

EVOLUTIONARY GENOMICS Selection, recombination, and hybrid evolution

Hybridization is an important force in evolution. The effects of hybridization across the whole genome are not understood. Using a fine-scale genetic map, Schumer *et al.* examined local ancestry in replicate natural hybrid populations of swordtail fish. Each parental species contributes different proportions of genetic material to the genomes of their descendants. Genes from the “minor” (less well-represented) parent occur in regions of the genome that are subject to higher recombination rates and where there are fewer potentially deleterious genes. Neanderthal ancestry in human genomes shows similar patterns. —LMZ

Science, this issue p. 656

FISHERIES

Big mammas matter for fish

The theoretical relationship between reproduction and body size has assumed that total mass relates directly to fecundity, regardless of the number of individuals involved. This assumption leads to fisheries management practices that suggest that one large female fish can be replaced by several smaller females. However, this assumption is incorrect. Barneche *et al.* show that larger females are far more productive than the same weight's worth of smaller females. Management practices that ignore the value of large females could contribute to unexplained declines seen in some fish stocks. —SNV

Science, this issue p. 642



The Atlantic cod,
Gadus morhua

NEUROENGINEERING Decoding brain-computer interfaces

Brain-computer interfaces (BCIs) can help humans with compromised motor function by using their brain activity to externally control movements. Existing methods, however, require extensive user training and effort. Ganesh *et al.* developed a BCI technique for decoding sensorimotor prediction errors that requires less user energy. It subliminally stimulates the user to think about an activity and then, instead of decoding what movement a user intends, decodes whether the movement that the user wants matches the sensory feedback that the stimulator induced. In 12 healthy individuals performing a wheelchair-turning task, this interface represented movements speedily (within 96 milliseconds) and without any training. —PJB

Sci. Adv. 10.1126/
sciadv.aag0183 (2018).

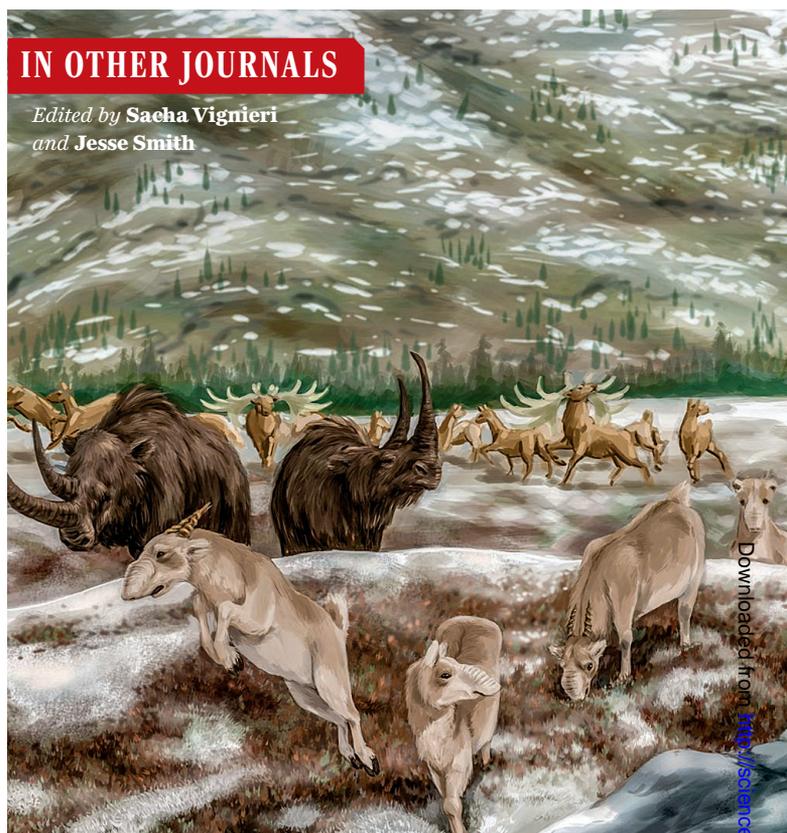
ORGANIC CHEMISTRY H-bond to deliver fluoride

Simple fluoride salts are theoretically convenient reagents for carbon-fluorine bond formation. In practice, they are often insoluble in the solvents that dissolve their reaction partners. Pupo *et al.* developed urea-based catalysts that make fluoride soluble through hydrogen bonding. Moreover, their chiral substituents bias the reaction toward one of two mirror image products of C–F bond formation. This strategy should be applicable to the asymmetric addition of other salts, too. —JSY

Science, this issue p. 638

IN OTHER JOURNALS

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MOLECULAR BIOLOGY

Stress granule transcription

When translation initiation is stalled under stress, non-translating messenger ribonucleoproteins form insoluble assemblies called stress granules (SGs) in the cytosol. Namkoong *et al.* sequenced all transcripts from purified SGs. They found that although translation of most transcripts is inhibited, only a subset of transcripts form SGs. The length and abundance of the AU-rich elements are key features determining SG-targeting specificity, agreeing with a recent report by Van Treeck *et al.* showing that RNA self-assembly drives SG formation. SGs have been implicated in cancer and neurodegenerative diseases; understanding the specificity of their RNA components and the principles of their formation offers insights into their pathological contribution. —SYM

Mol Cell. 10.1016/j.molcel.2018.02.025;

Proc. Natl. Acad. Sci. U.S.A. 10.1073/
pnas.1800038115 (2018).

ACADEMIC POLICIES

Stop the clock: Tenure, gender, and children

Allowing both male and female faculty to stop their tenure clock when having a child can increase tenure rates for the former and reduce them for the latter. Antecol *et al.* analyzed data on all assistant-professor hires at top-50 economics departments from 1980 to 2005; 44% of women and 47% of men had a child within 5 years of completing their Ph.D., before typical tenure deadlines. Differential effects of clock policies on tenure are driven by the fact that men publish more in top-tier journals after policies take effect, whereas women do not. Policies may not compensate for the specific productivity challenges that women face after childbirth. Despite this early setback, and the subsequent career churn, clock policies do not hurt women's chances of ultimately gaining tenure in the profession. —BW

Amer. Econ. Rev. 10.1257/
aer.20160613 (2018).

PHOTO: MIROSLAV HALAMA/SHUTTERSTOCK.COM



PALEOECOLOGY

Top-down or bottom-up?

Primarily producers and animal consumers interact to determine the structure and function of ecosystems, but how do their relative influences change over time? Jeffers *et al.* used the fossil record of the late Quaternary in Britain and Ireland to study whether the extinction of two-thirds of the native megaherbivores (including mammoths, giant deer, moose, and others) led to the observed expansion of woody plants at the end of the last glacial period. Instead, they found that more influential factors were a warming climate and reduction in fire, with an even more pronounced role for increasing shrub encroachment (followed by trees) in determining ecosystem structure. Plants and plant-soil feedbacks may have been more important than trophic interactions in driving the changes as northern ecosystems moved into the postglacial period. —AMS

Ecol. Lett. 10.1111/ele.12944 (2018).

Was climate warming more important than megafaunal loss for shaping postglacial landscapes in Britain?

CHEMISTRY

Early warning about emerging contaminants

Contamination of environmental samples with harmful chemicals can be detected with high-resolution mass spectrometry (HRMS). This method can provide accurate mass data for the complex mixtures, thus allowing retrospective analysis to look for newly identified contaminants. Alygizakis *et al.* report on a pilot study involving eight reference laboratories in Europe and Australia to investigate whether retrospective screening of HRMS data can be used to establish the extent of a newly identified contaminant's presence in the environment. On the basis of archived data from 48 diverse environmental samples from 14 countries, the study documents widespread occurrence of several chemicals not commonly included in monitoring of environmental samples. Expanding the pilot to a full early-warning system for global emerging contaminants will

require a virtual data repository with agreed-upon data standards. —JFU

Environ. Sci. Technol. 10.1021/acs.est.8b00365 (2018).

VASCULAR BIOLOGY

Sensing the stress

When blood flow in arteries increases, surrounding smooth muscle relaxes to allow blood vessel dilation. Using a high-throughput screen for mechanoreceptors that are sensitive to blood flow (shear stress), Xu *et al.* identified a type of sensor expressed by vascular endothelial cells called G protein-coupled receptor 68 (GPR68). Its activation triggers a cell signaling pathway that increases intracellular calcium concentration, an event that is associated with vasodilation. The authors discovered that GPR68 is expressed in mammalian small-diameter blood vessels and that loss of GPR68 expression in mice disrupts the vasodilatory response to increased blood flow. Moreover, a compound that activates

GPR68 activity increased vasodilation, indicating that drugs targeting this stress sensor could potentially treat cardiovascular disease. —LC

Cell **173**, 762 (2018).

STRUCTURAL BIOLOGY

Dynamic fibrils drive protein assembly

A low-complexity domain of the protein FUS plays a role in forming RNA granules. Luo *et al.* identify and structurally characterize two reversible amyloid cores (RACs) in this domain. In stable amyloid fibrils, β -strands stack to form β -sheets that pack tightly and exclude water. In contrast, RAC1 forms a kinked coil that stacks along the fibril axis; two such layers interact through tyrosine ring stacking. RAC2 forms β -sheets, but with water molecules between mating sheets. It is already established that the LARK (low-complexity amyloid-like kinked segment) may be broadly involved in

membraneless assemblies. The RAC2 structure suggests that reversible fibril formation may occur without kinking. —VV

Nat. Struct. Mol. Biol. **25**, 341 (2018).

COOLING TEXTILES

Scaling up textiles that cool down

Decreasing energy consumption by reducing the need for air conditioning helps combat CO₂ emissions and promotes sustainability. Peng *et al.* present a remarkable scale-up of nanoporous polyethylene microfibers for use in cooling fabrics. These fabrics allow heat to radiate through them while reflecting visible light and can be engineered for wearability. The ability to scale up production is important for making this material cost-effective relative to cotton and other mass-produced textiles. Incorporating cooling fabrics into everyday wardrobes presents an opportunity to decrease indoor cooling. —BG

Nat. Sustain. 10.1038/s41893-018-0023-2 (2018).

Early warning about emerging contaminants

Julia Fahrenkamp-Uppenbrink

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