

## NEUROSCIENCE

### Alzheimer's drugs make brains buzz

Several candidate drugs for Alzheimer's disease have failed to improve cognition in human clinical trials. One reason could be that they worsen neuronal defects, at least in mice.

The drugs are antibodies that have been designed to bind to and reduce levels of amyloid- $\beta$  protein, which builds up in the brains of people with Alzheimer's. Marc Aurel Busche and Arthur Konnerth at the Technical University of Munich in Germany and their colleagues used high-resolution imaging of mouse brains to monitor how the antibodies affect neuronal activity. In two mouse models of Alzheimer's, two different antibodies increased the number of cells in the cortex that were electrically hyperactive, further impairing brain function, compared with untreated animals.

The results suggest a greater need to test how molecular therapies affect neuronal function in the brains of living animals, the authors say.

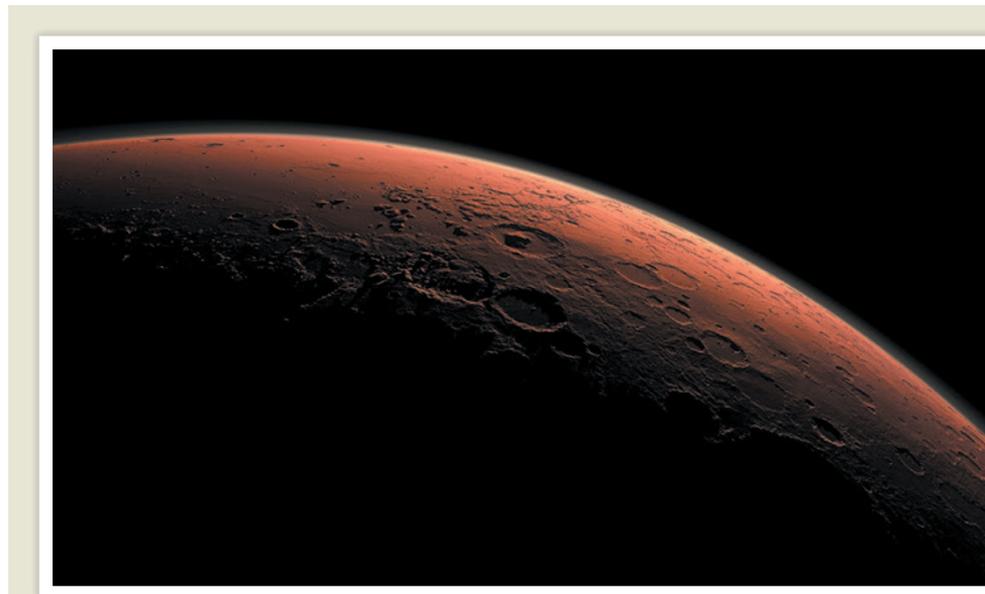
*Nature Neurosci.* <http://dx.doi.org/10.1038/nn.4163> (2015)

## MATERIALS

### Boron made into 2D sheet

Researchers have created a 2D form of boron and shown that it behaves as a semiconductor.

Materials such as graphene (the atomically thin form of carbon) and others made of silicon and phosphorus have desirable electrical properties that could be useful in electronics, and 2D forms of boron have shown promise in theoretical work. To make a 2D boron crystal monolayer, Guoan Tai at the Nanjing



NASA/JPL-CALTECH

## PLANETARY SCIENCE

### How Mars loses its atmosphere

Solar storms have blasted much of Mars's tenuous atmosphere into space over billions of years, making the planet the barren world it is today.

A series of papers has outlined the first results from NASA's Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft, which has been orbiting Mars since September 2014. In one paper, Bruce Jakosky of the University of Colorado Boulder and his colleagues report MAVEN data showing that when protons and electrons from a solar eruption slammed into the planet in March 2015, they increased the rate at which Mars loses its atmosphere by roughly an order of magnitude.

A second paper concludes that only about 10% of the atmospheric particles that leave

Mars are recaptured by its gravitational pull; the rest are lost to space permanently, find David Brain of the University of Colorado Boulder and his co-workers.

And when MAVEN flew within 130 kilometres of the Martian surface, it discovered new populations of charged and neutral particles, including oxygen, nitrogen and carbon dioxide. These were found at unexpectedly low altitudes in the Martian atmosphere, say Stephen Bougher of the University of Michigan in Ann Arbor and his team in a third paper. Together, the findings show that Mars's atmosphere is more complex and dynamic than scientists had thought.

*Science* <http://doi.org/83k> (2015);

*Geophys. Res. Lett.* <http://doi.org/83p> (2015);

*Science* <http://doi.org/83m> (2015)

## REGENERATIVE BIOLOGY

### How mice regrow ear tissue

Blocking a specific cell-signalling pathway in mice boosts the regeneration of ear tissue without any scarring after injury.

Some amphibians and fish can regrow organs and

appendages. To investigate the process in mammals, Thomas Leung, Seung Kim and their colleagues at Stanford University in California studied an engineered mouse model that is adept at regrowing injured ear tissue with no scarring. They found that certain cells in the skin's outer layer produced lower levels of a cell-signalling