RESEARCH HIGHLIGHTS

Selections from the scientific literature

ZOOLOGY

How the sponge got its skeleton

Sponges build their skeletons using specialized cells that transport and assemble structural beams like construction workers — a novel way of producing a skeleton compared to other animals.

Sponge skeletons are made of rod-like silica structures called spicules that are cemented to rocks and to each other with collagen. To find out how the spicule assembly process works, Noriko Funayama at Kyoto University in Japan and her colleagues studied a freshwater sponge (*Ephydatia fluviatilis*) under a microscope and discovered 'transport cells' that move spicules inside the sponge. The cells then push the spicules through the animals' outer surface to raise them up and attach them together.

This process allows sponges to adopt a huge variety of shapes and sizes, the authors say.

Curr. Biol. **http://doi.org/7sr (2015)**

NEUROSCIENCE

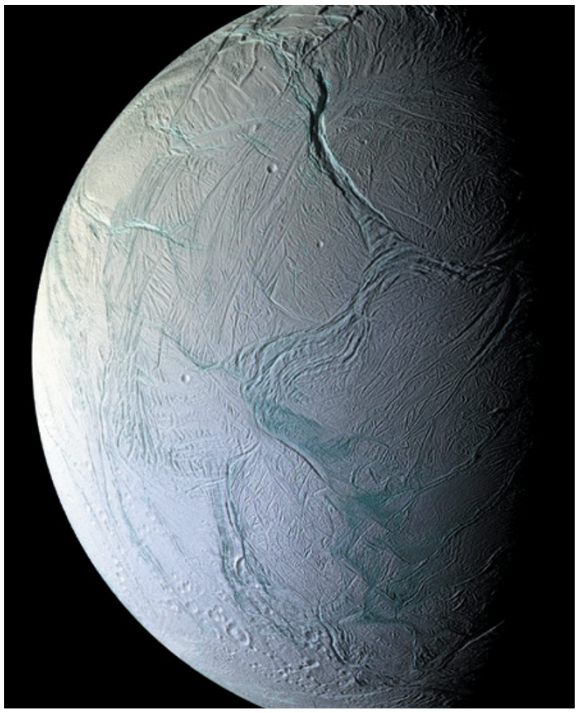
Sound switches on worm cells

Ultrasound has been used to stimulate individual brain cells in a worm. If the technique works in mice, it could be a less invasive way of studying specific neurons.

Neuroscientists currently implant probes into animal brains to stimulate cells that have been engineered to become sensitive to light. Sreekanth Chalasani at the Salk Institute for Biological Studies in La Jolla, California, and his colleagues instead introduced a pressure-sensitive protein, TRP-4, into neurons in the nematode *Caenorhabditis elegans*. They then put the worms in a Petri dish that was partially submerged in a water bath and sent a short burst of ultrasound into the dish, delivering mechanical signals to TRP-4 to activate certain neurons.

By adding the TRP-4 protein into neurons with different functions, the researchers were able to make free-crawling worms reverse direction, stop reversing or make more-frequent sharp turns in response to a brief pulse of ultrasound.

Nature Commun. **6, 8264 (2015)**



NASA/JPL/SPACE SCIENCE INST.

PLANETARY SCIENCE

Global ocean on Enceladus

Beneath an icy crust, Saturn's moon Enceladus (pictured) has an ocean that covers its entire globe.

NASA's Cassini spacecraft measured wobbles in Enceladus's rotation over more than seven years. The data confirm that the crust is moving separately from the rocky core, meaning that there must be a widespread layer of liquid between them, says a team led by Peter Thomas of Cornell University in Ithaca, New York.

Cassini had previously spotted jets of liquid spewing from the moon's surface, and other studies have suggested that Enceladus has an underground sea only near its south pole. This latest finding further highlights how Enceladus could be one of the most likely places for extraterrestrial life.

Icarus **http://doi.org/7rf (2015)**

NEUROSCIENCE

Electric zaps help spinal-cord rehab

Electrically stimulating a damaged spinal cord as part of rehabilitation therapy may enhance improvements in movement.

Steve Perlmutter at the University of Washington in Seattle and his team bruised the spinal cords of rats to partially paralyse the animals' forelimbs. They then used a neural–computer interface connected to the limb muscles and spinal cord to direct an electrical pulse to just below the damaged spinal area whenever the device detected activity in the weakened muscles.

Rats that received pulses for several weeks recovered their ability to reach for and grasp food pellets with their forelimbs to a greater extent than those that did not receive pulses. The stimulated rats maintained their recovery even after the stimulation was stopped, suggesting that it induced lasting changes in the spinal cord. The scientists suggest that the approach might also work in the clinic.

Proc. Natl Acad. Sci. USA **http://doi.org/7q4 (2015)**

EVOLUTION

Ancient lung parts found in fish

A fish species found in the Indian Ocean has a vestigial lung, suggesting that its ancestors had working lungs before they shifted to life in deep waters.

The coelacanth fish *Latimeria chalumnae* is descended from ancient coelacanths that lived in shallow waters. Paulo Brito at Rio de Janeiro State University in Brazil and his colleagues studied the fish at different