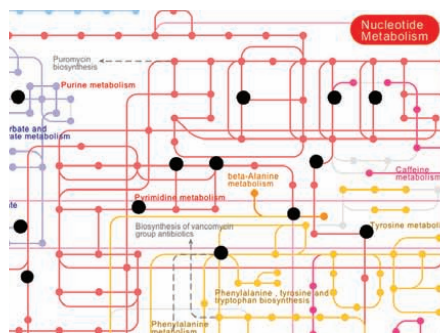


or oxidants that reached microbes in the sediments. The findings suggest that the unique seawater chemistry of the early Paleozoic promoted the worldwide preservation of BST soft-bodied fossils, according to the authors. — S.R.

Liver metabolites synced to circadian clock

Recent studies have revealed links between disruptions to the circadian clock and metabolic disorders such as obesity and diabetes. Because food consumption is a potent synchronizer of peripheral circadian clocks, researchers have speculated that metabolites may help regulate the precision and timing of circadian cycles. Kristin Eckel-Mahan et al. (pp.



Metabolic map, with metabolites linked to the circadian rhythm shown in black.

5541–5546) analyzed a comprehensive dataset of more than 500 liver metabolites and report numerous diurnal oscillations in mouse liver tissue across a range of pathways governing the metabolism of amino acids and carbohydrates, lipids, nucleotides, and xenobiotics. Using computational

modeling, the authors identified synergistic nodes between liver metabolites and the circadian transcriptome—the collection of RNA molecules that provide

transcriptional control of liver processes. The existence of these nodes, the authors conclude, reveals that a complex network of interrelated metabolic pathways functions in a coordinated, clock-dependent manner to achieve metabolic homeostasis. The findings demonstrate that the liver metabolome is controlled by dietary intake and circadian transcriptional machinery, according to the authors. — T.J.

Short-term contracts may hinder young scientists

Critics argue that academic tenure places undue financial risk on the modern research university and diminishes its ability to adapt to change. In response, research institutions have shifted away from tenure toward more short-term and nontenure track positions in the last 30 years. Alexander

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Petersen et al. (pp. 5213–5218) analyzed longitudinal career data for 300 physicists to understand how contract length affects scientists' production and career trajectory. The researchers developed a quantitative model to show that short-term contracts make careers more vulnerable to termination, not necessarily because scientists awarded these contracts lack talent or persistence but because the contracts make it difficult for scientists to overcome early barriers to achievement. The analysis suggests that most individuals experience termination relatively early in their career, while a few so-called "superstar" scientists survive an initial selection process that is significantly influenced by chance. Collaboration is important, the researchers found, though larger teams grow increasingly less efficient. According to the authors, the results suggest that reliance on short-term contracts may promote "rich-get-richer" scenarios that hinder the upward mobility of young scientists. Though the analysis focused on physicists, the authors suggest the findings could be extended to other disciplines in which publication and collaboration are keys to success. — J.M.

How seed pods are optimized for explosive seed dispersal



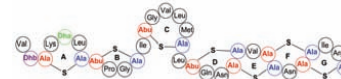
Many plants dis-

m/s despite the highly dissipative process of crack formation. The plant's seed pod consists of 5–10 seeds held within a shell comprised of five elongated segments or valves. The author found that the valves' tapered cross-sections made the pod highly resistant to cracks, with only 30% of a seam's length needed to keep the pods closed. Using high-speed video recording to observe crack propagation, the author found that the crack accelerates to full speeds only after it exceeds approximately 80% of the seam's length. Once one of the seams is driven past the threshold for crack growth, it begins to open and triggers the remaining seams to fracture. The video also revealed that the valves are mechanically coupled, and that simultaneous cracking ensures efficient energy transfer. The *I. glandulifera* seed pod is optimized for highly efficient transfer of elastic to kinetic energy and may account for the plant's success as an invasive species, the author suggests. — S.R.

Genome mining yields potential antibiotics

Antibiotics are urgently needed to combat emerging antibiotic-resistant pathogens. Nisin, a member of the lantibiotic class of antimicrobials that has been used for food preservation for decades without eliciting microbial resistance, has potential therapeutic

at physiologically relevant temperature and pH. Further analyses revealed that geobacillin I has a structure similar to nisin, whereas geobacillin II has a



Structure of geobacillin I.

structure different than that of any known lantibiotic. Additional studies are needed to determine the geobacillins' modes of action and activity in vivo, according to the authors. — N.Z.

B-cell subtypes belong to distinct lineages

Researchers have been unable to definitively determine whether a single hematopoietic stem cell (HSC) can reconstitute all of the known B-cell subtypes in mice. Though widely considered true, recent studies have challenged this idea by showing that HSCs, at different times during development, exhibit different reconstitution efficiencies for the known murine B-cell subsets B-1a, B-1b, B-2, and marginal zone B. Eliver Ghosn et al. (pp. 5394–5398) bolster a longstanding alternate hypothesis known as "layered evolution" by demonstrating that B-1a and B-2 cells originate from distinct progenitors in adults and thus belong to separate developmental lineages. The authors utilized fluorescence-acti-