

2011

EDITORS' CHOICE

Adapted extracts from selected News & Views articles published this year.

EPIDEMIOLOGY

HOW COMMON IS AUTISM?

Catherine Lord (*Nature* 474, 166–168; 2011)

Autism spectrum disorders (ASDs) encompass autism, Asperger's syndrome and other related conditions. Core features include difficulties in basic social and communicative behaviours, as well as repetitive behaviours and restricted interests. The prevalence of ASDs has been considered to be just over 1%. However, in a provocative, carefully executed study, Kim *et al.* present evidence for surprisingly high rates of these disorders — 3.74% in males and 1.47% in females — in school-age children in a South Korean community. The study is remarkable in its attempt to identify ASDs in children in mainstream schools, as well as in children receiving special care. Yet a larger question arises. Should individuals who are without impairment or disability — that is, without any suffering, limitations or restrictions in daily functioning — be diagnosed with an ASD?

Am. J. Psychiatry 168, 904–912 (2011).

ORGANIC CHEMISTRY

OVERCOMING CATALYTIC BIAS

Daesung Lee (*Nature* 471, 452–453; 2011)

The alkene metathesis reaction, in which carbon–carbon double bonds are redistributed between alkene molecules, has had an enormous impact on chemical research and industry, as was recognized in 2005 with a Nobel prize. But this remarkable reaction has an inherent limitation — it cannot generate the thermodynamically less stable isomers of the alkene products. Hoveyda and colleagues now report that they have overcome this problem using specially designed molybdenum catalysts. Several aspects of these new metathesis reactions remain to be further refined: the range of alkene substrates that can be used should be broadened beyond enol ethers and allylic amides, for example, and ways should be found to avoid using an excess of one of the reagents. Nevertheless, these reactions are highly promising and will potentially be of use for the preparation of numerous compounds, with far-reaching consequences for the future of metathesis chemistry.

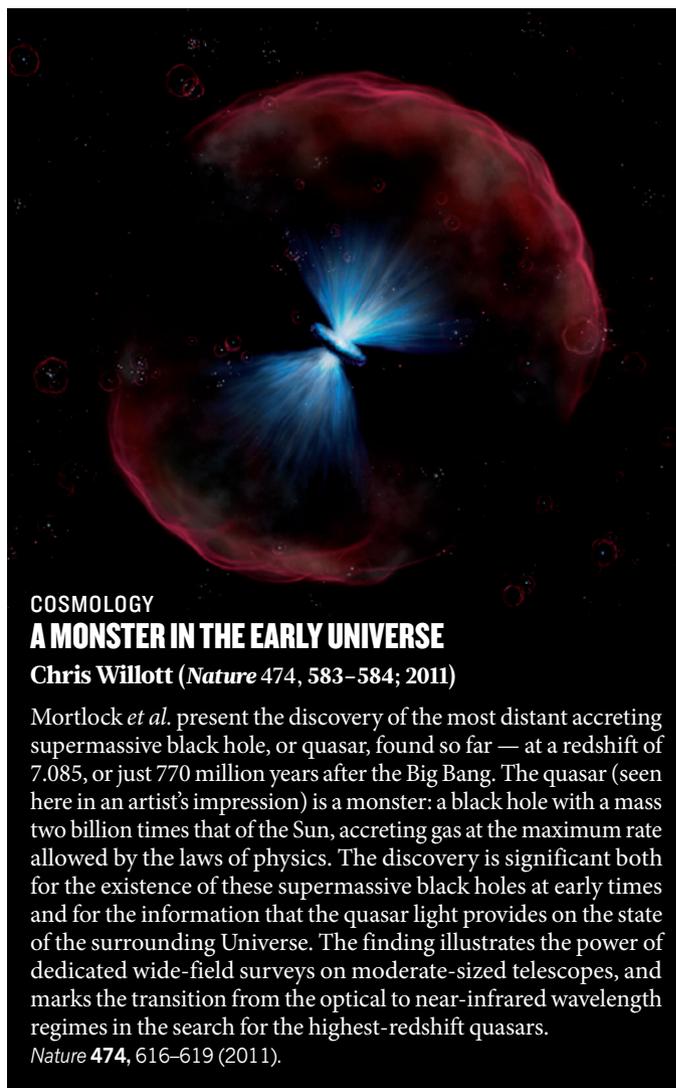
Nature 471, 461–466 (2011).

COMPLEX SYSTEMS

UNZIPPING ZIPF'S LAW

Lada Adamic (*Nature* 474, 164–165; 2011)

Perhaps the only thing more abundant in both natural and man-made systems than power laws are the models that have been developed to explain them. Baek *et al.* now argue that because such models depend on the specifics of each system, they fail to capture the shared cause of this regularity. The authors instead propose a general model that can be applied to any division of items into groups, and that can, for example, account for Zipf's law of word frequencies in text, the popularity



GEMINI OBSERV.

COSMOLOGY

A MONSTER IN THE EARLY UNIVERSE

Chris Willott (*Nature* 474, 583–584; 2011)

Mortlock *et al.* present the discovery of the most distant accreting supermassive black hole, or quasar, found so far — at a redshift of 7.085, or just 770 million years after the Big Bang. The quasar (seen here in an artist's impression) is a monster: a black hole with a mass two billion times that of the Sun, accreting gas at the maximum rate allowed by the laws of physics. The discovery is significant both for the existence of these supermassive black holes at early times and for the information that the quasar light provides on the state of the surrounding Universe. The finding illustrates the power of dedicated wide-field surveys on moderate-sized telescopes, and marks the transition from the optical to near-infrared wavelength regimes in the search for the highest-redshift quasars.

Nature 474, 616–619 (2011).

of last names, and city and county populations. A model purporting to explain a power-law distribution should be as general as Baek and colleagues' model, or it should be able to reproduce additional features of the system it models, beyond the familiar straight line on a log–log plot.

New J. Phys. 13, 043004 (2011).

PALAEOANTHROPOLOGY

MALAPA AND THE GENUS *HOMO*

Fred Spoor (*Nature* 478, 44–45; 2011)

Following on from the announcement last year by Berger *et al.* of the remains of a newly discovered hominin species, *Australopithecus sediba*, the same group has now published five reports detailing additional fossils and further analyses. Cave deposits at the Malapa site in South Africa yielded two partial skeletons, which Pickering *et al.* have found to be 1.977 ± 0.002 million years old. These skeletons are not only well preserved and remarkably complete, but also show a



surprising mix of morphological characters. The authors conclude that *A. sediba* fossils as late as those preserved at Malapa could have been the ancestor of *Homo*. It will, however, be difficult to uphold the suggestion that the extensive evolutionary change required could have occurred in the time available (a maximum of 80,000 years) if *A. sediba* at Malapa gave rise to *Homo* species. *Science* **333**, 1402–1407, 1407–1411, 1411–1417, 1417–1420, 1421–1423 (2011).

PRECISION MEASUREMENT A SEARCH FOR ELECTRONS THAT DO THE TWIST

Aaron E. Leanhardt (*Nature* **473**, 459–460; 2011)

If I were to tell you about an elementary particle that has mass and charge, but neither size nor structure, yet still has a well-defined orientation and can point in a specific direction in space, you would probably think I am describing something from a science-fiction novel. In fact, I am telling you about the electron. Hudson *et al.* describe an experiment aimed at refining our understanding of this fundamental particle and, more broadly, the basic laws of nature. Described colloquially, their experiment searches for evidence of an aspheric distortion to the shape of the electron. Hudson *et al.* observe no such distortion. The authors have pioneered the use of cold polar molecules to push the search for an electric dipole moment of the electron to new levels. Establishing the existence of an electric dipole moment of a fundamental particle is an exclusively experimental endeavour. Hudson *et al.* are the latest to attempt such a feat. Experiments of this genre reach far beyond the realm of atomic, molecular and optical physics: they can be viewed as low-energy windows on the high-energy soul of the cosmos. *Nature* **473**, 493–496 (2011).

BEHAVIOURAL NEUROSCIENCE FRUITY APHRODISIACS

Benjamin Prud'homme & Nicolas Gompel
(*Nature* **478**, 190–191; 2011)

The smell of a delicious stew often stimulates a man's appetite, but it rarely turns him on. Male *Drosophila* fruitflies, however, behave differently. Grosjean *et al.* identify how particular odours from rotten fruit and decaying vegetables — the creatures' typical diet — act as aphrodisiacs to male fruitflies. The authors show that the neural circuit mediating male-fly courtship is equipped with a plug-in to sense food resources that modulates the decision to court females. Regardless of how male flies integrate food odours into the decision to mate, one may wonder why they do so in the first place. Linking courtship behaviour to

a food compound gives the male some sway over how his progeny will be raised. Should the levels of phenylacetic acid be limited (read: low food resources), a male might not insist on courting local females, no matter how attractive they smell, and might wait to sire progeny grown in a richer environment.

Nature **478**, 236–240 (2011).



STEM CELLS THE DARK SIDE OF INDUCED PLURIPOTENCY

Martin F. Pera (*Nature* **471**, 46–47; 2011)

Induced pluripotent stem cells (iPSCs) are generated through the reprogramming of differentiated adult cells and can be coaxed to develop into a wide range of cell types. But the ultimate value of these cells for research and regenerative medicine will depend on the fidelity of their reprogramming to the pluripotent state, and on their maintenance of a normal genetic and epigenetic (involving aspects other than DNA sequence) status. Five recent surveys show that the reprogramming process and subsequent culture of iPSCs *in vitro* can induce genetic and epigenetic abnormalities in these cells. The studies raise concerns over the implications of such aberrations for future applications of iPSCs. They provide little insight into the crucial question of what aspects of the reprogramming methods might predispose the cells to the accumulation of recurrent genetic or epigenetic lesions. Also it is unclear how best to assess the effects of new genetic lesions on the growth, differentiation, tumorigenicity and functionality of pluripotent stem cells or their differentiated progeny.

Nature **471**, 58–62, 63–67, 68–73 (2011); *Cell Stem Cell* **7**, 521–531 (2010); *Cell Stem Cell* **8**, 106–118 (2011).

FORUM Ageing LONGEVITY HITS A ROADBLOCK

(*Nature* **477**, 410–411; 2011)

Increased expression of sirtuin proteins has been shown to enhance lifespan in several organisms. New data indicate that some of the reported effects may have been due to confounding factors in experimental design.

A VALUABLE BACKGROUND CHECK

David B. Lombard & Scott D. Pletcher

Burnett and colleagues' in-depth study of the influence of Sir2 overexpression on lifespan in *Caenorhabditis elegans* and *Drosophila*, as well as on diet-modulated longevity in the fly, shows that the protein has no effect. Given the demonstrated importance of sirtuins in mammals, why rehash the precise role of Sir2 in worm and fly ageing? First, challenging published results is an essential, self-correcting aspect of science. Second, invertebrate models continue to contribute to the understanding of sirtuin biology in mammals, and so future studies must be interpreted in the context of these new data. Third, the new reports reinforce the importance of rigorous genetic background control when interpreting the effects of single gene mutations.

DON'T WRITE SIRTUINS OFF

Carles Cantó & Johan Auwerx

Although in light of Burnett and colleagues' findings the appeal of sirtuins as a *sensu stricto* lifespan determinant might be gone, SIRT1 activation remains a promising approach to delaying general age-related physiological decline and to treating numerous inherited and acquired diseases characterized by defective mitochondrial function. The astonishing ability of SIRT1 to enhance 'healthspan' by promoting metabolic fitness will also guarantee it a long life as a subject for further exciting research. *Nature* **477**, 482–485 (2011).