

RESEARCH HIGHLIGHTS

Selections from the scientific literature

NEUROSCIENCE

What drives sugar addiction

Researchers have identified the brain circuits that compel mice to seek out sweet treats.

Kay Tye of the Massachusetts Institute of Technology in Cambridge and her colleagues genetically engineered mice so that the neurons in a brain circuit involved in reward processing would fire when exposed to light. When the researchers activated these neurons, the animals sought sugar more frequently through a port in their cage, even when they received a mild electric shock to their feet in the process. Switching the neurons off stopped the sugar-seeking behaviour, but did not prevent the mouse from eating its normal food.

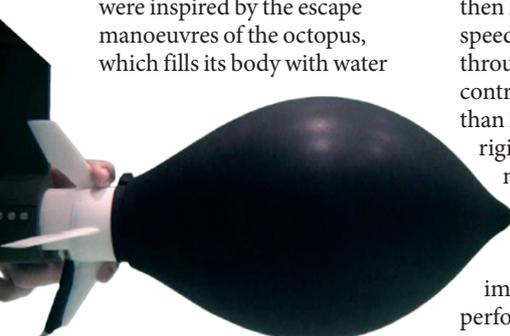
The researchers propose that targeting this pathway could be a possible therapy for compulsive overeating. *Cell* 160, 528–541 (2015)

ROBOTICS

Robot zips away like an octopus

A self-propelling, octopus-inspired rocket can zoom through water using energy more efficiently than fish that accelerate rapidly to escape.

Gabriel Weymouth of the University of Southampton, UK, and his colleagues were inspired by the escape manoeuvres of the octopus, which fills its body with water



KATHRYN LANGIN

EVOLUTION

Birds diversify at close quarters

A population of birds in California has evolved diverse bill sizes and shapes, even within a small geographic area.

Diversification within a species is thought to occur mainly when populations are separated by geographical barriers, such as mountains or bodies of water. To see if this happens in a single population, Kathryn Langin at Colorado State University in Fort Collins and her colleagues studied more than 500 island scrub-jays (*Aphelocoma insularis*; pictured),

which have small ranges and live only on the 250-square-kilometre Santa Cruz Island in California.

The team found that birds living in pine forests had longer, shallower bills — presumably for prying open pine cones — than jays in oak forests, even though the two habitats were next to each other. Adaptations at this microgeographic level could be more common than once thought, even for mobile animals, the authors suggest.

Evolution <http://doi.org/zt3> (2015)

and then quickly expels it to dart away. On the basis of this principle, the authors built their rocket using a flexible hull, which they inflated with water (pictured). They then measured the rocket's speed as it shot the fluid out through its base. As the rocket contracted, it achieved more than 2.6 times the thrust of a rigid rocket doing the same manoeuvre.

The researchers calculate that making the robot bigger would improve its accelerating performance, and suggest that

their technology could be used in underwater vehicles.

Bioinspir. Biomim. <http://dx.doi.org/10.1088/1748-3190/10/1/016016> (2015)

METEOROLOGY

Smoke makes tornadoes worse

Smoke in the air could increase the likelihood of tornadoes forming, as well as their intensity.

Pablo Saide of the University of Iowa in Iowa City and his colleagues

studied a major tornado outbreak that killed more than 300 people in April 2011 in the southeastern United States. It occurred when smoke particles from fires in Central America drifted across the region, which the team's calculations suggest led to atmospheric changes, such as thicker and lower clouds. These had several cascading effects, including stronger wind shear, that make tornadoes more likely to form and more severe in areas that are prone to such storms.

Meteorologists may need to

GABRIEL WEYMOUTH AND VIGNESH SUBRAMANIAN