

PALAEONTOLOGY

Caimans ruled ancient wetland

A vast diversity of specialized crocodylian species dominated the mega-wetlands of South America before the Amazon River flowed, a remarkable fossil find has revealed.

Rodolfo Salas-Gismondi at the University of Montpellier in France and his colleagues found two bone beds in Peru containing seven species of crocodylian — the largest diversity of such species ever found in one place.

As well as two known large-bodied species, they found five animals that are new to science, including several caimans with teeth that seem to be specialized for consuming shellfish. The numbers of these animals declined as Amazon River systems began forming around 10.5 million years ago, draining the wetlands and allowing more-generalist caiman predators to dominate. *Proc. R. Soc. B* 282, 20142490 (2015)

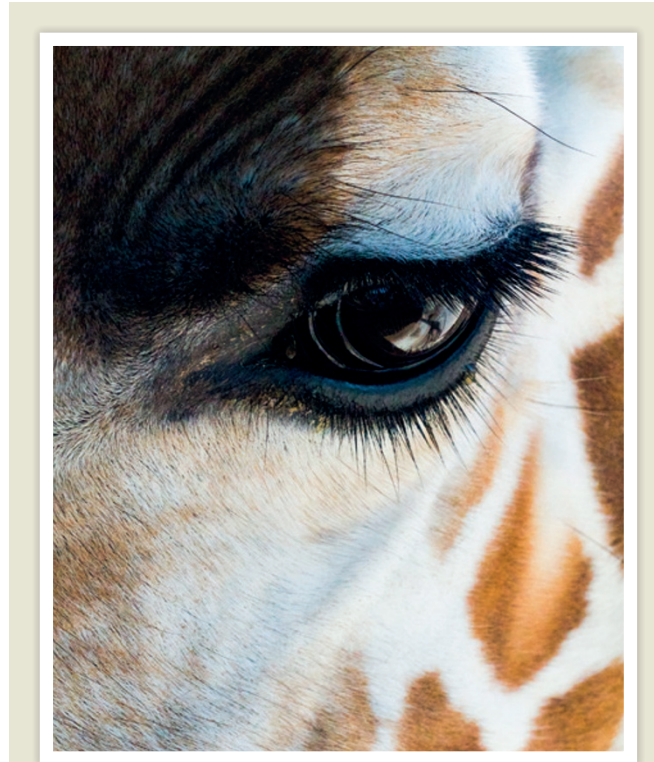
IMMUNOLOGY

Invading bacteria trigger DNA alarm

Immune systems use a previously unrecognized DNA detector to identify invading bacteria.

White blood cells called neutrophils recognize bacterial DNA, triggering a response that eventually kills the invaders. Zusen Fan and his colleagues at the Chinese Academy of Sciences Institute of Biophysics in Beijing found that a DNA-binding protein called Sox2 is also part of this bacterial surveillance system in mice and humans.

They discovered that Sox2 binds to bacterial DNA, and that bacterial infections were



ZOOLOGY

Eyelash length explained

The optimal length for mammalian eyelashes is one-third of the eye's width, which helps to retain moisture and keep out dust.

David Hu and his colleagues at the Georgia Institute of Technology in Atlanta measured the eyelash lengths of 22 species of mammals and found this ratio. They tested mock-ups of a mammalian eye in a wind tunnel to see how airflow changed depending on eyelash length. Lashes that were shorter than one-third of eye width were not optimal at blocking air from blowing onto the ocular surface. However, longer lashes directed more airflow towards the eye, making it susceptible to drying out. Understanding how eyelashes function could lead to devices that protect optical sensors, the authors say.

J. R. Soc. Interface <http://doi.org/2gk> (2015)

worse in mice that had been engineered to have no Sox2 expression in neutrophils. Infections were also worse in mice lacking another protein called TAB2, which interacts with Sox2. The findings could suggest new ways of treating infections, say the authors. *Nature Immunol.* <http://dx.doi.org/10.1038/ni.3117> (2015)

ANIMAL BEHAVIOUR

Birds allow kin to borrow nests

Female ducks recognize their kin and allow them to add eggs to their nests, but fight such attempts by non-relatives.

Many birds try to trick others of the same species

into incubating their eggs to avoid the associated energy costs. Malte Andersson at the University of Gothenburg in Sweden and his colleagues studied this 'brood parasitism' by filming the nests of High Arctic common eiders (*Somateria mollissima*) for more than 4,100 hours.

They also analysed the proteins in egg albumen to determine the relatedness of the females that laid eggs in the nest, and found evidence for discrimination against non-relatives.

In 65 nests studied, 11 contained eggs from two different females. At eight of these nests there were fights, and the two females laying eggs in each nest were unrelated. At three nests no aggression was observed, and the laying females were significantly more closely related than in the other eight. *Behav. Ecol.* <http://doi.org/2gj> (2015)

BACTERIOLOGY

Altruistic bacteria share their food

Starving bacteria can hook onto other bacterial species to share their nutrients.

Marie-Thérèse Giudici-Orticoni of Aix-Marseille University, France, and her colleagues cultured *Clostridium acetobutylicum*, which uses glucose to grow, and *Desulfovibrio vulgaris*, which uses lactate and sulfate, in a medium containing only glucose. *Desulfovibrio vulgaris* attached itself to *C. acetobutylicum*, allowing it to share the other bacterium's cytoplasm and proteins. This altered the metabolism of *D. vulgaris*, allowing it to grow with only glucose.

In a separate study, Christian Kost of the Max Planck Institute for

Chemical Ecology in Jena, Germany, and his colleagues mutated *Escherichia coli* and *Acinetobacter baylyi* so that they could not produce certain essential amino acids. When grown in a medium lacking the amino acid it required, *E. coli* formed nanotubes up to 14 micrometres long to connect with and share the cytoplasm of nearby *A. baylyi*, which was producing the amino acid. In return, *E. coli* provided *A. baylyi* with the amino acid it needed. These bacteria function as interconnected entities rather than individuals, the authors suggest. *Nature Commun.* 6, 6283; 6238 (2015)

NEUROSCIENCE

Monkeys predict cooperation

Monkeys use a distinct set of neurons to predict whether a fellow primate is likely to cooperate for a common good.

Keren Haroush and Ziv Williams at Harvard Medical School in Boston, Massachusetts, inserted electrodes into the brains of four rhesus macaques (*Macaca mulatta*) to record activity in hundreds of individual neurons in a specific area of the frontal lobe.

They then trained different pairs of macaques to play a computer game displayed on a shared screen. Both animals were rewarded with juice if they cooperated by selecting orange shapes instead of blue ones. A large subset of the animals' neurons fired in a pattern that accurately predicted their partners' intended, as-yet unknown, selections. This subset was distinct from other subsets that fired in patterns reflecting their own personal selections or the expected reward.

Changes in these newly identified 'other-predictive' neurons may be relevant in



social behavioural disorders such as autism, the authors say.

Cell <http://doi.org/2gn> (2015)

STEM CELLS

Stem-cell hope for Parkinson's

Dopamine neurons derived from stem cells and inserted into a monkey's brain reduce Parkinson's-like symptoms over two years.

Ole Isacson at Harvard Medical School in Boston, Massachusetts, and his colleagues created dopamine-producing midbrain neurons using induced pluripotent stem cells derived from the skin of cynomolgus monkeys (*Macaca fascicularis*). These neurons were introduced into the brains of three monkeys that lacked dopamine neurons — a model for Parkinson's disease, in which monkeys have impaired motor skills and are less active than normal monkeys.

In the most successfully treated animal, the stem-cell-generated neurons survived and grew axons, and dopamine production was restored. This animal gradually improved during the two years after treatment and showed normal activity, suggesting that transplantation of stem-cell-derived neurons could one day treat Parkinson's disease.

Cell Stem Cell <http://doi.org/2gm> (2015)

AGRICULTURE

Beetles felled by potato RNA

Plants can be engineered to contain molecules that disrupt insect genes, fending off a superpest that is resistant to all major insecticides.

Ralph Bock of the Max Planck Institute for Plant Physiology in Potsdam, Germany, and his colleagues engineered tobacco and potato plants so that their chloroplasts

SOCIAL SELECTION

Popular articles on social media

Psychology journal bans *P* values

A controversial statistical test has met its end, at least in one journal. Earlier this month, the editors of *Basic and Applied Social Psychology* (BASP) announced that the journal would no longer publish papers containing *P* values, because the values were too often used to support lower-quality research.

Authors are still free to submit papers to BASP with *P* values and other statistical measures that form part of 'null hypothesis significance testing' (NHST), but the numbers will be removed before publication. "Basic and Applied Social Psychology just went science rogue and banned NHST from their journal. Awesome," tweeted Nerisa Dozo, a PhD student in psychology at the University of Queensland in Brisbane, Australia. But Jan de Ruiter, a cognitive scientist at Bielefeld University in Germany, tweeted: "NHST is really problematic", adding that banning all inferential statistics is "throwing away the baby with the p-value".

Basic Appl. Soc. Psych. 37, 1–2 (2015)



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(the cell's photosynthetic structures) expressed RNA molecules that target vital insect genes. Larvae of the superpest Colorado potato beetle (*Leptinotarsa decemlineata*; pictured) died after nibbling leaves from the transgenic potatoes. By contrast, potatoes expressing the RNAs outside chloroplasts were not protected — probably because the plant's internal defence mechanism stopped the RNAs from accumulating to sufficient levels.

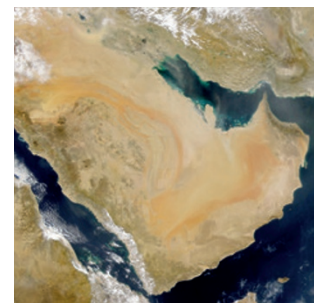
Science 347, 991–994 (2015)

PALAEOCLIMATOLOGY

A damp dispersal out of Africa

Early humans would have had several rainy opportunities to move out of Africa and into the normally arid and challenging Arabian peninsula (pictured).

Ash Parton of the University of Oxford, UK, and his colleagues discovered layers of sediments laid down by



ancient rivers in southeast Arabia, which flowed for several long periods during the past 160,000 years. Those wet spells could have enabled humans to push into the Arabian interior much earlier than some theories have suggested. Since at least 160,000 years ago, monsoon rains would have provided enough fresh water and plants to sustain human migration approximately every 23,000 years.

Geology <http://doi.org/2f8> (2015)

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