

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## IMMUNOLOGY

### Infections 'scar' immune system

After the body has cleared a gut bacterial infection, some intestinal tissues have long-lasting weakened immunity — partly because of gut microbes.

Infection can lead to chronic inflammatory disorders. To find possible mechanisms, Yasmine Belkaid at the National Institute of Allergy and Infectious Diseases in Bethesda, Maryland, and her colleagues infected mice with a foodborne pathogen, *Yersinia pseudotuberculosis*, and then monitored them for up to six months. They found a variety of changes that weaken the immune system in gut tissues. For example, immune cells called dendritic cells were diverted into fat tissue away from lymph nodes, where they would normally activate the immune response. Signals from gut microbes also seemed to maintain inflammation.

The results show how frequent infections could lead to chronic disease later in life. *Cell* 163, 354–366 (2015)

## CHEMISTRY

### Cheap absorber for solar cells

An iron-based chemical can absorb and convert light into electrons with 92% efficiency — making it a promising material for solar cells.

Light-harvesting 'sensitizers' in solar cells are typically made of rare elements, which are expensive to scale up. To find a cheaper alternative, Kenneth Wärnmark at Lund University in Sweden and his colleagues engineered an iron-based sensitizer that captures photons and transfers their energy to electrons in a similar way to those based on rare elements.



## METEOROLOGY

### Winged weather watchers

Soaring birds equipped with sensors that track their location could be used to estimate weather variables such as wind speed.

Jelle Treep at the University of Amsterdam and his team analysed Global Positioning System (GPS) data from four griffon vultures (*Gyps fulvus*; pictured) as the birds flew across the Grand Causses region of southern France. By tracking the birds' in-flight location at three-second intervals and using knowledge of airborne bird movements, the team estimated wind speed and direction and vertical air movement. These GPS estimates agreed with ground data at three local weather stations and were consistent with meteorological theories.

As GPS equipment becomes smaller, lighter and able to collect higher-resolution data, bird-borne trackers could become an important tool for meteorological surveys in remote areas, the authors say.

*Bull. Am. Meteorol. Soc.* <http://doi.org/768> (2015)

The sensitizer converts photons with 92% efficiency: 12% better than the previous best sensitizer based on iron.

Some electrons quickly combined with positive charges, limiting the effective current generated. Still, the authors say that using abundant materials such as iron as a sensitizer for photovoltaics opens up possibilities for

low-cost solar energy.

*Nature Chem.* <http://dx.doi.org/10.1038/nchem.2365> (2015)

## PALAEOGENETICS

### First ancient African genome

A 4,500-year-old human skeleton from a cave in Ethiopia has produced Africa's

first ancient genome sequence.

Marcos Gallego Llorente at the University of Cambridge, UK, and his colleagues sequenced genomic DNA from one of the bones and compared it with sequences from modern Africans and Eurasians, as well as ancient Europeans. They conclude that the ancestors of modern Ethiopian highlanders were related to early farmers who moved into Europe from western Eurasia around 9,000 years ago. Descendants of these people later moved back to Africa around 3,000 years ago.

Most Africans today have 4–7% Eurasian ancestry because of this migration, suggesting that this event was larger and more significant than was thought.

*Science* <http://doi.org/78d> (2015)

## NEUROSCIENCE

### People identified from brain activity

A map of connections between brain regions that are active during mental activity can be used as a unique, reproducible 'fingerprint' to identify individuals.

Emily Finn of Yale University in New Haven, Connecticut, and her colleagues studied data from the Human Connectome Project, which is mapping all of the structural and functional connections in the brain. They looked at 126 people whose brains were scanned while they were resting or doing certain tasks. By analysing patterns of neural connectivity, the team identified subjects with a success rate of more than 90% when comparing rest scans, and with 54–87% success when comparing brain activity during tasks. The most useful networks for identifying people were those in certain regions of the cerebral cortex that control attention, memory and other

CHRISTIAN AUSSAGUEL