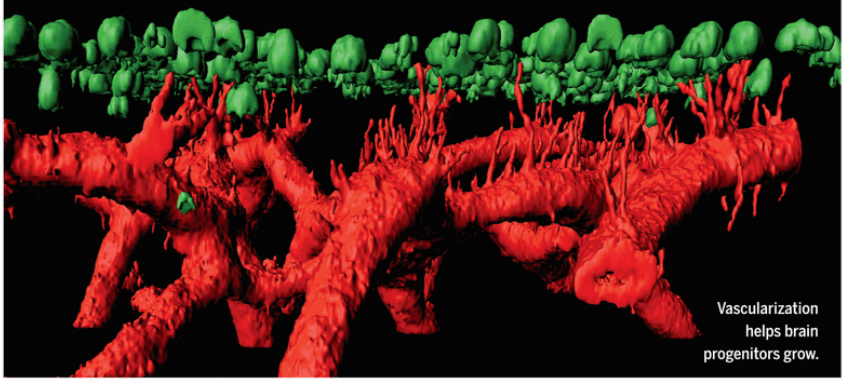
NEURODEVELOPMENT

Blood and brain intertwined during development

During brain development, blood vasculature grows rapidly to keep up with growing brain tissue. Studying the mouse hindbrain, Tata *et al.* show how these events are coordinated. Peak angiogenesis during embryonic development correlates with a surge in mitotic activity of neural progenitor cells. Processes from these cells wrap around developing vessels or tag the perineural vascular plexus. The interaction depends on neuropilin-1 (NRP1), a cell surface receptor that is expressed in endothelial cells of the developing vasculature. Without NRP1, neural progenitor cells fail to proliferate normally, resulting in fewer than normal progenitors and compromising hindbrain growth. —PJH

Proc. Natl. Acad. Sci. U.S.A. **113**, 13414 (2016).



Vascularization helps brain progenitors grow.

tissue. The extracellular space turned out to be a maze of interconnected compartments of multiple shapes that are structured in a wide range of different dimensions. This novel technique thus allows neuroscientists to observe fine structures of the extracellular space and provides insights into the flow of cerebrospinal fluid in the brain. —PRS

Nat. Nanotech. 10.1038/NNANO.2016.248 (2016).

MATERIALS CHEMISTRY

Reacting into new frameworks

Covalent organic frameworks (COFs) are formed through moderately strong bonds between multidentate centers and organic linkers. One difficulty in using very strong linkages to create more robust materials is that the process of crystallization must allow for error correction, so the linkages must be weak enough to be reversible. Waller *et al.* bypassed this problem by converting the imine linkages in two COFs into stronger amide linkages, using mild oxidizing conditions. Both materials retained their crystallinity and porosity and displayed much greater stability; they were stable after 24 hours in 12 M hydrochloric acid, as well as 1 M sodium hydroxide. —PDS

J. Am. Chem. Soc. 10.1021/jacs.6b08377 (2016).

ELECTROCHEMISTRY

Tracing the trends in oxygen reduction

Fuel cells currently rely too heavily on expensive platinum catalysts to reduce oxygen. Cheaper metals still have not matched the efficiency of platinum. Pegis *et al.* studied a series of well-defined iron porphyrin complexes in solution, in the interest of discerning which factors would be most productive to optimize. They found that the turnover frequencies correlated with overpotential, despite rate-limiting oxygen binding. Further grounds for optimization emerged from distinctions between the iron redox properties and the proton transfer characteristics of substituent interactions in the second coordination sphere. —JSY

ACS Cent. Sci. **2**, 850 (2016).

ANIMAL BEHAVIOR

Love the one you're with

For species living near the poles, the breeding season is short and accelerated, leaving little time to be choosy about finding a mate. Such challenges are increased in species with relatively small numbers or that have broadly distributed mating colonies. Maftei *et al.* observed mating behavior in the rare and poorly known Ross's gull (*Rhodostethia rosea*) at a remote Arctic breeding ground for 3 years. They found that both males and females regularly courted and displayed to individuals from other species. Though this strategy did not result in hybrid pairings, it did seem to help the Ross's gulls develop their mating displays, which may improve their performance when it really counts and members of their own species are available. —SNV

Arctic **69**, 341 (2016).

Ross's gulls court other species when their own species is hard to find.

IMMUNOLOGY

A view to a kill, preventing collateral damage

Natural killer (NK) cells are immune cells that kill virally infected target cells. To do this, NK cells dock with their sickened targets and unleash on them the destructive contents of their cytotoxic lytic granules. Hsu *et al.* looked at the detailed cellular rearrangements involved in killing. They regulated signaling pathways and used acoustic trap microscopy to arrange NK and target cells in such a way that the lytic granules would be released in a directed fashion toward the targets or in a nondirected fashion. Perhaps unsurprisingly, when the NK cells had the chance to line up and release their lytic granules directly toward their targets, fewer bystander cells were damaged. Furthermore, killing of the target cells was more efficient. Inhibiting the microtubule motor dynein or blocking cell adhesion molecules interfered with targeted killing and increased nondirected granule release, thereby damaging more bystander cells. —SMH

J. Cell Biol. 10.1083/jcb.201604136 (2016).

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