

MATERIALS

Nanocrystals seen in solution in 3D

Researchers have determined the 3D structure of individual nanoparticles in a solution with near-atomic resolution.

Paul Alivisatos at the University of California, Berkeley, and his colleagues used graphene (sheets of single carbon atoms) to protect a solution containing platinum nanocrystals from the vacuum conditions of a transmission electron microscope. A sensitive detector picked up the electrons passing through the sample and an algorithm used that data to reconstruct the structure of two of the platinum nanocrystals. They found that each particle has a dense central disc of atoms with cone-shape protrusions, but they differed in atomic arrangement on the surface.

Understanding the structure of nanoparticles could lead to insights about their chemical and physical properties, the authors say.

Science 349, 290–295 (2015)

EVOLUTION

Hands hold clues to primate evolution

Human hand proportions are similar to those of some of our ancestors, suggesting that our hands did not evolve to serve the unique needs of modern humans.

Sergio Almécija at George Washington University in Washington DC and his colleagues analysed hand-length proportions in humans, apes (chimpanzee hand **pictured**), monkeys and fossil primates. They show that humans differ from living apes in overall hand proportions, but not from some of our ancestors, even when they accounted for differences in body size between species. Different



primate species seemed to take their own evolutionary path to arrive at similarly long thumbs to improve hand dexterity.

The authors suggest that their evidence challenges the idea that contemporary apes are good morphological models of human ancestors.

Nature Commun. 6, 7717 (2015)

CHEMISTRY

Elusive molecule made in the lab

An organic molecule first postulated a century ago has finally been created and characterized in the lab.

Scientists first theorized the existence of ethylenedione in 1913, but it remained unobserved despite its simple chemical formula (OCCO).

Andrei Sanov and his colleagues at the University of Arizona in Tucson created the molecule by bombarding the stable ion OCCO⁻ with laser light, which stripped an electron off. They measured the energy of ejected electrons, enabling them to characterize neutral OCCO, which has been predicted to survive for less than a nanosecond.

The unstable compound decays quickly into two molecules of carbon monoxide.

Angew. Chem. Int. Edn 54, 8764–8767 (2015)

NEUROSCIENCE

'Mini-brain' gives autism hints

Researchers have cultured stem cells from people with autism spectrum disorder (ASD) to form brain-like structures in the lab, revealing errors in neuronal development.

Flora Vaccarino of Yale University in New Haven, Connecticut, and her colleagues took skin cells from four people with ASD and their unaffected relatives, and reprogrammed the cells into stem cells. They then

SOCIAL SELECTION

Popular topics on social media

Communicate to reproduce results

Cell-biology labs often struggle to reproduce the research results of other groups. But a 15 July report suggests that many of those troubles would vanish if scientists reached out to the original experimenters. The report, released by the American Society for Cell Biology (ASCB), includes survey results from hundreds of ASCB members and calls for changes in scientific culture to make results easier to confirm. Besides better communication, it urges scientists to adopt more-uniform standards within their fields and to focus more on data quality rather than on publishing in high-impact journals. "Important reading on the reproducibility crisis in biology from ASCB

— culture problems, impact factor mania," tweeted Arturo Casadevall, a microbiologist and immunologist at Johns Hopkins Bloomberg School of Public Health in Baltimore, Maryland.

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made 'mini-brains' using 3D cultures of the cells, which recreated human forebrain development 9–16 weeks after conception. The team found that compared to control cultures, ASD cultures contained more neurons that produce a brain-signalling molecule, GABA, which inhibits neuronal activity. One reason for this difference was that the ASD cells overexpressed the *FOXP1* gene; correcting this reduced the growth of GABA-producing neurons.

The four people did not share any obvious genomic changes, suggesting that different genetic factors for autism can cause the condition by affecting similar neurobiological mechanisms during fetal growth.

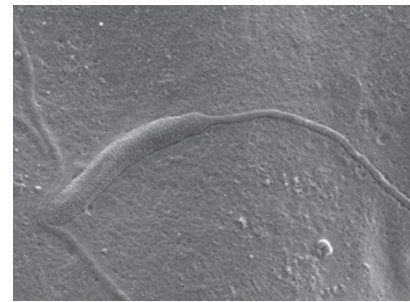
Cell 162, 375–390 (2015)

PALAEOBIOLOGY

Oldest animal sperm spotted

Cells preserved inside a 50-million-year-old fossilized worm cocoon represent the oldest animal sperm ever found.

Because of their delicate nature, sperm cells are rarely found in fossils. But Benjamin Bomfleur at the Swedish



Museum of Natural History in Stockholm and his colleagues spotted the sperm fragments (**pictured**) when they used an electron microscope to examine the inner surface of the cocoon fossil, which was found in Antarctica. Such cocoons are secreted by some worms, including earthworms and leeches, which deposit sperm and eggs inside.

The researchers do not know what kind of worm left the sperm. However, scanning electron microscope images show helical structures resembling drill-bits and beaded tails, which are characteristic of sperm produced by crayfish worms, leech-like creatures that live on freshwater lobsters.

Biol. Lett. 11, 20150431 (2015)

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