

years, but the star is unlikely to be engulfed by the black hole, say the authors.

*Mon. Not. R. Astron. Soc.* 467, 2199–2216 (2017)

## ENERGY

## Sodium battery packs a punch

A cheap, rechargeable sodium-based battery could one day deliver high power at room temperature thanks to its hybrid solid electrolyte.

Electrolytes allow electrical charge to flow between a battery's electrodes. Liquid electrolytes can leak and tend to react with sodium metal, an abundant, low-cost material used for electrodes in some batteries, whereas purely solid electrolytes are poor conductors at room temperature. Shufeng Song at Chongqing University in China and his colleagues developed a hybrid solid electrolyte for sodium batteries by combining solid polyethylene oxide, sodium perchlorate and silica with an ionic liquid. They tested this in a sodium-metal battery and observed high conductivity at room temperature — a step towards increased power — and high stability over 56 cycles.

The electrolyte is a promising material for safer and more efficient sodium batteries, the authors suggest.

*J. Mater. Chem. A*

<http://doi.org/b2vm> (2017)

## CLIMATE-CHANGE BIOLOGY

## Heat could lead to tiny mammals

Mammals might respond to global warming by shrinking in size.

During a large warming event called the Palaeocene–Eocene Thermal Maximum (PETM), some 56 million years ago, mammals became smaller. To see how common this climate-driven dwarfing might have been, Abigail D'Ambrosia of the

University of New Hampshire in Durham and her colleagues measured the size of fossil teeth from four common mammal species from the Bighorn Basin in Wyoming, as a proxy for body size. The fossils, including those of an ancestral horse and a rabbit-sized, hoofed animal, spanned a time period that included a climate-warming event called the Eocene Thermal Maximum 2, which occurred 53 million years ago and was less hot than the PETM.

The team found that the rabbit-sized animal shrank by about 15% during the later warming event. The ancient horse species decreased in size by about 14%, whereas previous research suggested that a closely related horse shrank by roughly 30% during the PETM.

The authors hypothesize that reduced size could have helped the animals to disperse heat by increasing their surface-to-volume ratio, or could be due to dietary changes or climate-change-related drought.

*Sci. Adv.* 3, e1601430 (2017)

## ANIMAL BEHAVIOUR

## Kingsnakes go for the big squeeze

Kingsnakes have superior crushing power, allowing them to squeeze bigger snakes to death, even when these snakes are also constrictors.

David Penning at Missouri Southern State University in Joplin and Brad Moon at the University of Louisiana at Lafayette studied 182 snakes

from six species, measuring the cross-sectional area of the animals' muscles, and quantifying the pulling force that the snakes use to escape predators and the pressure used to constrict prey. Muscle area and pulling force increased with size for all snakes, but the three kingsnake (*Lampropeltis*) species had significantly higher constriction power per unit of body weight than three ratsnake (*Pantherophis*) species, which are larger constrictors preyed on by kingsnakes (pictured, *Lampropeltis getula* eating a Texas ratsnake, *Pantherophis obsoletus*).

This strong crushing ability may result from the snakes' distinctive posture during constriction — regularly aligned coils wrapped around the prey — that allows them to apply more pressure, the authors say.

*J. Exp. Biol.* 220, 1154–1161 (2017)

## EVOLUTION

## Oldest algal fossils found

Fossils of organisms resembling red algae suggest that multicellular life may have emerged on Earth some 400 million years earlier than previously thought.

Fossils of the earliest algae — which are closely related to the ancestors of modern plants — are rare and, until now, the most ancient specimen was around 1.2 billion years old. Stefan Bengtson at the Swedish Museum of Natural History in Stockholm and his colleagues studied fossils from Chitrakoot in India, and found two types of multicellular colony dating to 1.6 billion years ago. One is a thread-like form (*Rafatazamia chitrakootensis*, pictured), whereas the other is lobe-shaped (*Ramathallus lobatus*). Using 3D X-ray microscopy, the team found that the colonies contained structures characteristic of red algae, including some that may have



been used in photosynthesis.

This discovery may mean that dates of divergence for key parts of the tree of life need to be recalibrated, the authors say. *PLoS Biol.* 15, e2000735 (2017)

## DRUG DISCOVERY

## CRISPR finds drug synergy

Certain combinations of drugs might kill drug-resistant tumours, and a method based on the CRISPR–Cas9 gene-editing system offers a way to find them.

Tumours often become resistant to individual drugs, leading clinicians to use combinations of medicines in the hope of thwarting resistance. Michael Bassik and his colleagues at Stanford University in California developed a method that systematically disables two genes at a time in cells. They used the system to knock out 21,321 pairs of potential drug targets in leukaemia cells, looking for combinations that work synergistically to kill cancer cells.

The team found that disabling two genes called *BCL2L1* and *MCL1* killed drug-resistant cells. Drugs that inhibited the proteins encoded by these genes killed more leukaemia cells than each of the two medicines did individually. *Nature Biotechnol.* <http://dx.doi.org/10.1038/nbt.3834> (2017)

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