

CARDIOVASCULAR BIOLOGY

Mutations lower heart-disease risk

Two groups have found rare gene mutations linked to reduced blood fat levels and a lower risk of heart disease.

The *APOC3* gene codes for a protein that increases blood triglyceride levels — a known risk factor for heart disease. So, Anne Tybjaerg-Hansen at the Copenhagen University Hospital and her colleagues sequenced the protein-coding regions of the gene in more than 10,000 people and found three rare mutations associated with low blood triglyceride levels. They analysed these mutations in an additional 65,000 people and found that individuals with any of the mutations had a 36–41% lower risk of heart disease and stroke than people without any of the mutations.

Sekar Kathiresan at the Broad Institute in Cambridge, Massachusetts, and his team sequenced the protein-coding regions of nearly 20,000 genes from more than 3,500 participants and came up with four mutations in the same gene with similar effects.

The findings suggest that lowering blood triglyceride levels could protect against heart disease.

N. Engl. J. Med. <http://doi.org/s98>; <http://doi.org/s97> (2014)

NEUROSCIENCE

Brain circuit spurs social behaviour

Neuroscientists have pinpointed a specific set of neurons that connects two brain areas and regulates social behaviour in mice.

Karl Deisseroth and his colleagues at Stanford University in California used a variety of technologies to identify the exact circuitry

involved in the behaviours adopted by mice encountering an unfamiliar mouse or object. The team found that activity of cells in the ventral tegmental area (VTA) region of the brain increased during exploration of both the mouse and the object. Stimulating the firing of the VTA cells that project into the nucleus accumbens increased the animals' exploration of their new companion — but not the object. The mice also seem to use this circuitry for natural social exploration.

Studying the brain circuits, and not just the molecules,

involved in social behaviour could lead to new insight into some neuropsychiatric disorders, the authors say. *Cell* 157, 1535–1551 (2014)

ATMOSPHERIC SCIENCE

Arctic heat lessens cold snaps

The middle latitudes of the Northern Hemisphere have experienced fewer cold snaps during autumn and winter, thanks to Arctic warming.

Earlier studies have linked unusually frigid winters in

North America and Europe over the past decade to changes in atmospheric circulation caused by rising Arctic temperatures. But when James Screen of the University of Exeter, UK, analysed global temperature data from 1979 to 2013, he found that the frequency and severity of autumn and winter cold extremes decreased during this period. In these seasons, the coldest days in the Northern Hemisphere's high and middle latitudes have warmed faster than the warmest days, reducing overall temperature



ANIMAL BEHAVIOUR

Magnetic compass guides butterflies

On overcast days, monarch butterflies use a magnetic compass to find their way south, making them one of only a few migratory insects known to sense Earth's magnetic field.

The eastern North American monarch butterflies (*Danaus plexippus*; pictured) use the Sun to guide them from southern Canada and the United States towards Mexico, but they still manage to fly in the correct direction on cloudy days. Steven Reppert at the University of Massachusetts Medical School in Worcester and his team studied butterflies in a flight

simulator inside an artificial magnetic field. The authors found that the butterflies changed their flight orientation when the researchers shifted the magnetic field, but only when the insects were exposed to certain wavelengths of light.

The insects' antennae could contain magnetosensors, the authors say, adding that human-induced electromagnetic noise might disrupt the butterflies' migration.

Nature Commun. <http://dx.doi.org/10.1038/ncomms5164> (2014)

variation. Climate models suggest that this trend will continue in the future.

The rapid warming of northerly winds, which carry cold Arctic air south, could be dampening winter extremes, Screen says.

Nature Clim. Change <http://doi.org/s88> (2014)

ORGANIC CHEMISTRY

Microbes pitch in with synthesis

The metabolism of living organisms could be harnessed to help construct small molecules, according to a team from Harvard University in Cambridge, Massachusetts.

Chemists routinely use microbial enzymes as catalysts. But Emily Balskus and her colleagues instead used engineered *Escherichia coli* as a source of reagent. They combined a palladium-based catalyst with the hydrogen generated by the *E. coli* to add hydrogen to a variety of alkenes (which contain double-bonded carbon atoms).

Although the reaction was not as efficient as conventional methods, the approach could produce molecules that cannot be made using biochemistry alone, the researchers argue.

Angew. Chem. <http://doi.org/f2sbt2> (2014)

CLIMATE SCIENCE

Warming could boost air pollution

Climate change could lead to increased air pollution in the most populated areas, thanks to greater stagnation of air masses

allowing pollutants such as ground-level ozone to build up.

A team led by Daniel Horton of Stanford University in California used climate models to study how global warming can produce stagnant air by altering atmospheric circulation and precipitation patterns. The models predict that air stagnation will increase over the rest of this century across most of the tropics and subtropics. For example, large swathes of India (pictured) and Mexico could experience more 'stagnation days', and longer lasting stagnation events.

The areas at highest risk are home to roughly 55% of the world's population.

Nature Clim. Change <http://doi.org/tch> (2014)

ASTRONOMY

Speedy stars revealed nearby

Astronomers have spotted 28 stars that are hurtling through space fast enough to escape the Milky Way's gravitational pull — the biggest set of such stars, and the nearest to Earth, so far identified.

A team led by Jing Zhong of the Shanghai Astronomical Observatory, China, analysed data on star speeds gathered by the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST) in Hebei province. The scientists found 28 stars moving faster than 300 kilometres per second with respect to the galaxy. Some were within 1,000 parsecs of Earth.

High-velocity stars are thought to gain their speed through gravitational interactions with nearby stars or black holes — finding so many of these stars could reveal which mechanisms are most common. *Astrophys. J. Lett.* 789, L2 (2014)

ANTHROPOLOGY

To and from the Horn of Africa

After emerging from Africa 100,000 years ago, humans migrated back to the continent earlier than previously thought.

SOCIAL SELECTION

Popular articles on social media

Secret publishing deals exposed

Judging by the social-media reaction, researchers worldwide are paying attention to a report by US economists detailing the confidential deals that universities make with big publishers for electronic access to multiple journals. The prices, which can exceed US\$1 million a year, vary hugely between institutions, and do not always represent a good buy. For instance, libraries that buy bundled deals from Elsevier (which sells more than 2,200 journals) pay about three times more per citation than they do for non-profit items such as the *Journal of the American Chemical Society*. (Nature Publishing Group was not included in the study.) "Large commercial publishers offer v. poor value," tweeted biologist Ross Mounce of the University of Bath, UK. *Proc. Natl Acad. Sci. USA* <http://doi.org/s78> (2014)



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A team led by Ryan Raaum at the City University of New York in the Bronx compared nuclear genome data from several populations living in the Horn of Africa with those of humans from across the Middle East and elsewhere. Groups such as Ethiopians and Somalians have non-African ancestry that is distinct from that of present-day people of the Middle East, indicating that interbreeding between African and Middle Eastern people occurred more than just a few thousand years ago, as other studies have suggested.

The authors conclude that humans were moving back to the Horn of Africa as early as 23,000 years ago, before the advent of agriculture.

PLoS Genetics 10, e1004393 (2014)

NEUROSCIENCE

Tanning might be addictive

Repeated visits to the beach or tanning salon could be signs of an addiction, according to a study in mice.

David Fisher at the Massachusetts General Hospital in Boston and



his team found that mice chronically exposed to ultraviolet light produced an opioid called β -endorphin, which numbs pain and is associated with addiction. The mice also showed signs of withdrawal, including shaky paws and chattering teeth, after treatment with an opioid-blocking drug. The effects of β -endorphin, however, were not as pronounced as those seen in earlier studies of mice given morphine.

If the results hold true in humans, they could explain why many tanners (pictured) continue to seek out the sun, despite the known risks.

Cell 157, 1527–1534 (2014)

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