developmental stage, and nutritional environment. Kobayashi et al. identified Holliday junction resolvase as a key factor in the dynamism of chloroplast nucleoids in the unicellular green algae Chlamydomonas reinhardtii. The gene encoding the resolvase is ubiquitously conserved among green plants. Disruption or down-regulation of this gene also disturbed chloroplast nucleoid organization and segregation in the land plant Arabidopsis thaliana. —PJH

Science, this issue p. 631

ENDOCYTOSIS
ER-PM contacts in nonclathrin endocytosis

The epidermal growth factor receptor (EGFR) is internalized through both clathrin-mediated endocytosis and nonclathrin endocytosis (NCE). The two pathways act in concert to sustain EGFR signaling or its long-term attenuation. The mechanistic underpinnings of EGFR-NCE are unclear. Caldieri et al. used a variety of cell and molecular biology approaches to identify nine regulators of EGFR-NCE (see the Perspective by Tan and Anderson). They also identified an additional cargo of the pathway (CD147). One of the regulators of the pathway was the endoplasmic reticulum (ER)–resident protein reticulon 3 (RTN3). Unexpectedly, EGFR-NCE required the formation of specific contacts between the plasma membrane (PM) and the cortical ER, mediated by RTN3. ER-PM contact sites were required in the very early steps of the internalization process for the maturation of NCE tubular intermediates. —SMH

Science, this issue p. 617; see also p. 584

FOREST ECOLOGY
Mapping the world’s dry forests

The extent of forest area in dryland habitats, which occupy more than 40% of Earth’s land surface, is uncertain compared with that in other biomes. Bastin et al. provide a global estimate of forest extent in drylands, calculated from high-resolution satellite images covering more than 200,000 plots. Forests in drylands are much more extensive than previously reported and cover a total area similar to that of tropical rainforests or boreal forests. This increases estimates of global forest cover by at least 9%, a finding that will be important in estimating the terrestrial carbon sink. —AMS

Science, this issue p. 635

IMMUNOTHERAPY
Cancer immunotherapy according to GARP

Cancer, like microbes, can adapt to become resistant to a single therapy, making combination therapies the approach of choice. Complementary therapies that decrease immunosuppression may boost the efficacy of immunotherapies. Rachidi et al. found that targeting platelets improved adoptive T cell therapy of multiple cancers in mice. Transforming growth factor β (TGFβ) from platelets decreased T cell function, largely through the expression of the TGFβ docking receptor, GARP (glycoprotein A repetitions predominant). Thus, combining immunotherapy with platelet inhibitors may improve cancer therapy. —ACC


IN OTHER JOURNALS
Edited by Caroline Ash and Jesse Smith

Immune cells in the heart influence contractility.

Macrophages feel the heart beat

Macrophages, best known for their phagocytic function in the immune system, also have multiple tissue-specific functions, not least in the heart. Hulsmans et al. explored the role of macrophages that are abundant in the atrioventricular (AV) node of the mouse. These macrophages express the connexin 43 (CX43) protein that forms gap junctions between cells, which allow electrical coupling of cells. Macrophages forming such connections alter the electrophysiological function of cardiomyocytes. Deletion of the CX43 protein from macrophages delays conduction by the AV node, and ablation of macrophages blocks conductance of atrial impulses to the ventricles. Macrophages thus influence normal heart contraction, but, because of their alternative function as immune effectors, they might also contribute to heart abnormalities associated with inflammatory diseases. —LBR


ARTHITIS
Targeting senescence to combat osteoarthritis

During senescence, cells remain in a state of growth arrest. Accumulation of similar nonfunctional cells has been linked to chronic inflammatory diseases and degenerative disorders. Inflammation after joint injury is a common sequela. Jeon et al. sought to understand whether senescence was
CROP SCIENCE

Crop resistance to parasites

The parasitic weed *Striga* infests a large proportion of cereal crops in Africa and parts of Asia, which has a devastating effect on farming, particularly in subsistence communities. An obligate parasite, *Striga* requires a chemical signal from the host plant to germinate, offering an avenue for genetic improvement of host crops. Gobena et al. studied the difference between sorghum strains associated with high and low *Striga* germination levels and mapped a mutation associated with low *Striga* germination (*LGS1*) to a previously uncharacterized sulfotransferase gene. Deletion of this gene does not result in reduced levels of root chemical signaling, but rather in a change in the composition of chemicals exuded from the root. Identification of this gene could allow marker-assisted breeding to generate sorghum varieties with reduced *Striga* infestation. —CHG


PHYSICS

An elusive magnet in an atomic cloud

Whether repulsive interactions alone can cause a system of electrons to become ferromagnetic is an open problem in condensed matter physics. One way to tackle it is to use cold fermionic atoms of opposite spins instead of electrons and generate interactions by tuning an external magnetic field. However, such atoms are much more likely to form a superfluid than a ferromagnet. To avoid the superfluid pairing, Valtolina et al. started with an atomic system divided neatly into two clouds of opposite spin, with a barrier separating them. After removing the barrier, they monitored the dynamics of the cloud motion and the spin diffusion. For some interaction strengths, the dynamics were consistent with those of a metastable ferromagnetic state. —JS

Nat. Phys. 10.1038/ NPHY54108 (2017).

ORGANIC CHEMISTRY

Quantum dots visibly forge carbon bonds

Chemists are late to the game that plants play of using visible light to make carbon–carbon bonds. Nonetheless, they have made up for lost time over the past decade, applying light activation of precious iridium and ruthenium catalysts to a wide variety of molecular transformations. Zhang et al. and Caputo et al. now report that nanoparticulate quantum dots (cadmium sulfide and cadmium selenide, respectively) can also catalyze several of these photo-redox reactions. Composed of more abundant elements, these quantum dots further benefit from high light-absorption cross sections and straightforward tunability through variation of diameter and surface ligand structure. —JSY


OUTER SOLAR SYSTEM

A probable dwarf planet beyond Neptune

The cold outer reaches of our solar system host an array of orbiting bodies and may even hide a distant planet. Gerdes et al. have searched for new bodies in that region by using an optical survey that is primarily used for cosmology. They discovered an object, designated 2014 UZ224, located 92 times as far from the Sun as Earth—making it the second-most distant body whose orbit is known. Follow-up millimeter-wavelength observations allowed them to measure the thermal emission and thereby estimate the body’s size and temperature. With a diameter of around 600 km, it is probably a dwarf planet. —KTS


TRANSCRIPTION

Selection acts on the neighbors

To make a protein, three base pairs of DNA are copied into an RNA transcript that is then translated by a ribosome into amino acids. However, three-base-pair codons are commonly redundant in their translation into amino acids. Chevance and Hughes show that even when the amino acids do not change, the sequences of the codons proximal to a specific DNA sequence may affect the number and rate of transcripts formed, and hence gene expression, in the bacterium *Salmonella*. Modeling shows how the composition of successive codons can influence translational efficiency profoundly in some cases or not at all in others, depending on the species. —LMZ


Witchweed (*Striga*) is a parasitic plant that devastates arable crops in the tropics.