Canola pollen gets around

Concerns over gene flow from genetically modified (GM) plants to their weedy or non-GM counterparts continue to restrict exploitation of GM crops, but there has been little "real life" evidence to alleviate or confirm these fears. Now, Mary Rieger and a team of Australian researchers present evidence that herbicide resistance can spread from GM to non-GM canola plants—albeit at low rates—over much longer distances than anticipated (*Science* **296**, 2386–2388, 2002). During 2000, Australians first planted a variety of canola bred to be resistant to herbicides inhibiting acetolactate synthase—not a GM variety but one created via mutagenesis. Using this as a natural "field trial," the researchers monitored contamination of 63 adjacent fields planted with non-GM canola. Herbicide resistance was present in 63% of the fields tested, although the frequency of contamination never exceeded 0.2%—well below the 0.5% level recently deemed acceptable by European regulators. However, the frequency of resistance was consistent over distances up to 3 km from the GM fields, suggesting that existing isolation protocols may be inadequate. Gene flow might be influenced by a variety of factors including size of field and behavior of insects, and such information will be key to intelligent policy making. *JJ*

Telling your left from your right

Many therapeutic molecules have both left- and right-handed chiral forms (or enantiomers), but often only one is active in humans. However, the manufacture of chirally pure forms of medicines is difficult and costly. Now, researchers in Florida and Espoo, Finland have devised miniature filters that can fish out one enantiomer from a mix (*Science* **21**, 2198–2200, 2002). First, the researchers generated membranes from thin films of alumina, which bore cylindrical pores of nanometer diameter. Then they synthesized silica nanotubes inside the pores, attaching antibodies with selectivity for one enantiomer of an inhibitor molecule of the aromatase enzyme. The researchers found that they could fine tune the binding affinity of antibody for the enantiomer by changing the concentration of an added solvent, dimethyl sulfoxide. The membranes could transport the enantiomer of interest around twice as quickly as its counterpart, allowing separation of the two chiral forms. As antibodies can be generated to any drug enantiomer relatively easily, this technique could have wide application for the production of chirally pure drugs. The researchers also plan to enhance the throughput of the membranes by altering their composition, or apply force. *LF*

Research news briefs written by Liz Fletcher, Judy Jamison, and Peter Mitchell.

Upright and uptight protein chips

The development of a robust protein "chip" requires that capture proteins be attached to the chip platform in a manner that does not disrupt their function. Until recently, the only method studied involved tagging proteins with histidine and binding them to nickel-coated slides, but the protein binding was weak and readily disrupted by washing. Now, researchers at the National University of Singapore have generated an avidin-biotin-based system that can more robustly attach proteins while retaining their correct three-dimensional structures (*J. Am. Chem. Soc.* ASAP article; published online July 2, 2002, DOI 10.102/ja0265963). Shao Yao and colleagues expressed proteins (green fluorescent protein (GFP), maltose binding protein, and glutathione-*S*-transferase) linked to intein tags on their C termini, and biotinylated these tags to generate biotin-linked proteins. The biotinylated proteins were then applied to avidin-coated slides, and instantly formed very strong avidin–biotin bonds. The researchers confirmed that the proteins retained their three-dimensional structure (by monitoring the native fluorescence of GFP) and function (by measuring the selective binding of glutathione to glutathione-*S*-transferase). Yao says that the team is now testing the system on 200 yeast proteins, and believes that the system lends itself to high-throughput expression and plating in even greater numbers. *LF*

Multicolored DNA

Multicolored nanocrystals, also called quantum dots, can be used to sort out different gene sequences from one another more efficiently than is possible using organic fluorescent dyes, say Paul Alivisatos and colleagues at the University of California (Berkeley, CA). The researchers made four separate solutions of cadmium selenide/zinc sulfide nanocrystals—colored red, orange, yellow, and green—and covalently linked each to a different oligonucleotide sequence (*J. Am. Chem. Soc.* **124**, 7070–7074, 2002). They then applied these labeled probes to a gold-coated microarray chip on which complementary DNA strands had been immobilized. When viewed through a confocal microscope, the various colored nanocrystals hybridized only to the microarray regions containing their specific target DNA. Alivisatos says that, because the nanocrystals are only 7–14 nm in diameter, they may be able to gene map combed DNA at resolutions below one kilobase, much better than is achievable with ordinary organic dyes. They are now working to improve their technique to detect single base-pair mismatches *PM*

Cancer killer mailed direct

A clever combination of new drug delivery and gene therapy strategies has successfully shrunk tumors in mice (*Science* **296**, 2404–2407, 2002). A team of researchers lead by David Cheresh of The Scripps Research Institute (La Jolla, CA) was searching for ways to better target gene therapy to the endothelium of blood vessels, for example as anti-angiogenesis agents. To do this, the team generated nanoparticles from lipids linked to a ligand for the integrin αvβ3 receptor—a receptor that is expressed on growing, but not mature, blood vessel walls. The nanoparticles were loaded with a mutant version of the *Raf-1* gene, which can be used to trigger apoptosis of new blood vessels. In theory, the αvβ3 ligand latches onto the growing blood vessel walls, encouraging the update of the nanoparticles' toxic payload. In practice, when the gene-loaded nanoparticles were injected into the bloodstream of mice bearing large tumors, both primary and metastatic cancers shrank in size or were eliminated. Few adverse side effects were seen. Cheresh adds, "we think that this strategy may circumvent tumor resistance since we are targeting the vasculature with a death-inducing gene." *LF*