

ASTRONOMY

Spots spotted on Vega star

One of the brightest stars in the night sky seems to have surface structures called starspots — a surprising finding for this particular star.

Torsten Böhm at the University of Toulouse in France and his colleagues used a telescope at France's Haute-Provence Observatory to look at Vega, a well-studied star that is roughly double the mass of the Sun. They found evidence of many faint spots: structures caused by magnetic-field changes that slightly alter the temperature in these areas. Vega is an 'A-type' star, a group thought to be incapable of generating magnetic fields and hence these spots.

The starspots could be linked to a weak surface magnetic field that was detected from Vega in 2009, the authors say.

Astron. Astrophys. 577, A64 (2015)

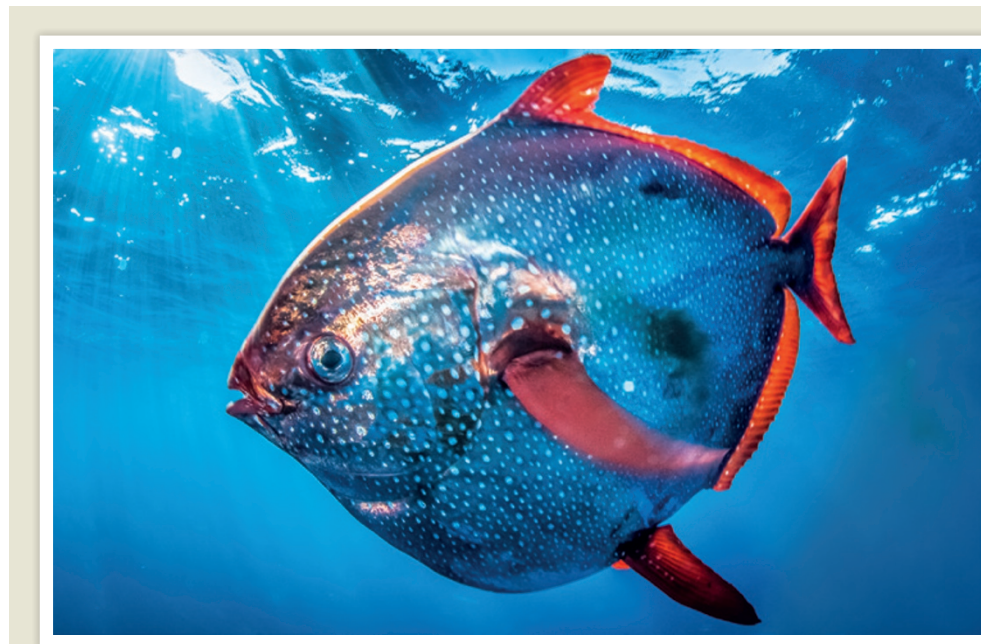
NEUROSCIENCE

A way to regrow nerve fibres

Injured neurons in fruit flies and mice regrow better when the activity of *Rtca*, an RNA-processing enzyme, is reduced.

Permanent damage to the central nervous system can occur when injured nerve cells fail to regenerate their axons — the long, impulse-transmitting part of the nerve cell. Yuh Nung Jan at the University of California in San Francisco and his colleagues screened fruit flies (*Drosophila melanogaster*) and found that severed axons regrew more effectively in mutant flies with reduced activity of *Rtca*.

When the enzyme was overexpressed, axons were regenerated less often and were much shorter than in normal



RALPH PACE

ANIMAL PHYSIOLOGY

Fish keeps warm in cold waters

A fish is able to maintain a warm body temperature in deep, cold waters.

Some species such as tuna can keep parts of their bodies warm, but Nicholas Wegner of the National Marine Fisheries Service in La Jolla, California, and his colleagues report that the deep-swimming opah (*Lampris guttatus*; pictured) can make its entire body — including the heart — warmer than its environment by

3–6°C. They measured the temperature and studied the anatomy of 22 opahs captured off the coast of California at depths of 50–300 metres. They found that the animal generates heat by flapping its pectoral fins and retains it using specialized blood-vessel structures in the gills.

This warmth probably boosts the power output of the fish's muscles, the authors say.

Science 348, 786–789 (2015)

flies. Similar results were seen in rat cells and in mice.

Altering the activity of *Rtca* or other molecules that it regulates could offer treatments for nervous-system injuries, the authors suggest.

Nature Neurosci. <http://doi.org/4m3> (2015)

OPTICS

Iron atoms slow down X-rays

Researchers have made an X-ray beam travel 10,000 times slower than the speed of light — an effect seen before only

for visible light.

Physicists have previously slowed light waves to a crawl and even stopped them by controlling the transparency of the medium through which the light passed — usually an ultracold gas of atoms such as sodium. They did this by tuning the interaction of light with the electrons in the gas. Now, a team led by Jörg Evers of the Max Planck Institute for Nuclear Physics in Heidelberg, Germany, has seen a similar effect by letting X-rays from a synchrotron interact with the nuclei of iron atoms, rather than with their electrons.

Controlling X-rays in this way could be useful for high-resolution imaging and other applications.

Phys. Rev. Lett. <http://dx.doi.org/10.1103/physrevlett.114.203601> (2015)

CANCER

Organoids mimic tumours

Human cancer tissue that is grown into 'organoids' in the laboratory could be used to test drug responses and to personalize therapy.

Organoids are 3D cultures

of cancerous cells that better represent the composition of a tumour in the body than cancer-cell lines, according to Mathew Garnett at the Wellcome Trust Sanger Institute in Hinxton, UK, Hans Clevers at the Hubrecht Institute in Utrecht, the Netherlands, and their colleagues. They built a small bank of 22 tumour organoids using samples from 20 people with colon cancer, and tested the effects of 83 cancer drugs on the cultures. They found correlations between the activity of specific genes and responses to particular drugs.

Some organoids were also uniquely sensitive or insensitive to certain compounds, so the approach might one day be used to tailor treatments for individuals.

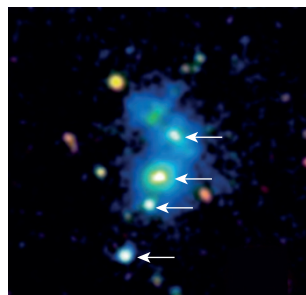
Cell 161, 933–945 (2015)

ASTRONOMY

Quasar quartet in galactic nursery

Astronomers have discovered a massive cluster of four quasars — a rare find of galaxies just being born.

Quasars are young, bright galaxies powered by supermassive black holes and are hard to find because this youthful period is brief. Using the W. M. Keck Observatory in Hawaii, Joseph Hennawi of the Max Planck Institute for Astronomy in Heidelberg, Germany, and his colleagues found the quasars (pictured, indicated by arrows) at the heart of one of the largest known nebulae — clouds of gas that, if large enough, can give birth to new galaxies. The quasars are illuminating the surrounding gas and



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HENNAWI & ARRIGONI-BATTAINA, MPA

are probably evolving into a massive galaxy cluster.

This rare grouping, together with the size of the nebula, suggests that gas in protogalactic clusters might be cooler and denser than was thought.

Science 348, 779–783 (2015)

CHEMICAL BIOLOGY

Fish makes its own sunscreen

Zebrafish have the genes needed to synthesize a compound that can provide protection from ultraviolet radiation.

Such chemicals have been found in fish but it was thought that they came from their diet or from microbes that live in or on the animals. Taifo Mahmud at Oregon State University in Corvallis and his colleagues previously analysed fish genomes and discovered genes involved in making these compounds. They then studied the embryos of zebrafish (*Danio rerio*) and found that their extracts contained the sunscreen compound gadusol. The team inserted the zebrafish genes for gadusol production into yeast (*Saccharomyces cerevisiae*), which produced milligrams of the compound.

Yeast could be harnessed to make large quantities of the UV protectant, the authors say. *eLife* 4, e05919 (2015)

ECOLOGY

Rare bees barely benefit ecosystem

The sheer number of the most common species in an ecosystem — rather than the level of biodiversity — determines how much the system benefits people.

Conservationists have argued that biodiversity supports ecosystem services such as crop pollination. To separate out the effects of species richness from species abundance, Rachael Winfree of Rutgers University in New Brunswick, New Jersey,

SOCIAL SELECTION

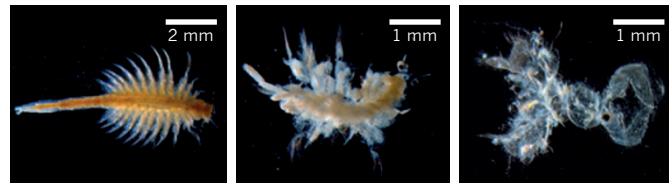
Popular topics on social media

Fruit-fly paper has 1,000 authors

Author lists have grown lengthy in many fields of science, but when a *Drosophila* genomics paper was published with more than 1,000 authors, it sparked discussion online about the meaning of authorship. The paper, published in the journal *G3: Genes Genomes Genetics*, names 1,014 authors, with more than 900 undergraduate students among them. Zen Faulkes, an invertebrate neuroethologist at the University of Texas–Pan American in Edinburg, questions on his blog whether every person made enough of a contribution to be credited as an author (see go.nature.com/8rffl7). But the paper's senior author, geneticist Sarah Elgin at Washington University in St. Louis, Missouri, says that large collaborations with correspondingly large author lists have become a fact of life in genomics research. "Putting together the efforts of many people allows you to do good projects," she says.

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Genes Genomes Genet. 5, 719–740 (2015)



and her colleagues used an equation from evolutionary biology to analyse wild-bee pollination of fruit crops.

The team counted thousands of individual bees from as many as 56 different species in fields of watermelons, blueberries and cranberries, as well as the average number of pollen grains they deposited on flowers. They calculated that pollination was dominated by a few common bee species.

Loss of rare species would not change pollination rates much, but reductions in the number of common bees would make a huge difference, the authors say.

Ecol. Lett. <http://doi.org/4m5> (2015)

PALAEOLOGY

Gut microbes give good fossils

Gut microbes are the main driver of tissue decay when animals die, and were probably important for preserving

soft-tissue anatomy in fossil animals.

Philip Donoghue at the University of Bristol, UK, and his colleagues studied the brine shrimp (*Artemia salina*; pictured left) and monitored its decay (pictured, middle and right) under various conditions. They found that soon after death, the shrimp's gut wall breaks open and bacteria spill out into the body cavity. The bacteria form sticky aggregates, or biofilms, that gradually replace shrimp tissue and contain mineral deposits, as revealed by microscopy. This mineralization is a key step in tissue preservation in fossils.

Evolution of the gut led to an explosion in both animal diversity and the abundance of fossils, the authors say.

Proc. R. Soc. B 282, 20150476 (2015)

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