Continued from page 15

ent laboratories. Unfortunately, the malaria samples had somehow become contaminated with REVs, possibly during serial passage using mammalian blood or possibly by contact with the bêtes noirs for pathogen spillovers—bats. The REV was then able to integrate into bona fide bird viruses, and thence into vaccine strains, and ineluctably became one of the hazards modern poultry have to face. — CA

PLOS Biol. **11**, e1001642 (2013).

MATERIALS SCIENCE

Doping by Diffusion

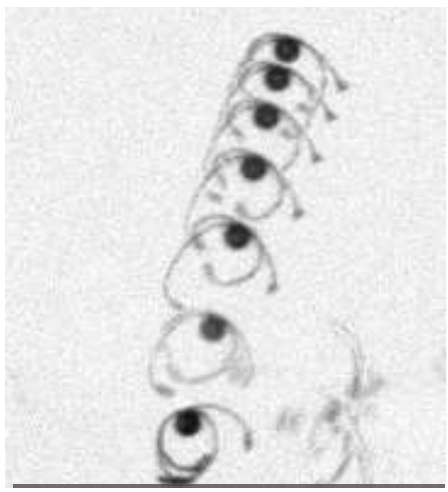
The electronic properties of bulk semiconductors can be improved by doping, the deliberate introduction of impurity atoms that increase the number or mobility of charge carriers. Usually, just doping the surface of a bulk semiconductor is sufficient, but for semiconductor nanocrystals, the entire particle needs to be doped to achieve the desired properties. Vlaskin *et al*. report on the doping of CdSe nanocrystals with Mn ions, a process that has proven especially difficult at the high levels desired to impart magnetic properties. Hot-injection synthesis of Mn-doped CdSe nanocrystals (where the particles rapidly form in solution from precursors) results in particles that are depleted in Cd^{2+} at the surface. The authors were able to incorporate Mn^{2+} ions uniformly by starting with CdSe seed nanocrystals, which were injected as a solution along with selenium into a solution of manganese acetate at ~300°C for times varying from seconds to several hours. This thermodynamically controlled process, which uniformly increased the size of the seeds, resulted in diffusion doping of the entire crystal without requiring Cd^{2+} ion ejection and allowed doping levels of Mn^{2+} as high as 20% to be achieved. — PDS

J. Am. Chem. Soc. **135**, 10.1021/ja4072207 (2013).

PLANT SCIENCE

Dessicated Dispersal

Equisetum plants (horsetail) have a lineage dating back to the Paleozoic, and these unusual vascular plants reproduce with spores. Marmottant *et al.* have now taken a closer look at how the spores get around. The spores have four long legs that, in humid conditions, are wrapped closely around the spore body, but as the relative humidity decreases, the legs straighten out. The change in shape is driven by the two-layer construction of the legs, with one layer having a greater tendency than the other to change volume in response to moisture, similar to the change in shape of old bimetallic thermostats in response to changes in temperature. The process is reversible, with legs furling and unfurling as the humidity goes up and down. In the naturally moist habitat that *Equisetum* frequents, a shaft of bright sunshine or a dry breeze can effectively change the local humidity surrounding a spore. As the legs move, so moves the spore. Occasionally the legs get stuck on each other, and, when they get unstuck, the release of elastic energy



can propel the spore into a rather large leap. Whether crawling or leaping, repeated cycles of motility would increase the dispersion of these otherwise sedate plants. — PJH

Proc. R. Soc. B **280**, 10.1098/rspb.2013.1465 (2013).

MICROBIOLOGY

Parasite Palmitoylation

The molecular mechanisms involved in the active invasion processes used by apicomplexan parasites such as *Toxoplasma gondii* to enter host cells are not well understood. Compounds that inhibit—or in some cases enhance—the infectivity of *T. gondii* parasites were recently identified in a chemical-genetic screen. How such small-molecule invasion enhancers might work, however, remains obscure. Child *et al.* have now been able to identify the molecular target of one class of small-molecule enhancers: a *Toxoplasma* enzyme, palmitoyl protein thioesterase-1 (TgPPT1). Inhibiting this thioesterase enhanced the invasive capacity of tachyzoites by increasing parasite motility and promoting secretion from micronemes, the parasite's invasion-associated organelles. TgPPT1 acts as a depalmitoylase, removing fatty acids that have been attached to proteins post-translationally. Thus, reversible palmitoylation within the parasite appears to play a key role in the invasion of host cells by *T. gondii*. — SMH

Nat. Chem. Biol. **9**, 651 (2013).

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