice without the circadian clock gene *Cry* produced less connexin43 during the night than did normal mice, and did not show daily rhythms in urination patterns. Another clock gene, *Rev-erba*, regulates connexin43 expression.

The authors suggest that other genes related to bladder-muscle contraction and daily cycles might also have a role in staving off night-time trips to the toilet.

*Nature Commun.* <http://dx.doi.org/10.1038/ncomms1812> (2012)



## CLIMATE SCIENCE

### A check on speeding glaciers

Analysis of a decade-long record of Greenland's glaciers suggests that the ice sheets are not accelerating towards the ocean as much as previously forecast.

Earlier work on a small number of glaciers had uncovered large increases in speed. Using satellite radar data to calculate the movements of more than 200 of the island's ocean-terminating glaciers between 2000 and 2010, Twila Moon at the University of Washington, Seattle, and her colleagues found a range of accelerations and decelerations, with an overall acceleration.

Glaciers in the northwest and southeast — where approximately 80% of ice loss occurs — accelerated by about 30% over the ten-year period, whereas glaciers elsewhere exhibited a generally steady flow.

Glacial melting can lead to an increase in sea level. However, Moon and colleagues' data suggest that Greenland's current glacial acceleration is unlikely to produce the previously forecast worst-case scenario of a 0.5-metre sea-level rise by 2100.

*Science* 336, 576–578 (2012)

## GEOCHEMISTRY

### North Sea starved of oxygen

Summer oxygen levels are declining in some parts of the North Sea, probably because of ocean warming and the decay of photosynthetic blooms that form as a result of nutrient influx.

Bastien Queste at the University of East Anglia in Norwich, UK, and his team compared the results of an oceanographic field survey conducted in August 2010 with twentieth-century records of

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