

Silver). They showed that epothilone B, a U.S. Food and Drug Administration–approved microtubule-stabilizing drug that can cross the blood-brain barrier, does promote functional axon regeneration, even after injury. — SMH

Science, this issue p. 347; see also p. 285

STRUCTURAL BIOLOGY

Resolving whole mitoribosomes

Mitochondria probably evolved from a prokaryotic cell living within a proto-eukaryotic cell. Consequently, mitochondria have lost much of their genomic DNA, except for a few genes that require highly divergent mitoribosomes for protein translation. Greber *et al.* and Amunts *et al.* have used cryo–electron microscopy to uncover the structure of this complex (see the Perspective by Beckmann and Hermann) and reveal an unusual mRNA binding channel. The structure supplies clues for how aminoglycoside antibiotics might inhibit mitoribosomes and how mutations in mitoribosomes might cause human disease. — GR

Science, this issue p. 303, p. 288; see also A. Amunts *et al.*, *Science*, 3 April, p. 95

SOCIAL EVOLUTION

Gaze into my eyes

Humans bond emotionally as we gaze into each other's eyes—a process mediated by the hormone oxytocin. Nagasawa *et al.* show that such gaze-mediated bonding also exists between us and our closest

animal companions, dogs (see the Perspective by MacLean and Hare). They found that mutual gazing increased oxytocin levels, and sniffing oxytocin increased gazing in dogs, an effect that transferred to their owners. Wolves, who rarely engage in eye contact with their human handlers, seem resistant to this effect. — SNV

Science, this issue p. 333; see also p. 280

STEM CELLS

Stem cells can sort mitochondria by age

The renewal of tissues in aging organisms requires stem cells, which have the unusual ability to divide asymmetrically into one daughter cell that retains stem cell properties and another that differentiates into a particular tissue type. Katajisto *et al.* used photoactivated marker proteins to monitor the age of cell organelles in stemlike cells from human breast tissue and their distribution into daughter cells. Most organelles were evenly distributed, but daughter cells that maintained stem-cell properties received more newly produced mitochondria and fewer old ones. — LBR

Science, this issue p. 340

CANCER

Will the real mutation please stand up?

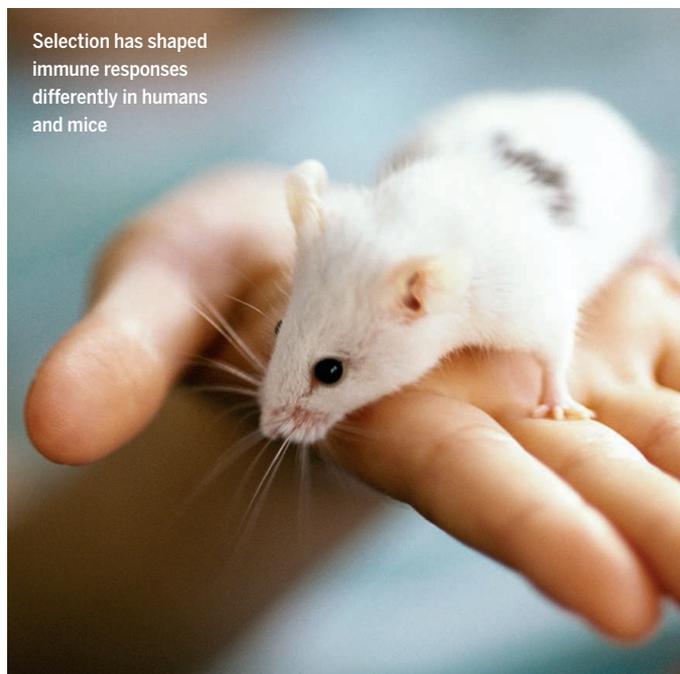
When a patient is diagnosed with cancer, tumor samples are analyzed to search for mutations that might guide targeted treatment of the disease. Jones *et al.* characterized samples from more than 800 patients with 15 different cancer types. For accuracy, this approach requires a matched sample of normal DNA from the same patient. By doing this, mutations present in the patient's normal tissues can be excluded as therapeutic targets, and therapeutically useful new mutations in the tumor are revealed. — YN

Sci. Transl. Med. **7**, 283ra53 (2015).

IN OTHER JOURNALS

Edited by **Sacha Vignieri** and **Jesse Smith**

Selection has shaped immune responses differently in humans and mice



IMMUNOGENETICS

Of mice and men

Species undergo different selective forces, and those that drive immunity are of special interest because they may affect studies of human health. Webb *et al.* investigated the differences between human and mouse for 456 protein-coding gene families involved in innate immunity. Of these, 2 genes in humans and 35 genes in mice exhibited signatures of positive selection. Examining the evolutionary distance between mice and humans, they further identified many genes likely to be under positive selection in the primate and murid lineages. These changes, for the most part, appear to have been fixed within humans and mice, respectively, demonstrating the different evolutionary trajectories that immune genes have taken during evolution. — LMZ

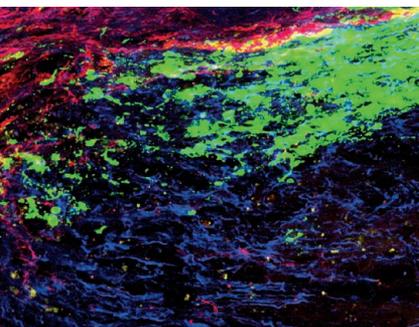
Mol. Biol. Evol. 10.1093/molbev/msv051 (2015).

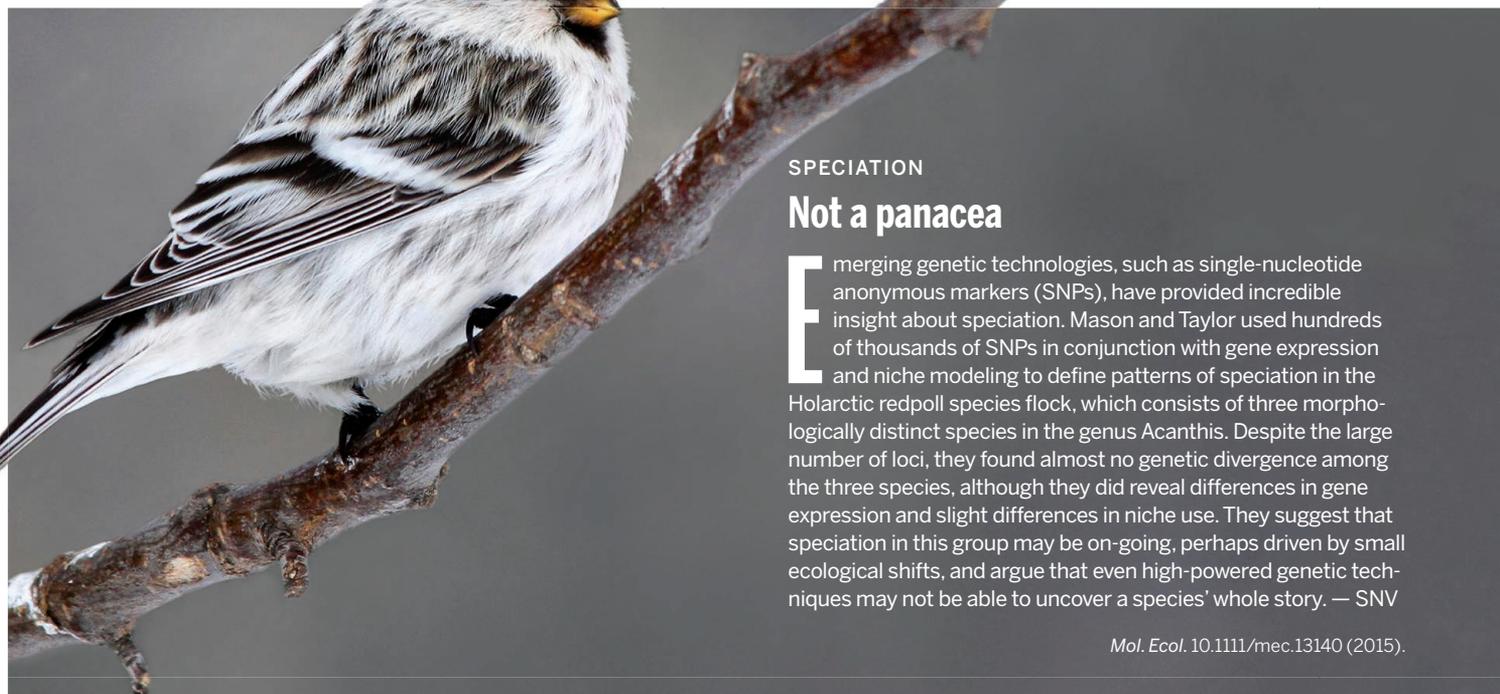
PROTEIN FOLDING

Interfering in an aggregation pathway

Most dementia cases are caused by neurodegenerative Alzheimer's disease. Plaques composed of fibrils of a 42-residue amyloid- β peptide (A β 42) are characteristic of this disease. There is evidence that neurotoxicity is caused by A β 42 oligomers rather than the fibrils, but fibrils catalyze the

formation of oligomers. Cohen *et al.* show that the human chaperone domain Briochos binds to the surface of A β 42 fibrils and prevents them from catalyzing oligomer formation. In electrophysiology experiments in mouse brain slices, Briochos prevented the inhibition of neural oscillations caused by A β 42 aggregation. In this case, a chaperone acts not by promoting folding or preventing misfolding but by targeting a





SPECIATION

Not a panacea

Emerging genetic technologies, such as single-nucleotide anonymous markers (SNPs), have provided incredible insight about speciation. Mason and Taylor used hundreds of thousands of SNPs in conjunction with gene expression and niche modeling to define patterns of speciation in the Holarctic redpoll species flock, which consists of three morphologically distinct species in the genus *Acanthis*. Despite the large number of loci, they found almost no genetic divergence among the three species, although they did reveal differences in gene expression and slight differences in niche use. They suggest that speciation in this group may be on-going, perhaps driven by small ecological shifts, and argue that even high-powered genetic techniques may not be able to uncover a species' whole story. — SNV

Mol. Ecol. 10.1111/mec.13140 (2015).

Though morphologically distinct, the three species of Holarctic redpolls, including this hoary redpoll, display almost no genetic divergence

nucleation step in the aggregation pathway. — VV

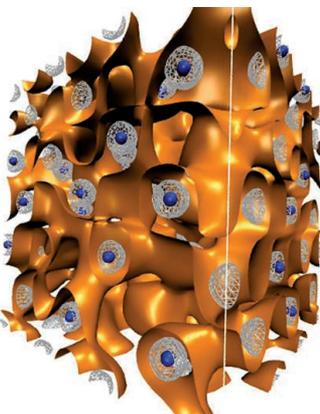
Nat. Struct. Mol. Biol. 10.1038/nsmb.2971 (2015).

PHYSICS

Shocking aluminum into a warm dense state

In some extreme environments (such as the interior of Saturn, for example), matter is a dense soup of strongly interacting particles: "warm dense matter" by name. Scientists can create this regime in the laboratory by hitting a material with powerful laser beams, causing shock

Simulation of warm dense matter topology



waves that lead to melting. Fletcher *et al.* monitored the properties of a thin sample of aluminum as it transformed from a solid into warm dense matter, its density more than doubling in the process. Using x-ray scattering and comparing their results to model calculations, they found that short-range repulsive interactions between ions played a major role in the transition. — JS

Nat. Photon. 10.1038/nphoton.2015.41 (2015).

EDUCATION

Out with tradition and in with inquiry

Replacing traditional chemistry labs with inquiry-based laboratories that mimic a research project is no easy feat. Hartings *et al.* describe the creation and assessment of two, two-semester-long, student-driven, faculty-assisted laboratory curricula. What makes this approach unique is that the students control the research direction. Research done in the first semester is considered to be a control experiment forming the basis for the second

semester, which is then dictated by the expertise and interest of the researchers. The research trajectory continues as the second-semester experiments from one year become the control experiments for the next year. This allows the research project to continually evolve according to student decisions, making it a research project that truly belongs to students. — MM

J. Chem. Educ. 10.1021/ed500793q (2015).

CELL BIOLOGY

Keeping the cell nucleus pumped up

The nucleus is the most prominent organelle inside eukaryotic cells. It is often roughly spherical in shape and houses the genomic DNA. Nuclear Lamins are important for maintaining nuclear shape, and deformed nuclei are often associated with premature aging diseases. Verboon *et al.* find that the fruit fly gene *washout* (*wash*), involved in maintaining endosome shape in the cytoplasm, is also required to maintain the smooth spherical shape of the nucleus. Wash protein interacts with Lamin and is associated

with heterochromatin in the nucleus. It also helps organize chromosomes and subnuclear domains, such as the nucleolus and cajal bodies. — GR

Curr. Biol. 25, 804 (2015).

ANTIBIOTIC RESISTANCE

Challenging antimicrobial growth trends

Antimicrobial use in animal production could exceed 100,000 tons a year by 2030. Chronic use of growth-promoting antimicrobials in farming has selected for resistant bacteria that have spread into humans. Facing the reluctance of the food and veterinary industries to report on antimicrobial sales, Van Boeckel *et al.* used statistical models to map and project global antimicrobial consumption. By far the biggest current and future consumer is China, followed by the United States, but Brazil, India, and Mexico also are or soon will be major users, along with other transitional countries seeking to intensify animal production for their increasingly affluent societies who are demanding more meat to eat. — CA

Proc. Natl. Acad. Sci. U.S.A. 10.1073/pnas.1503141112 (2015).