

STRUCTURAL BIOLOGY

Building a gate to the nucleus

Nuclear pore complexes form a gateway between the cytoplasm and the nucleus (see the Perspective by Ullman and Powers). Stuwe *et al.* combined structural, biochemical, and functional analyses to elucidate the architecture of a six-protein complex that makes up the inner ring of the fungal nuclear pore. This includes a central trimeric complex homologous to the Nup62 complex found in metazoans that is incorporated into the nuclear pore inner-ring complex. Chug *et al.* report the structure of the metazoan trimeric Nup62 complex. Neither study supports a model in which the pore can dilate and constrict. Instead they suggest a rigid pore in which flexible domains called FG repeats fill the channel and form a barrier that can be traversed by receptors that carry cargos across. — VV

Science, this issue pp. 56 and 106; see also p. 33

PLANETARY SCIENCE

An exoplanet extracted from the bright

Direct imaging of Jupiter-like exoplanets around young stars provides a glimpse into how our solar system formed. The brightness of young stars requires the use of next-generation devices such as the Gemini Planet Imager (GPI). Using the GPI, Macintosh *et al.* discovered a Jupiter-like planet orbiting a young star, 51 Eridani (see the Perspective by Mawet). The planet, 51 Eri b, has a methane signature and is probably the smallest exoplanet that has been directly imaged. These findings open the door to understanding solar system origins and herald the dawn of a new era in next-generation planetary imaging. — BG

Science, this issue p. 64; see also p. 39

GENOME EDITING

Improving gene editing in human T cells

Gene editing holds promise for correcting human disease, but has been hampered by low efficiencies. To address this, Sather *et al.* devised a more effective way to disrupt and replace the CCR5 locus in human T cells, a procedure known to improve HIV clearance. Serotype 6 of an adeno-associated viral vector worked particularly well for the delivery of nucleases and repair templates to primary human T cells, achieving efficient gene editing rates and little toxicity. The nuclease they used (megaTAL) generated homology-directed repair (rather than nonhomologous end-joining repair) and so could both delete and replace the target locus. When inserted into the locus, chimeric antigen receptors and an HIV fusion inhibitor ameliorated HIV infection in mice. — KLK

Sci. Transl. Med. **7**, 307ra156 (2015).

POLYMER CHEMISTRY

Transient polymer links are better

Very long polymer molecules elongate in shearing flows. This ordering of the chains lowers the viscosity of small-molecule solvents. The chains also reduce the dangers of misting during explosive spreading of the solvents. However, the long polymer chains degrade during normal fuel handling and clog pumping equipment. Wei *et al.* used telechelic polymers—short chains with reactive end groups—to form extremely long chains in organic solvents (see the Perspective by Jaffe and Allam). These reformable polymers offer the potential for better fuel safety without the drawbacks of covalently bonded long-chain polymers. — MSL

Science, this issue p. 72; see also p. 32

IN OTHER JOURNALS

Edited by Sacha Vignieri and Jesse Smith



Genes recruited during “pregnancy” in male seahorses are homologous to those used by females across taxa

REPRODUCTIVE EVOLUTION

Like mother, like father

Live birth has evolved repeatedly across the major taxonomic groups, but in the vast majority it is the female that does the brooding. The most developed case of gender reversal in brooding occurs among seahorses. In some seahorse species, males not only incubate the eggs internally but develop a pouch structure that is strikingly similar to a uterus in terms of form and function. Whittington *et al.* produced a detailed transcriptome of the genes up-regulated during pregnancy in male *Hippocampus abdominalis* and found that those involved in embryo growth and support functions, such as nutrient transport and waste removal, were generally homologous to those seen in pregnant female mammals and reptiles. Thus, it seems that the pregnancy pathway is much the same whether fish or mammal, female or male. — SNV

Mol. Biol. Evol. **10.1093/molbev/msv177** (2015).

SUPERCONDUCTION

Building a nanowire superconducting qubit

A major ingredient of a superconducting qubit is a Josephson junction, typically containing an insulator that acts as a bridge (“weak link”) between two superconductors. Larsen *et al.* and de Lange *et al.* fabricated superconducting qubits that,

instead of an insulator, used a semiconducting nanowire as the weak link. Both groups used InAs nanowires, in one case enclosed in a shell of superconducting Al and in the other contacted by superconducting NbTiN. The researchers controlled the frequency of the qubit—a complex operation in the conventional setup—by simply modulating the carrier