

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## PHYSICS

### A crack in the standard model?

A signal from the Large Hadron Collider (LHC) could challenge the standard model of particle physics for how matter and forces interact.

The LHCb experiment at CERN, Europe's particle-physics lab near Geneva, has uncovered an unexpected difference in the rate at which short-lived particles called *B* mesons undergo certain decays into muons and taus (heavier cousins of the electron). The standard model says that once the particles' mass differences are taken into account, the decays should occur at exactly the same rate.

The deviation is small, and the chance that it is a statistical fluctuation in random noise is too high to claim a discovery (the significance is 2.1 sigma, but physicists' threshold for a discovery is 5 sigma). However, the results are intriguing because they match previous measurements made by two other experiments elsewhere.

*Phys. Rev. Lett.* (in the press)

## IMMUNOLOGY

### Odd fish use old immune trick

Mice and lamprey fish produce a similar antibody response to influenza, despite being separated by hundreds of millions of years of evolution.

Lampreys (pictured) are jawless fish whose common

ancestor with mammals lived 550 million years ago. They defend themselves with antibodies that are unlike those produced by the immune systems of jawed vertebrates. A team led by Jonathan Yewdell at the National Institute of Allergy and Infectious Diseases in Bethesda, Maryland, exposed lamprey larvae to inactivated influenza virus and found that their blood cells produced antibodies that

recognize key amino-acid sites on the head of the haemagglutinin protein of influenza. This is the same region as that targeted by influenza antibodies from mice, suggesting that

lamprey and mouse antibodies recognize pathogens in a similar way despite their huge evolutionary separation. *eLife* 4, e07467 (2015)

## EVOLUTION

### Basque ancestors were farmers

The ancestors of people from the Basque region of Spain were early farmers — not hunter-gatherers as was thought.

Farming practices emerged around 11,000 years ago in the Near East and later spread to Europe as people migrated in waves, eventually replacing the hunter-gatherer lifestyle. To study this influx in Iberia, a

team led by Mattias Jakobsson at Uppsala University in Sweden sequenced the genomes of 8 individuals from remains found in a cave in northern Spain. These people lived 5,500–3,500 years ago, after the arrival of Spain's first farmers around 7,000 years ago. The closest living descendants of the sequenced people are modern Basques, contradicting past studies that linked Basques to late hunter-gatherer groups.

The Basque language is distinct from all other European tongues, and the authors say that it could be a relic of Spain's first farmers. *Proc. Natl Acad. Sci. USA* <http://dx.doi.org/10.1073/pnas.1509851112> (2015)



## ANIMAL BEHAVIOUR

### Seabirds duped by plastic waste

It is likely that most seabirds have consumed plastic rubbish floating in the ocean after mistaking it for prey.

Chris Wilcox at the Commonwealth Scientific and Industrial Research Organisation in Hobart, Australia, and his colleagues collated published data on the diets of 135 seabird species over the past four decades, including the red-footed booby (*Sula sula*; pictured) and the Cape petrel (*Daption capense*).

According to the data, the proportion of birds that had eaten plastic increased by about 1.7% per year. Using this figure, the team predicts that, had these studies been done today, more than 90% of the seabirds would have eaten plastic. By 2050, that could reach 99% if the flow of plastic waste to the seas is not reduced. The researchers found that the area of highest risk was in the Tasman Sea between Australia and New Zealand. *Proc. Natl Acad. Sci. USA* <http://doi.org/7dv> (2015)

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