

patient recovers normally from other common childhood viral infections. — KLM
Science, this issue p. 448

BIOENGINEERING

Drug testing in a patient's own tumor cells

It is not easy to predict a patient's response to chemotherapy with animal models and cultured cells. The true test of responsiveness requires the evaluation of drug activity within human tumors. In two studies, Jonas *et al.* and Klinghoffer *et al.* have engineered devices that deliver microdoses of drugs directly into tumors. After treatment, the researchers removed the tumor tissue and quantified cancer-cell death. In both studies, the local response to chemotherapy matched the systemic response to known, as well as experimental, drugs. However, drug sensitivities were revealed that were not detected in cell culture. — MLF

Sci. Transl. Med. **7**, 284ra57 and 284ra58 (2015).

PROTEIN FOLDING

Ribosomes help careful protein folding

Protein assembly *in vitro* is useful for studying small molecules but is problematic for studying the assembly of larger, more complex proteins. Kim *et al.* analyzed the biogenesis of the mutation-prone nucleotide-binding domain of the cystic fibrosis conductance regulator (CFTR) (see the Perspective by Puglisi). Newly synthesized polypeptides emerged relatively slowly from the ribosome and folded through a modulated pathway that ensured correct protein folding. Some parts of the protein chain folded immediately upon synthesis, whereas other segments did so more slowly. It appears that acquiring the correct conformation for this complex



Polystyrene pellets

protein is partly guided by the ribosome itself. — SMH

Science, this issue p. 444; see also p. 399

CARDIAC PHYSIOLOGY

Keeping hearts at the right size

If left untreated, high blood pressure can lead to abnormally enlarged hearts (a condition called pathological hypertrophy) and heart failure. Inhibitors of protein kinase C (PKC) isoforms are in development for treating heart failure and some cancers. Withal *et al.* report that the inhibition of some PKC isoforms may exacerbate heart pathology. During development, mice lacking two related PKC isoforms, PKC δ and PKC ϵ , had abnormally large hearts and usually died in utero. Thus, drugs that inhibit PKC δ and PKC ϵ could trigger adverse cardiac side effects. — WW

Sci. Signal. **8**, ra39 (2015).

POLYMER CHEMISTRY

A more direct way to synthesize styrene

Foam cups, foam pellets, plastic cutlery: All are made of polystyrene, which in turn is made of styrene. The massive manufacturing scale of this commodity chemical places a premium on the efficiency of its synthesis. The current industrial route requires three steps to make styrene from benzene and ethylene. Vaughan *et al.* present a rhodium catalyst that achieves the coupling in a single step by using a recyclable copper salt as an oxidant. Although the catalyst is slow for industrial application, it demonstrates the viability of a more direct process. — JSY

Science, this issue p. 421

IN OTHER JOURNALS

Edited by Sacha Vignieri and Jesse Smith



The structured surface of a leaf beetle carapace diffracts light to produce spectacular colors

APPLIED OPTICS

A stretch to change color

The reflection of white light from structured surfaces often results in a spectacular display of color as the white light is split into its different wavelengths through diffraction. Structure gives rise to the intense iridescent colors that distinguish some members of the animal kingdom, such as beetles and butterflies. Human-made materials, such as DVD or CD surfaces, also diffract light into a rainbow. Zhu *et al.* combine surface structure with membrane flexibility to show that they can locally select the color of reflected light, as they stretch the membrane and change the periodicity of the structure. This technique could be used in a range of applications, including camouflage coatings, optical sensing and steering, and displays. — ISO

Optica **2**, 255 (2015).

CELLULAR BIOMECHANICS

The mechanics of cellular left and right

Cells need to know their own left and right in order to coordinate with neighboring cells in collective movement or embryonic

development. To do so, each cell has to establish left/right asymmetry. Tee *et al.* studied actin organization in human cells to understand underlying mechanisms, using fluorescence and electron microscopy and simulations. Actin fibers forming



Perception of angry faces is shaped by stereotypes

SOCIAL PSYCHOLOGY

Stereotyping sticks

A person better remembers faces of people who are members of one's own group—as defined, for instance, by sex or race—than of those who belong to an outgroup. An angry expression might reduce this difference, because threatening stimuli capture one's attention. Alternatively, it might increase the difference were it to trigger stereotyping. In a careful study using white and black faces and undergraduates, Gwinn *et al.* show that both white and black students better remembered individual neutral black faces than angry black faces, whereas their memories for angry and neutral white faces were similar, consistent with a stereotypical association of black faces and threat in the United States. — GJC

J. Exp. Soc. Psychol. **58**, 1 (2015).

the cellular skeleton rearranged from a symmetric to an asymmetric pattern through interplay between two types of fibers. The fibers stretching along the cell edge swirled towards the center, whereas the radially assembled fibers tilted unidirectionally. The contractile stress and rotational growth of the fibers drove the motions, while an actin cross-linking protein controlled the clockwise or anticlockwise directionality. — MSM

Nat. Cell Biol. 10.1038/ncb3137 (2015).

MATERIALS SCIENCE

Ordering up just the right temperature

One typically thinks of glassy or amorphous materials as having little of the order or structure that is found in a crystal. However, the molecules of organic glasses deposited from the vapor phase, like those that form the active

layer in a light-emitting diode or solar cell, can show a preferential molecular orientation. Dalal *et al.* use high-throughput screening to show that the quality of this orientation can be tuned through control over the substrate temperature during deposition, which influences the molecular mobility at the surface. This ability may give a simple route to optimizing active layers in organic electronics, because the molecular orientation can affect light emission, charge mobility, and device lifetimes. — MSL

Proc. Nat. Acad. Sci. 10.1073/pnas.1421042112 (2015).

CELL DIFFERENTIATION

Differentiating blood stem cells

Hematopoietic stem cells (HSCs), which generate all blood cell types, contain hundreds of long noncoding RNAs (lncRNAs)

Luo *et al.* identify 159 lncRNAs that are likely to be HSC-specific (lncHSCs) through deep RNA sequencing of primitive long-term HSCs from mouse bone marrow. As HSC function decreases with age, lncHSCs show reduced expression. Furthermore, like HSC-specific protein genes, promoters of lncRNAs are bound specifically by HSC transcription factors for regulated expression. Analysis of two specific lncRNAs reveals a role for lncHSC-1 in myeloid differentiation and lncHSC-2 involvement in HSC self-renewal and T cell differentiation. Analysis of the many other HSC-specific lncRNAs is likely to reveal varied mechanisms in regulating the self-renewal and differentiation of blood types. — BAP

Cell Stem Cell 10.1016/j.stem.2015.02.002 (2015).

NEURODEVELOPMENT

Catching it early

Communication difficulties associated with autism spectrum disorders (ASD) vary, making treatment more difficult. To anticipate language capability among those with ASD, Lombardo *et al.* used functional magnetic resonance imaging to analyze responses of toddlers to language during sleep. In individuals who later displayed poor language development, the superior temporal cortex responded differently than in individuals with better language development. Linkages between large-scale brain systems,

such as those driving emotion, reward, and motor function, were atypical in toddlers with poor language outcomes. For those with better language outcomes, brain systems were at first abnormal but later normalized. Given the variation in severity of ASD, this early identification could inform ongoing treatments. — PJH

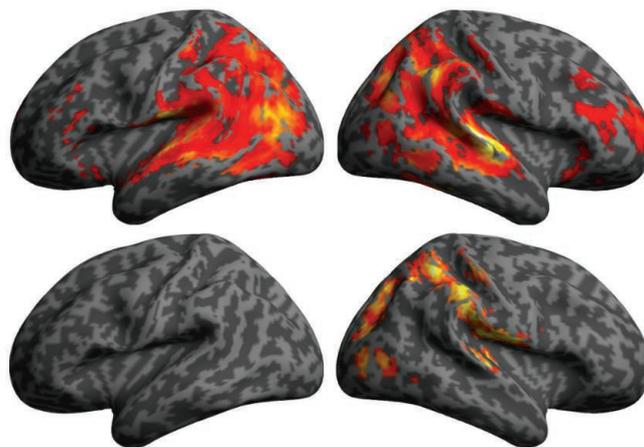
Neuron 10.1016/j.neuron.2015.03.023 (2015).

SUBSURFACE MICROBES

Generating archeal diversity

Retroelements—gene sequences that are introduced into DNA through an RNA intermediate—in subsurface archaea help increase gene and protein diversity. Paul *et al.* identified an archeal virus from a methane seep in a California borderlands basin that contains a complete and active diversity-generating retroelement (DGR). Furthermore, published metagenomes of two uncultivated nanoarchaea from the marine subsurface contain at least four DGRs, more than any other bacteria or virus known to date. Because anaerobic archaea in the subsurface grow so slowly, and thus have low background genome mutations, DGRs may be a widespread source of genetic diversity in these environments. — NW

Nat. Comm. 10.1038/ncomms7585 (2015).



Differences in language maps of young autistic brains predict future abilities

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