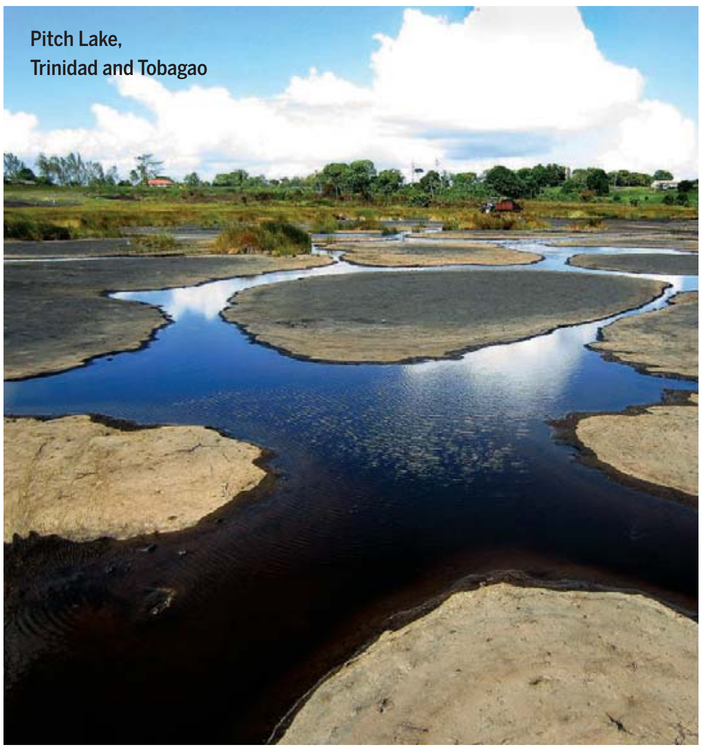
OIL BIODEGRADATION

Microbial life thrives in an oily bubble

Microorganisms can break down hydrocarbons in oil reservoirs. Microbes grow primarily at the interface between oil and water, where they can find nutrients and dispose of metabolites. Meckenstock *et al.* now show that tiny water droplets can also provide a suitable home for hydrocarbon-degrading microorganisms. The authors examined oil from Pitch Lake, Trinidad and Tobago, and found that diverse microorganisms thrived in these tiny isolated microhabitats. — NW

Science, this issue p. 673



Pitch Lake, Trinidad and Tobagao

RIBOSOME STRUCTURE

Factors that aid ribosomal protein synthesis

The ribosome is a large macromolecular machine responsible for making proteins inside cells. During its mechanical cycle, parts of the ribosome must move. These movements are facilitated by proteins that bind to the ribosome. Gagnon *et al*. describe the structure of one such protein, Elongation Factor 4, bound to the ribosome. This protein appears to help the ribosome to reverse its conformation as it is making a protein, which might prevent the ribosome from stalling during protein synthesis. — VV

Science, this issue p. 684

CARDIOVASCULAR DISEASE

Better blood thinner, without bleeding

Blood thinners prevent heart attacks and strokes by making it harder for blood to clot, but these drugs can put patients at risk of dangerous bleeding. Now Moeckle *et al*. describe an enzyme that can prevent clots without this perilous side effect. They engineered the enzyme apyrase to remove the pro-clotting molecule ADP from the blood quickly. In dogs and mice with heart attacks, apyrase stopped blood cells from aggregating, the first step in forming a clot. At the highest dose, the animals suffered less heart damage and did not bleed excessively. In comparison, clopidogrel, a blood thinner used currently in patients, protected the heart less well and did cause excessive bleeding. — KLK

Sci. Transl. Med. **6**, 248ra105 (2014).

IN OTHER JOURNALS

Edited by **Kristen Mueller** *and* **Jesse Smith**

PHYSICS

Making more-directional magnetic materials

Magnetic materials generally reach an ordered state when they are made cold enough. Theoretical physicists, however, came up with the fascinating concept of a quantum spin liquid (QSL), which remains in a disordered (liquidlike) state even at absolute zero. Some three-dimensional (3D) materials may show hints of becoming a QSL at higher temperatures, which makes them easier to study. Modic *et al.* synthesized a form of the 3D compound Li_2IrO_3 in which magnetic interactions strongly depend on spatial direction, in line with theoretical predictions. X-ray diffraction pointed to a crystal structure made up of honeycomb planes with varying orientations. Although these crystals show magnetic ordering, the authors envision a series of related structures of this material that all could be QSLs. — JS

Nat. Commun. **5**, 4203 (2014).

EVOLUTION

How proteins can evolve new functions

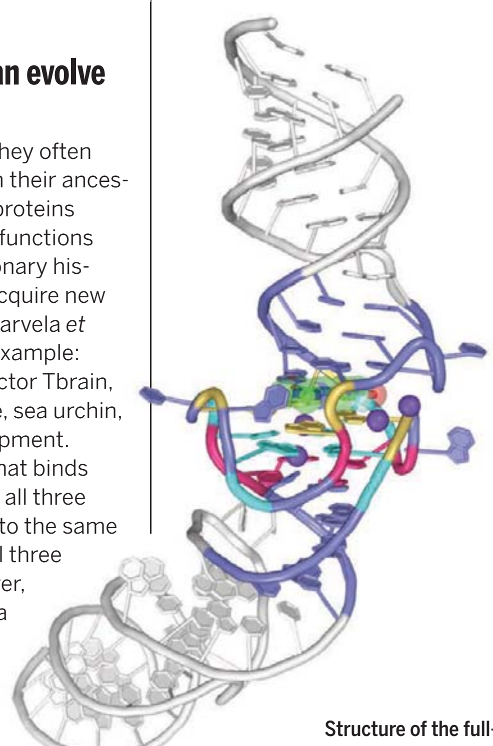
As species evolve, they often retain proteins from their ancestor species. Those proteins often retain critical functions throughout evolutionary history, but they can acquire new roles, too. Cheatle Jarvela *et al*. investigate one example: the transcription factor Tbrain, which drives mouse, sea urchin, and sea star development. A region of Tbrain that binds to DNA appeared in all three species and bound to the same DNA sequence in all three species, too. However, both mouse and sea star Tbrain also bound to a second DNA sequence, which differed between the two species. In sea stars, that second binding induced gene expression. The work highlights one path genes can take to evolve new functions. — LMZ

Mol. Biol. Evol. 10.1093/molbev/msu213 (2014).

RNA STRUCTURE

A fluorescent tool for tagging RNA

A fluorescent tool for tagging RNA, green fluorescent protein (GFP) revolutionized cell biology by allowing researchers to tag proteins with the glowing substance. Scientists recently developed an analogous RNA tool, called Spinach, which consists of a short segment of RNA bound to a molecule that mimics the GFP chromophore (the part responsible for its fluorescence). Warner *et al*. now report the crystal structure of Spinach. They find that an unusual RNA conformation held the chromophore in place. The conformation includes a G-quadruplex, a structure



Structure of the full-length Spinach RNA

CREDITS: (LEFT TO RIGHT) CHRISTINE UND DAVID SCHMITT/FLICKR; KATHERINE WARNER AND ADRIAN FERRÉ-D'AMARÉ