

reaction that occurs in fuel cells, its scarcity continues to drive efforts to improve its utilization. Zhang *et al.* made nanocages of platinum by coating palladium nanocrystals with only a few layers of platinum and then etching away the palladium core (see the Perspective by Strasser). Platinum nanocages made using nanoscale octahedra and cubes of palladium displayed different oxygen catalytic activity for the oxygen reduction reaction. — PDS

*Science*, this issue p. 412; see also p. 379

## QUANTUM INFORMATION Making hybrid quantum information systems

Different physical implementations of qubits—quantum bits—each have their pros and cons. An appealing idea is to combine them into hybrid architectures, taking advantage of their respective strengths. Tabuchi *et al.* placed a ferromagnetic sphere and a superconducting qubit in a cavity and used an electro-magnetic mode of the cavity as the mediator between the two. They achieved strong coupling between a collective magnetic mode of the sphere and the qubit. Viennot *et al.* coupled a single spin in a double quantum dot to photons in a cavity. Both approaches hold promise for future applications. — JS

*Science*, this issue pp. 405 and 408

## EVOLUTION Snakes' four-legged missing link

It may surprise you to learn that snakes, like us, are tetrapods derived from an ancient

four-legged ancestor. Martill *et al.* describe a fossil from the Brazilian Cretaceous period that contains a snakelike species that is elongate and serpentine, with both hind- and forelimbs (see the Perspective by Evans). This species appears to have been a burrower and shows clearly the early transitional stages from a lizardlike body plan to the smooth legless snakes we know today. — SNV

*Science*, this issue p. 416; see also p. 374

## METABOLISM Counteracting the effects of a bad diet

Obesity is a risk factor for metabolic disorders. These include insulin resistance, which can lead to type 2 diabetes, and hepatic steatosis, in which fat accumulates in the liver. By inhibiting  $\beta$ -adrenergic signaling, the kinase GRK2 decreases adipose tissue function. GRK2 also decreases insulin sensitivity. Vila-Bedmar *et al.* genetically ablated GRK2 in adult mice after they had become obese and developed insulin resistance by eating a high-fat diet. GRK2 deletion prevented these mice from gaining more weight and from developing hepatic steatosis on the high-fat diet. It also improved their sensitivity to insulin. — WW

*Sci. Signal.* **8**, ra73 (2015).

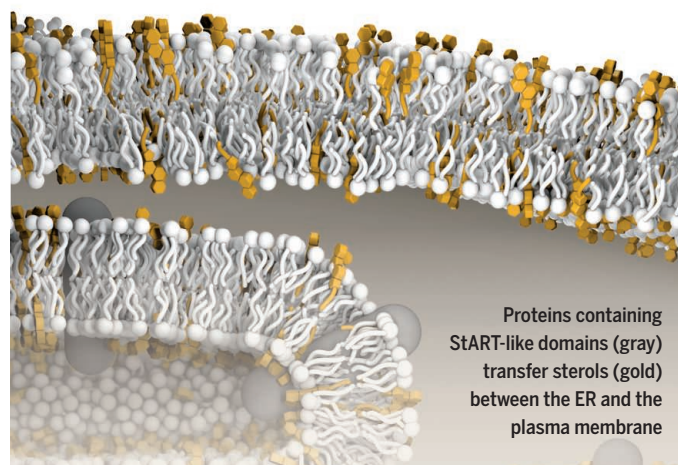
## DEEP BIOSPHERE A deep sleep in coal beds

Deep below the ocean floor, microorganisms from forest soils continue to thrive. Inagaki *et al.* analyzed the microbial communities in several drill cores off the coast of Japan, some sampling more than 2 km below the seafloor (see the Perspective by Huber). Although cell counts decreased with depth, deep coal beds harbored active communities of methanogenic bacteria. These communities were more similar to those found in forest soils than in other deep marine sediments. — NW

*Science*, this issue p. 420; see also p. 376

## IN OTHER JOURNALS

Edited by Kristen Mueller and Jesse Smith



Proteins containing StART-like domains (gray) transfer sterols (gold) between the ER and the plasma membrane

## CELL BIOLOGY

### Making a StART on sterol transport

Different organelles and membranes within cells contain different sets of lipids. Sterols are key components of cellular membranes, and their trafficking within cells is poorly understood. Sterols must traffic between the endoplasmic reticulum (ER) and the cell surface, but do so via a nonvesicular route. Gatta *et al.* examined this fundamental process in yeast. They found a class of proteins involved in the transfer of sterols between the ER and the plasma membrane (PM) that contained so-called StART-like (for steroidogenic acute regulatory transfer) domains. These ER membrane proteins localized at specific ER-PM contact sites and bound sterols. Efficient PM-to-ER sterol transport required not only StART-like domain-containing proteins themselves, but also their proper localization at the contact sites. — SMH

*eLife* **4** e07253 (2015).

## PSYCHOLOGY Learning while listening to a foreign language

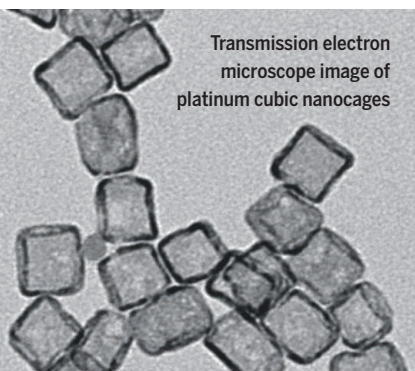
Speech not only conveys information in the form of the words uttered, but it also provides auditory cues that identify the speaker. Orena *et al.* now show that knowledge of the language spoken helped listeners to identify a speaker. The authors compared English-monolingual Montréal residents who could not understand spoken French or speak French themselves, to a similar set of residents of Connecticut, who were not regularly exposed to French. Montréal residents were better at identifying the French-speaker

voices, demonstrating that mere exposure improves language skills. — GJC

*Cognition* **143**, 36 (2015).

## GENETIC ENGINEERING SLIDE-ing to promote biosecurity

One hurdle facing the widespread use of genetically engineered organisms, such as probiotics or anticancer agents, is controlling their ability to reproduce. Lopez and Anderson developed one technique to do this, called "SLIDE" (synthetic auxotroph based on a ligand-dependent essential gene). Organisms that express SLIDE can only grow when supplied with a particular



Transmission electron microscope image of platinum cubic nanocages



Kangaroos and other marsupials favor using their left forelimbs over their right

## EVOLUTION

### Lefties find marsupial friends

**A**s most lefties know, we live in a right-handed world. Scientists have long thought that such handedness is largely unique to humans; however, Giljov *et al.* now report that marsupials show handedness, too. Surprisingly, these wallabies and kangaroos preferred to predominantly use their left forelimbs, rather than their right. Unlike in humans, handedness in marsupials did not correlate with gender, and more bipedal than quadrupedal marsupial species exhibited handedness. Handedness did not associate with phylogenetic relationships between marsupial species, suggesting that ecological adaptations may have driven such preferences. Thus, yet another characteristic thought to be unique to humans falls by the wayside, or rather, to the wallabies. — PJH

*Curr. Biol.* 10.1016/j.cub.2015.05.043 (2015).

compound. Working with the bacterium *Escherichia coli*, the authors mutated genes essential for *E. coli*'s viability, so that the hydrophobic cores of the encoded proteins could be filled by a nontoxic, bioavailable complementing compound. The technology was easy and cheap, and bacteria engineered to express multiple SLIDE alleles showed limited escape. — BJ

*ACS Synth. Biol.* 10.1021/acssynbio.5b00085 (2015).

## EDUCATION

### Academic effort hindered by peer pressure

Allowing promising adolescents to keep their academic efforts private could prevent them from reducing their efforts in order to fit in with lower-performing classmates. Bursztyn and Jensen describe a natural experiment showing that effort among the highest performers on a computerized remedial tutoring system

diminished after the system began to identify top performers for all users to see. Their field experiment offered free training for a college admissions test to students who took both honors and non-honors classes. If the offer was made during a non-honors class, enrollment was lower if students were told that their decision would be shared with the class, rather than kept private. There was no difference between public and private when

offers were made during an honors class. — BW

*Quart. J. Econ.* 10.1093/qje/qjv021 (2015).

## ORGANIC CHEMISTRY

### Boron juggling makes two bonds in a row

Suzuki coupling is a widely used chemical reaction to make carbon-carbon bonds. Essentially, the technique relies on a boron substituent to activate one of the carbon centers. If two different compounds in the mix had C-B bonds, you might expect little control over which one reacted when. Seath *et al.* now show that by juggling the other groups bound to the boron, they can selectively activate two different C-B linkages sequentially. A timely swapping of methylaminodiacetic acid with pinacol enables selective and efficient coupling of three components in a single reaction mixture. — JSY

*Angew. Chem. Int. Ed.* 10.1002/anie.201504297 (2015).

## CHEMISTRY

### Printing potent patchy particles

Functionalized colloidal particles offer a versatile platform for building catalysts and sensors or for use as atomic analogs for studying packing and crystallization. However, selective asymmetric functionalization is still a challenge. Tigges *et al.* formed a monolayer of polystyrene particles with a surface layer of aldehyde groups. Then, using microcontact printing, they selectively modified the top of the particles by applying polymer inks containing poly(aminoethyl(meth)acrylate) homopolymers or copolymers that covalently link to the surface on amination. The polymer patches served as platforms for further functionalizing, using click-type reactions or copper-catalyzed cycloadditions, or through the inclusion of biotin in the inks for biorecognition reactions. — MSL

*Small* 10.1002/smll.201501071 (2015).

# Science

## Boron juggling makes two bonds in a row

Jake Yeston

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