# RESEARCH HIGHLIGHTS

*Selections from the scientific literature*

NEUROIMMUNOLOGY

## Reward system boosts immunity

Activating the reward system in the brains of mice directly boosts their immune systems, offering a physiological explanation for the placebo effect.

Shai Shen-Orr, Asya Rolls and their colleagues at the Technion–Israel Institute of Technology in Haifa activated neurons in a part of the mouse brain that processes rewarding activities such as eating and sex. The next day, they injected the mice with the bacterium *Escherichia coli*. The animals showed increases in both short-term and long-term immune responses to the pathogen, compared with mice in a control group. But these effects were lost when the researchers also inactivated the animals' sympathetic nervous systems, suggesting that this system helps to mediate interactions between the brain and the immune system.

***Nature Med.*** **http://dx.doi.org/10.1038/nm.4133 (2016)**

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ZOOLOGY

## Wind powers weeks of non-stop flight

Frigate birds use the power of the wind and rising air to stay airborne for many weeks at a time.

Henri Weimerskirch at the CNRS Centre for Biological Studies in Chizé, France, and his colleagues fitted great frigate birds (*Fregata minor*), with devices to track their movements over the Indian Ocean. Some birds were also fitted with devices to measure their heart rate and acceleration.

The researchers found that the birds stayed on the wing for up to 48 days and travelled an average of 450 kilometres daily, often tracking the wind around the edge of the huge area of low pressure called the doldrums.

The birds use a "roller-coaster flight", the authors say, ascending up to 4,000 metres with the help of the wind and thermals. Frigates cannot land on the water, but they can glide over distances of many kilometres in a low-energy mode — sometimes with no flapping at all. This may provide them with the opportunity to nap for up to 12 minutes at a time, and allow them to stay in the air almost indefinitely.

***Science*** 353, **74–78 (2016)**

ASTROPHYSICS

## No neutrinos from black hole smash

The first hunt for neutrinos coming from the merger of two black holes — which last year produced the first direct detection of gravitational waves — has come up empty.

Imre Bartos at Columbia University in New York and his colleagues analysed data from two neutrino detectors: ANTARES, under the Mediterranean Sea, and IceCube at the South Pole. They found that no neutrinos were detected at ANTARES in the 500 seconds before or after the black holes collided, and that just three were detected at IceCube — none of which came from the direction of the event.

The scarcity of neutrinos from the collision puts an upper limit on how much energy it could have radiated through the near-massless particles, say the authors. If researchers can find a signal from a black-hole collision in the future, they could use the relatively high spatial resolution of neutrino telescopes to pinpoint its location.

***Phys. Rev. D*** 93, **122010 (2016)**

EVOLUTION

## Lizards tailor tails to local predators

Brightly coloured tails are a common feature of young lizards, and can be tailored to the eyesight of specific local predators.

Takeo Kuriyama and his colleagues at Toho University in Funabashi, Japan, collected 15 juvenile *Plestiodon latiscutatus* lizards from three areas of Japan dominated by different predators — snakes, weasels or birds. Lizards' tails were vivid blue where weasels or snakes were common, but had high ultraviolet reflectance only in areas high in snakes. Weasels can see blue wavelengths, but, unlike snakes, cannot detect UV light, suggesting that the lizards have evolved to draw the attention of specific local predator species away from their bodies and towards their disposable tails. Brown tails were found in the area where keen-eyed predatory birds make camouflage a better strategy.

***J. Zool.*** **http://doi.org/bkqm (2016)**