Species ranges are larger in plants that are able to self-pollinate than in those that must receive pollen from another individual, such as these dwarf monkey flowers in Oregon

PLANT BIOGEOGRAPHY

Self-pollination and expanding range

The mating system of a plant species may play an important role in determining its geographic range size. Grossenbacher *et al.* compared the range size of self-pollinating plant species with the ranges of closely related outcrossing species. They found that selfing species tended to have the wider geographic ranges, and that this tendency increased with the time since a selfing species evolutionarily diverged from its outcrossing relative. Traits that improve mating success may be at least as important as other traits, such as dispersal ability, in helping plants to increase their range size and colonize new areas.— AMS

Ecol. Lett. 10.1111/ele.12449 (2015).

ECOLOGICAL BIOCHEMISTRY

Natural sunscreens

The Sun is the primary source of the world's energy, but it is also a powerful source of damaging radiation. Many small organisms, including bacteria, algae, and marine invertebrates, produce amino acid compounds that protect them from the Sun's harmful ultraviolet rays. Known as mycrosporine-like amino acids (MAAs), these compounds have also been found in marine fishes, where they were presumed to be diet- or symbiont-derived. Osborn *et al.*, however, report that zebrafish are able to produce such compounds de novo. Further, that the identified genetic pathway underlying their production is also present in the genomes of other vertebrates, including amphibians, reptiles, and birds, suggesting that such internal sun protection could be widespread. – SNV

eLife 10.7554/eLife.05919 (2015).

CANCER BIOLOGY

Tumor cells educate the metastatic niche

Why primary tumors metastasize preferentially to particular organs is an important but still unanswered question in cancer biology. The tumor presumably communicates with the target organ, but how this long-distance molecular conversation occurs has been difficult to envisage. Enter exosomes, mysterious lipid vesicles that have been turning up in many diverse areas of biomedical research. Costa-Silva *et al.* show that well in advance of metastasis, primary tumor cells secrete exosomes that carry a specific molecular cargo to the target organ. This cargo helps transform the organ into a hospitable niche that supports the growth of metastatic cells. In the case of mouse pancreatic cancer, the exosomes carried a protein that induced a proinflammatory, tumor cell–friendly milieu in the liver. – PAK

Nat. Cell Biol. 10.1038/ncb3169 (2015).

HEART MECHANICS

Valve development relies on heart force

Blood pumping from the heart not only oxygenates the body, but its oscillation is needed early for the development of the heart itself. Using live imaging and mathematical modeling of a beating zebrafish heart, Heckel *et al.* identify how fluid flow is sensed. Endothelial cells detect oscillatory flow as wall shear stress via the membrane-bound mechanosensitive ion channels Trpv4 and Trpp2, which trigger intracellular calcium signaling, with the subsequent activation of klf2a expression. Hence, fluid flow in the heart is crucial for development via a mechanotransduction mechanism. Alterations in the flow of these molecular players result in valve defects.— BAP

Curr. Biol. **25**, 1354 (2015).

GEOMORPHOLOGY

Constraining erosion rates with copper

The location of copper deposits would seem to have little to tell us about the role of climate on mountain erosion. However, Yanites and Kesler suggest that precipitation plays the key role in exhuming porphyry copper deposits. Porphyry deposits are the prime source of copper ore and form at about 2 km depth from hydrothermal fluids released from nearby magma bodies. An estimate of the long-term erosion rate is possible for deposits exposed at the surface, then, as long as the formation age is known. High precipitation rates, such as those that occur near the equator, not only allow rapid exhumation but also reduce the regional density of deposits. — BG

Nat. Geosci. 10.1038/ngeo2429 (2015).

QUANTUM OPTICS

Building blocks of a quantum network

A successful quantum-based communication network will require several components that can reliably store, manipulate, retrieve, and retransmit quantum-encoded information. Being robust, fast, and capable of traveling long distances, photons are ideal quantum information carriers. Sayrin *et al.* show that cold atoms trapped at the surface of a tapered optical fiber can slow and store light pulses, down to the single-photon level, within the tapered fiber cavity and then retrieve them a couple of microseconds later. Such a building block that can exploit the well-established optic fiber technology could prove an extremely versatile platform for developing long-distance quantum communication networks. — ISO

Optica **2**, 353 (2015).