

ANDREW FORBES

infected animals ate less than normal, the decrease in their food intake was less marked than in mice infected with a mutant strain that lacked this protein. Fewer of the animals carrying the mutant bacteria shed it in their faeces, even though the bacteria had spread throughout the body more often than in mice infected with normal *S. Typhimurium*.

Limiting appetite loss is advantageous for both *S. Typhimurium* transmission and host survival, the authors say. *Cell* 168, 503–516 (2017)

## MATERIALS

## Metal–organic mix for air filters

Air filters that greatly reduce air pollution could be mass-produced using materials called metal–organic frameworks (MOFs).

MOFs are porous crystalline materials containing organic ‘struts’ and metal ions, and can capture large amounts of fine particulate matter electrostatically. Bo Wang and his colleagues at the Beijing Institute of Technology heated three kinds of MOF crystals and applied them individually to substrates including fabric, foam and plastic using two hot rollers. In lab tests, the resulting filters reduced the levels of hazardous 2.5- and 10-micrometre-wide particles in air by up to 99.5% at room temperature, with a loss of efficiency of only a few per cent at 200 °C.

Potential applications for the filters include household vacuum-cleaner dust bags and vehicle exhaust pipes.

*Adv. Mater.* <http://doi.org/f3tx3v> (2017)

## DEVELOPMENTAL BIOLOGY

## Human–pig embryo made

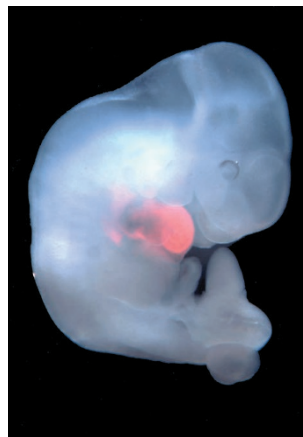
Human stem cells can integrate into developing pig embryos, a finding that could lead to new ways of growing human organs and studying

early human development.

Previous attempts to engraft human stem cells into developing mice have met with limited success. Juan Carlos Izpisua Belmonte at the Salk Institute for Biological Studies in La Jolla, California, and his colleagues instead worked with embryos of pigs, which are biologically more similar to humans. They injected various types of human pluripotent stem cell — which can develop into any cell type — into balls of cells called blastocysts that become embryos. Early-stage human pluripotent stem cells integrated into the blastocysts, but only stem cells injected at an intermediate stage of maturity went on to form later-stage embryonic chimaeras, which contained appreciable numbers of cells from both species.

The researchers also grew rat stem cells (pictured in red) into organs in mouse embryos by eliminating the development of certain mouse organs — a technique that could be applied to human–pig chimaeras to generate human organs in the future.

*Cell* 168, 473–486 (2017)



## NEUROSCIENCE

## How to separate memories cleanly

The harrowing flashbacks experienced by people with post-traumatic stress disorder when recalling a memory of normal daily life are an example of what can happen

when two memories become linked. By targeting specific brain cells, researchers have separated memories in mice without affecting how each memory is recalled individually.

Kaoru Inokuchi at the University of Toyama in Japan and his colleagues gave mice a mildly harmful chemical along with a sweetener, and then administered electric shocks at the same time as the animal heard a sound. The authors then gave the sweetener and made the sound at the same time to link the two memories. A specific group of neurons in the brain’s amygdala stored this memory link. Suppressing the activity of these brain cells unlinked the memories, but the mice were still able to recall the individual memories.

The results suggest that a therapy targeting these brain cells could one day help people with post-traumatic stress disorder.

*Science* 355, 398–403 (2017)

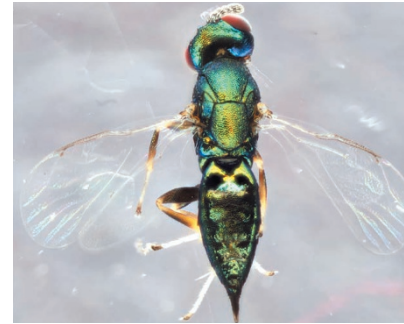
## ECOLOGY

## Parasite controls another wasp

A newly discovered wasp can increase its own chance of survival by infecting another parasitic wasp and controlling its mind.

The crypt gall wasp (*Bassetia pallida*) causes trees to produce abnormal growths, or galls, which provide a protected place for their eggs. Newly developed adult wasps gnaw their way out, but some die with their head blocking the escape hole.

To find out why, Kelly Weinersmith at Rice University in Houston, Texas, and her team collected crypt galls, and found that nearly all head-plugging wasps were infected with a previously undescribed species of wasp, the crypt-keeper (*Euderus set*, pictured). The team resealed some head-plugged holes, and found that *E. set* adults were three times more likely to die trapped in these galls than in those in which they only had



to emerge through *B. pallida* heads. This suggests that *E. set* is manipulating the behaviour of its host, causing *B. pallida* to dig the hole in the crypt and plug it with its head, allowing *E. set* to escape easily, the authors say.

*Proc. R. Soc. B* 284, 20162365 (2017)

## CLIMATE CHANGE

## Drop in coal use slows emissions

The growth of global carbon emissions has slowed in recent years, primarily because coal use in China and the United States has fallen since 2011 as a result of broad economic trends, greater energy efficiency and the expansion of renewable energies.

Glen Peters at the Center for International Climate and Environmental Research–Oslo and his co-workers developed a way to track progress on emissions pledges made under the 2015 Paris Agreement, using national and global data on energy, emissions and economic trends. They estimate that carbon emissions remained flat in 2016.

Despite the recent slowdown, the authors warn that it will be difficult to limit global warming to 2 °C above pre-industrial levels without large-scale deployment of technologies such as carbon capture and sequestration.

*Nature Clim. Change* <http://dx.doi.org/10.1038/nclimate3202> (2017)

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