

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## NEUROSCIENCE

### High-serotonin mice mimic autism

Some 30% of children with autism spectrum disorder have raised blood levels of the neurotransmitter serotonin, but the relationship between this biomarker and brain function is unclear. Jeremy Veenstra-VanderWeele and Randy Blakely at Vanderbilt University in Nashville, Tennessee, and their colleagues have engineered a mouse with increased levels of blood serotonin that also exhibits behaviours characteristic of autism.

The mouse carries a variant of a gene that encodes SERT, a transporter protein that takes up serotonin into neurons and is also found in blood cells. The authors previously identified this variant in some people with autism. As pups, the mice vocalize less, and as adults, they display repetitive behaviour and are more likely to withdraw when they encounter another mouse. Raised SERT activity may lead to autism-related changes during brain development, the authors suggest.

*Proc. Natl Acad. Sci. USA*  
<http://dx.doi.org/10.1073/pnas.1112345109> (2012)

## NEUROIMAGING

### MRI lights up the whole brain

Functional magnetic resonance imaging (fMRI) can show most of the brain at work during a mental task, if data from large numbers of scans are averaged and different types of analysis are used.

fMRI is typically used by neuroscientists to identify just those few brain areas that are most active during a particular task. However, this approach



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## CLIMATE SCIENCE

### Heads up on a heat wave

A model for forecasting seasonal climate in the United States was able to predict months in advance the intense summer heat that scorched the country's central plains last year (**pictured**).

Lifeng Luo at Michigan State University in East Lansing and Yan Zhang at Scinovation in Princeton, New Jersey, compared the observed number of extremely hot days in the region last summer with temperature-anomaly predictions made by the National Weather Service's upgraded Climate Forecast System, which became operational at the end of March 2011. Almost all the 424 runs of the model between

April and mid-July 2011 accurately predicted an unusually large number of days with extreme temperatures in the region.

As the summer approached, the model became more certain about where, when and how intense the heat wave would be.

Successful prediction of a climate extreme adds confidence to seasonal climate forecasts, the authors say. But how often the model correctly predicts future events still needs to be evaluated, they caution.

*Geophys. Res. Lett.* <http://dx.doi.org/10.1029/2012GL051383> (2012)

might overlook important areas involved in cognitive processing, according to Javier Gonzalez-Castillo at the National Institute of Mental Health in Bethesda, Maryland, and his colleagues.

They imaged the brains of three people who had to decide whether a symbol flashed onto a flickering screen was a number or a letter. Averaging of the results from 100 scans revealed fMRI activations in 95% of the brain that were coincident with the task, varied in shape across regions, and clustered in a highly organized manner. This suggests that the

signals may be functionally relevant rather than noise.

*Proc. Natl Acad. Sci. USA*  
<http://dx.doi.org/10.1073/pnas.1121049109> (2012)

## CARDIOVASCULAR BIOLOGY

### Cell clean-up for artery health

Defects in the intracellular degradation and recycling of cellular components — a process called autophagy — have been linked to several diseases, including cancer. Now two research groups show a link between defective

autophagy and heart disease in mice.

Clay Semenkovich at Washington University in St Louis, Missouri, and his colleagues fed a fat-rich 'Western' diet to mice that are genetically susceptible to atherosclerosis, which is marked by the formation of fatty plaques in arterial walls.

They found dysfunctional autophagy in a type of immune cell called a macrophage, which is abundant in the plaques. Other mice engineered to have autophagy-deficient macrophages and fed a fatty diet had more plaques than