## More bubbly from the vine

Good news for wine lovers: Australian researchers Paul Boss and Mark Thomas report that they have propagated dwarf grapevines that are more fruitful than their progenitors (*Nature* **416**, 847–850, 2002). Most grapevine cultivars are genetically identical because they are derived from cuttings of the same common stocks. However, an ancient cultivar of *Vitis vinifera*, Pinot Meunier, is distinct from the well-known champagne cultivar Pinot noir, growing hairy rather than smooth leaves—the result of a somatic mutation in its epidermal (L1) layer. Boss and Thomas cultured L1 cells, producing plants expressing what they later identified as the mutant gene *VvGAI1* in every cell. Not only were the "L1" plants shorter and stockier than wild-type PM cultivars, but they also produced flowering stems (and therefore fruit) along the entire shoot length rather than only opposite the first few leaves. The researchers later showed that *VvGAI1* was a homologue of the *GA-insensitive* gene in *Arabidopsis thaliana* and the *Reduced height-1* gene in wheat, both of which regulate plant growth by controlling the activity of the hormone gibberellin (GA). The mutated gene permanently suppresses GA activity, causing dwarfing but also transforming tendrils into flowering and fruiting stems. Co-author Thomas says that field trials are underway to evaluate plant performance. If these prove encouraging, vineyard owners might have to develop new trellises for these diminutive but fruity plants. *JJ*

## Microbial beach babes

Microorganisms are a rich but predominantly untapped source of valuable biological information and new medicines. However, more than 99% of microbes have proven frustratingly difficult to cultivate in the laboratory, because they wither and die when removed from their native habitat. By simulating the microbes' seaside home, Tammi Kaeberlein and colleagues from the Marine Science Center (MSC) of Northeastern University (Boston, MA) have managed to isolate formerly uncultivatable microorganisms from marine sediment (*Science* **296**, 1127–1128, 2002). The extracted microbes were placed within a diffusion chamber, which permits the exchange of nutrients from a sandy saline layer into the microbial layer but does not allow the cells to move. Although simple, the technique was highly effective: the researchers isolated two previously uncultivated microorganisms, MSC1 and MSC2, and are investigating nine others. Interestingly, MSC1 would grow only in diffusion chambers or in Petri dishes contaminated with MSC2. The researchers suggest that the organisms require environment-related signals from neighboring microbes to grow, which could explain previous difficulties in culturing pure isolates. *CM*

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## Membrane proteins arrayed

Almost half of all drug targets are membrane-bound proteins, such as the G-protein-coupled receptors (GPCRs) and neurotransmitter transporters, but creating arrays ("protein chips") of such structures is a challenge. The microchip must not only *not* denature the protein but also favor binding of suitable membrane lipids. Joydeep Lahiri and colleagues at Corning (Corning, NY) have gone some way to developing a suitable chip, using slides imprinted with patches of "membrane" (*J. Am. Chem. Soc.* **124**, 2394–2395, 2002). The team coated glass slides with γ-aminopropylsilane, which provided a stable substrate for membrane-like lipids imprinted in spots on its surface. Next, three different GPCRs were loaded into the membrane patches, and incubated with relevant fluorescent labels to confirm that the proteins were in a native and functional state. Membrane-bound-protein arrays could be valuable tools for drug discovery. As evidence, the researchers carried out binding assays using fluorescently labeled ligands and unlabeled inhibitors on adrenergic receptor–bearing slides. Concentration–binding relationships provided estimates of receptor–ligand affinities similar to those measured using traditional techniques. Lahiri says that in the future it may be possible to study multiple GPCRs simultaneously, a feat that is currently not possible. *LF*

## Brain drain reversed

In inherited lysosomal storage diseases (LSDs, which include Gaucher and Fabry diseases), lysosomal enzymes, which are key parts of the cell's garbage disposal system, are missing. Cells become clogged with large molecules such as glycolipids and ultimately die. Enzyme replacement therapy offers one effective remedy, but because enzymes cannot cross the blood–brain barrier, the neurological damage associated with these disorders often is untreatable. Beverly Davidson and colleagues at the University of Iowa report the first successful recovery of brain function in mice with the LSD mucopolysaccharidosis type VII, or Sly syndrome (*Proc. Natl. Acad. Sci. USA* **99**, 6216–6221, 2002). Davidson and co-workers injected feline immunodeficiency virus vectors encoding the missing enzyme, β-glucuronidase, into the brains of mice with advanced disease. Histological assays over the following 18 weeks indicated that the enzyme was active beyond the site of injection. Moreover, the treated mice showed dramatic improvements in cognitive function. Microarray analysis revealed a parallel increase in the expression of genes known to be involved in memory and learning. Davidson says: "The upregulation of these genes reveals an enormous level of plasticity in the brain that could be widely applicable to other disease models." *JP*

## Bacteriophage on display

Liquid crystals are particularly valuable in the construction of electronic and optical devices, such as displays. Now, US physicists have built such crystals using genetically engineered bacteriophage hybridized to tiny fluorescent crystals ("quantum dots"). The researchers, at the University of Texas Institute for Cellular and Molecular Biology (Austin, Texas), used a phage display library to select M13 phage that have a special affinity for zinc sulfide, a substance that fluoresces strongly in quantum-dot structures (*Science* **296**, 892–895, 2002). The researchers suspended these 880-nm-long rod-shaped phage in a zinc sulfide solution, whereupon each phage "grew" a 3-nm-wide quantum dot at one end. Because the phage have a paramagnetic protein coat, they behave in solution like liquid crystals, able to line up in a magnetic field and alternately be made opaque or transparent depending on the force field. Engineers can create crystals of different lengths and fluorescence by, respectively, genetically modifying the length of the phage or by selecting phage with affinity for semiconductor materials other than zinc sulfide. *PM*