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VOL. 267 • PAGES 1565-1736

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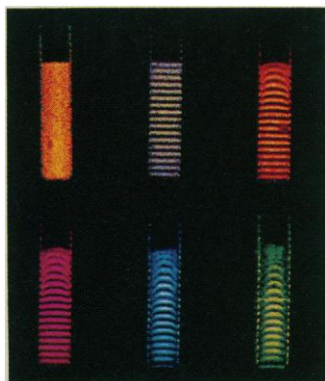


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Bryozoans are a major component of rocky bottom subtidal marine communities. Pictured here is an orange and brown cyclostome bryozoan colony of *Heteropora pacifica* along with articulated, more delicate crisiid bryozoans, the pink branched hydrocoral *Allopora californica*, coralline and fleshy red algae, sponges, and

compound ascidian tunicates. The phylogeny of the lophophorates (bryozoans, brachiopods, and phoronid worms) is discussed on page 1641. [Photo: James G. Morin at the "Pinnacles" off Seventeen Mile Drive, near Monterey, California, at a depth of 25 meters]



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TB drug target



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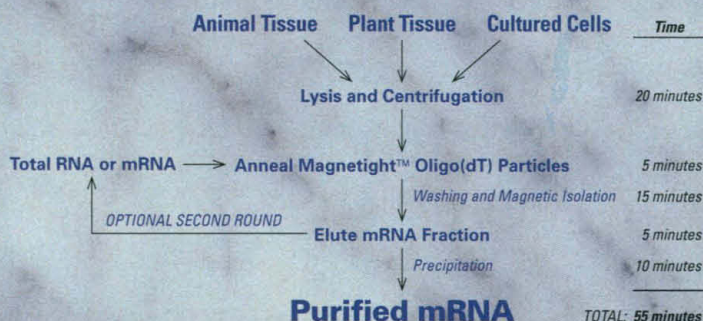
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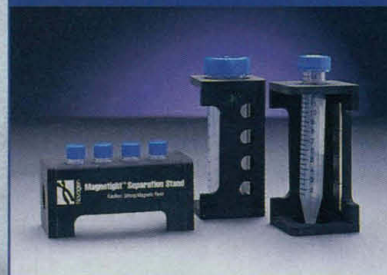
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Dust discriminated

Because the surface of Mars is covered by a dusting of iron-rich oxidized material, spectroscopic observations aimed at establishing the nature of the underlying minerals have been problematic. Mustard and Sunshine (p. 1623) have used high-resolution infrared data from the Phobos mission to show that areas of relatively unaltered surface can be found, and with a new analytical technique deduce mineralogy from reflectance spectra. The composition of volcanic rocks on Mars is distinctly non-terrestrial but resembles that of the SNC meteorites, long thought to be of martian origin.

Stacking up

Studies by Cess *et al.* and Ramanathan *et al.* (*Science*, 27 January, pp. 496 and 499) provided evidence from satellite and surface radiation measurements that clouds trapped significant amounts of incoming solar radiation, a phenomenon that needs to be included in climate modeling. One concern with these studies was that they relied on different measurement systems above and below clouds, but Pilewski (p. 1626) has now confirmed these results in the tropics by using a number of aircraft deploying identical instrumentation and flying at several elevations.

Rough and ready

Raman scattering is used to obtain vibrational spectra of molecules, but the effect is often weak; however, Raman intensities from molecules adsorbed on slightly rough gold, silver, or copper surfaces are enhanced by a factor of about 1 million. Freeman *et al.* (p. 1629) have

self-assembled monodisperse colloidal gold and silver particles into monolayers onto polymer surfaces that bear CN, NH₂ or SH groups. These surfaces can be used as substrates for obtaining surface-enhanced Raman spectra of adsorbed molecules as well as for studying the origin of the enhancement effect.

Poppy seed rolls

Grains and powders exhibit a variety of fluid-like flow patterns, including convection. Ehrichs *et al.* (p. 1632) used magnetic resonance imaging of a column of poppy seeds to obtain three-dimensional images of the convection pattern produced by vertical vibration. In contrast to convective flow in a true liquid, where velocity vanishes at the boundaries, the largest velocities in the column of seeds were in a boundary layer, one or two seed diameters across, at the container walls.

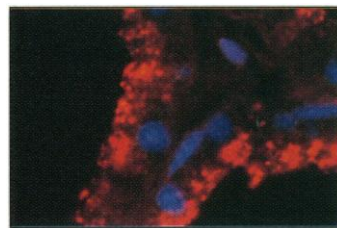
Reductase resistance

The InhA protein of *Mycobacterium tuberculosis* is targeted by the anti-tuberculosis drug isoniazid, but resistant strains of

the bacterium express mutant forms of InhA. Dessen *et al.* (p. 1638) show that InhA is an enoyl-acyl carrier protein (ACP) reductase, an enzyme that is likely to be involved in mycolic acid biosynthesis. Compared to the wild-type enzyme, a drug-resistant form of InhA has a lower affinity for the cofactor NADH (nicotinamide adenine dinucleotide), a defect reflected at the structural level by a perturbation of the NADH binding site.

Peppy newt peptide

Courtship in newts is known to be mediated by chemical signals, and Kikuyama *et al.* (p. 1643) have now isolated from



the male red-bellied newt, *Cynops pyrrhogaster*, a small peptide that acts as a pheromone. The peptide, named sodefrin, attracts female newts of the same species at concentrations as low as 10 nanograms in 3 liters of water. This is the first

pheromone identified in an amphibian species and, appropriately to the newt's environment, is water-soluble, unlike the usually volatile pheromones found in other vertebrates.

Microbes get licked

Tongues are in close and often abrasive contact with the outside world, yet rarely develop serious infection. Schonwetter *et al.* (p. 1645) have isolated from the epithelium of bovine tongues a number of peptides with antibacterial and antifungal properties, the most notable being a member of the β -defensin class, which the authors name lingual antimicrobial peptide (LAP). LAP messenger RNA was found in increased abundance around injured regions of bovine tongues, and its presence was correlated with other signs of inflammation, suggesting that LAP is a key component of the mucosal response to injury.

Understanding ulcers

Investigation of the bacterium *Helicobacter pylori*, now known to be the cause of the majority of gastric and duodenal ulcers in humans, has been hampered for lack of an animal model. Marchetti *et al.* (p. 1655; see also Perspective by Tompkins, p. 1621) have been able to infect mice with newly isolated clinical strains of *H. pylori*, although laboratory strains of the bacterium did not cause infection. Infected mice displayed gastric symptoms as in human disease; antigens obtained from them successfully immunized other mice against infection, indicating that the mouse model may be a practical tool for testing human therapies.

Brain-altering chemicals

The signaling molecules called neurotrophins are essential for brain and neuronal development, and are present, along with their receptors, in the adult mammalian hippocampus and cortex. Cabelli *et al.* (p. 1662) found that neurotrophic factor 4/5 (NT-4/5) and brain-derived neurotrophic factor (BDNF) disrupted the normal segregation of neurons in the visual cortex into blocks corresponding to each eye, while nerve growth factor (NGF) had no effect. The neurotrophins apparently overwhelm the ligand-receptor competition that controls segregation. In a finding that may shed light on the physiological functioning of neurotrophins, Kang *et al.* (p. 1658) showed that application in vitro of BDNF and NT-3 to slices of adult rat hippocampus markedly enhances synaptic response; NGF again had no effect. The enhancement resembles long-term potentiation, although it appears to work by a different pathway.

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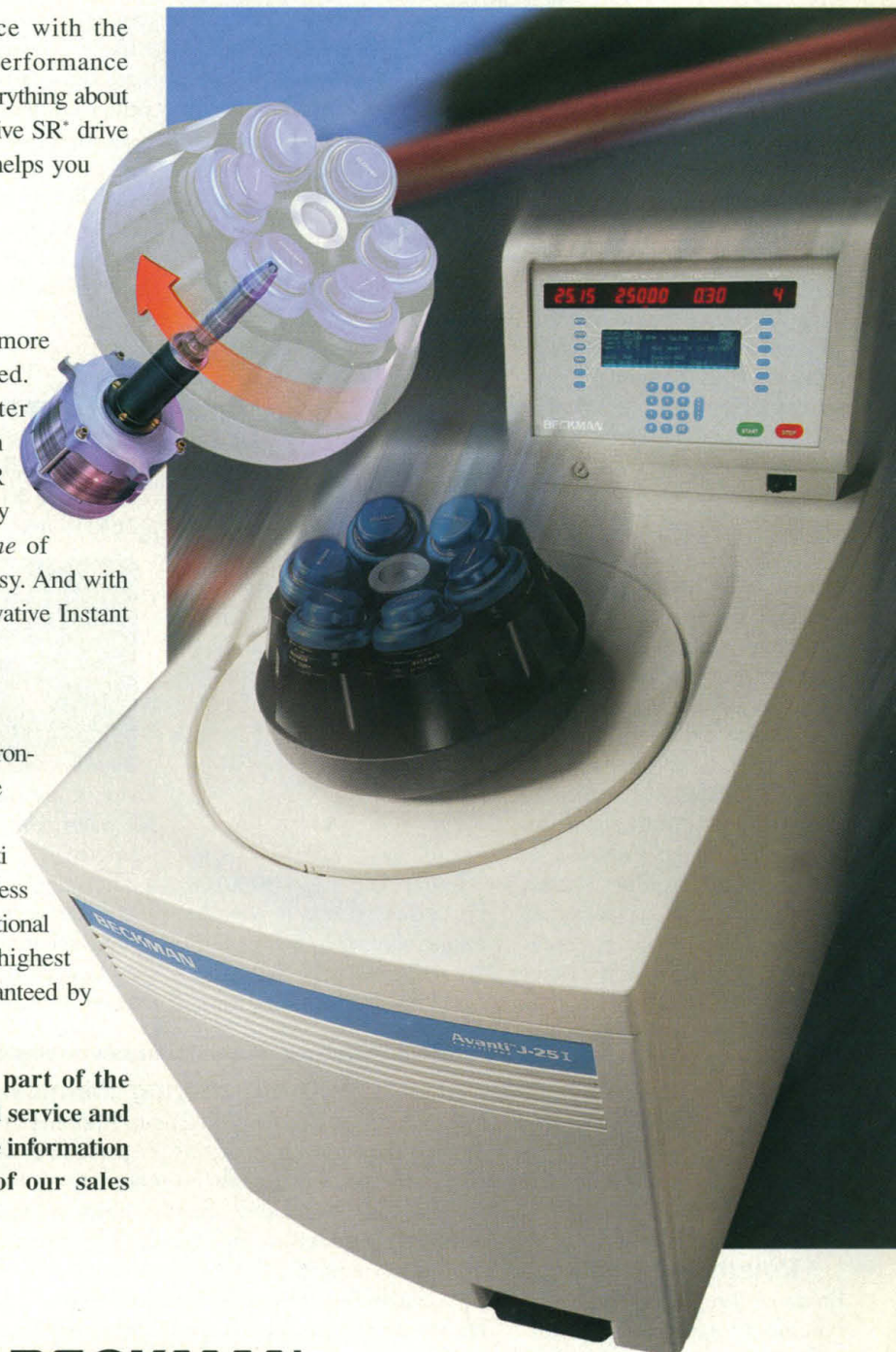
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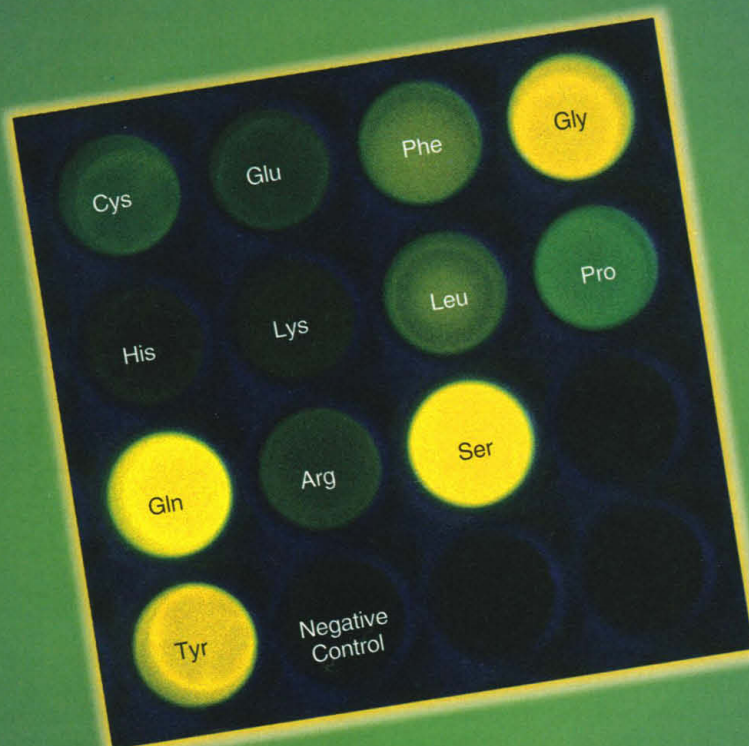
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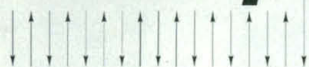
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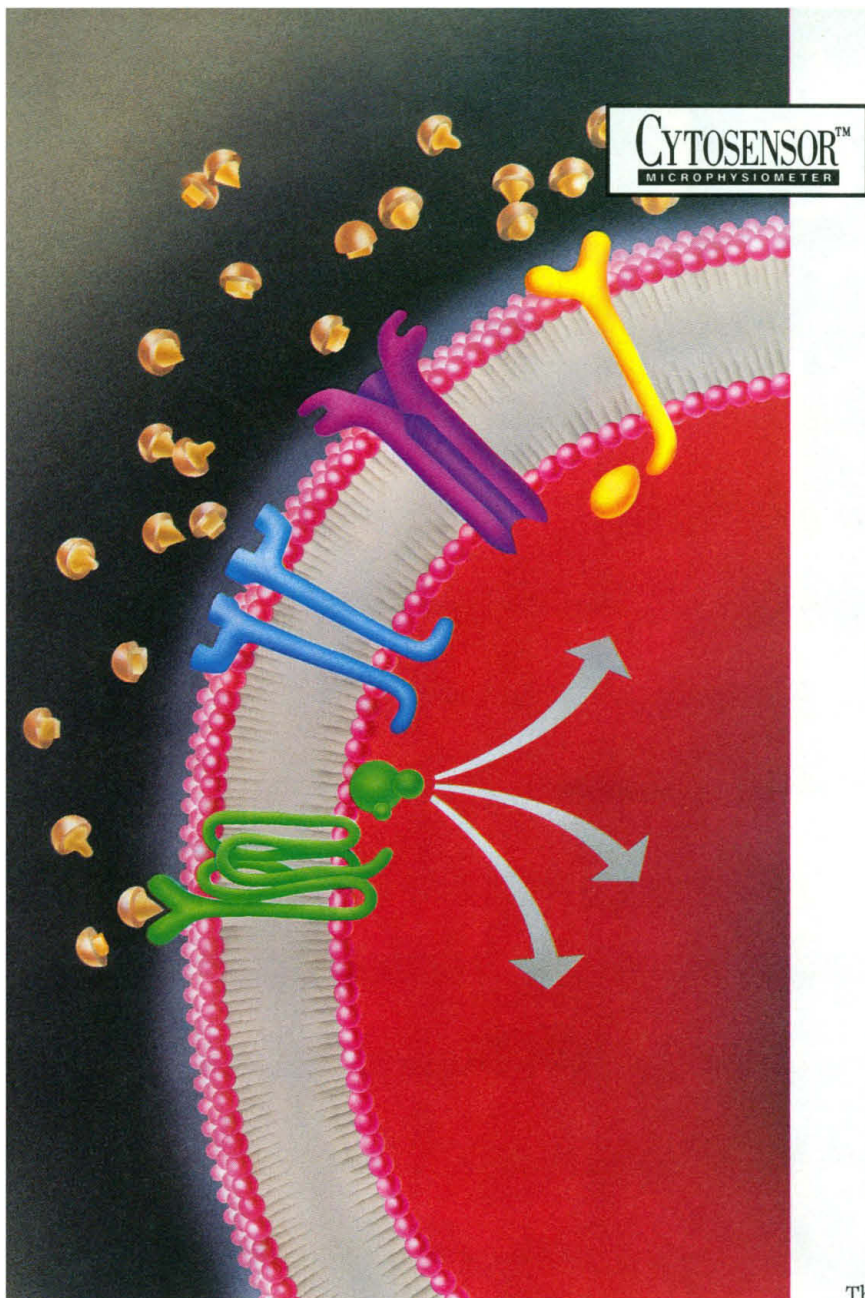
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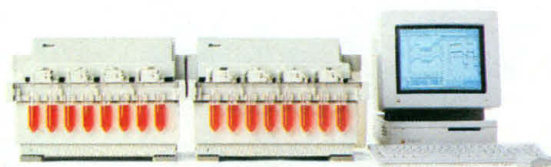
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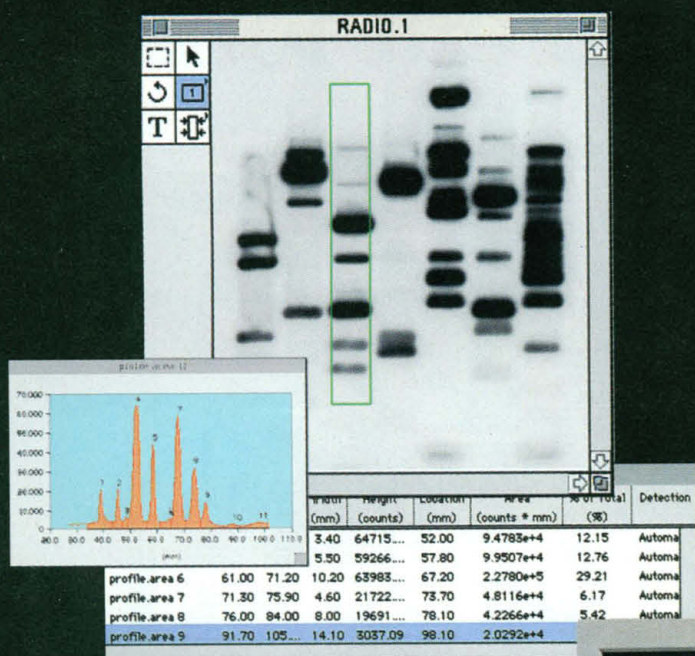


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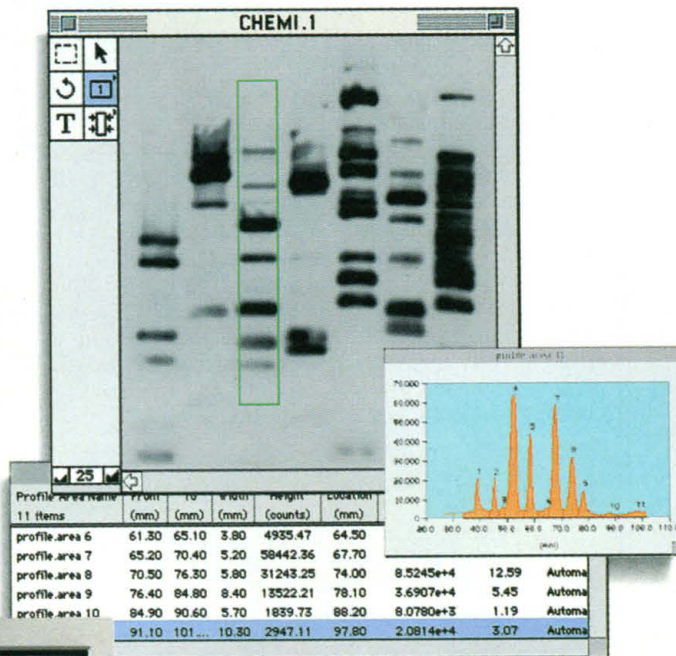
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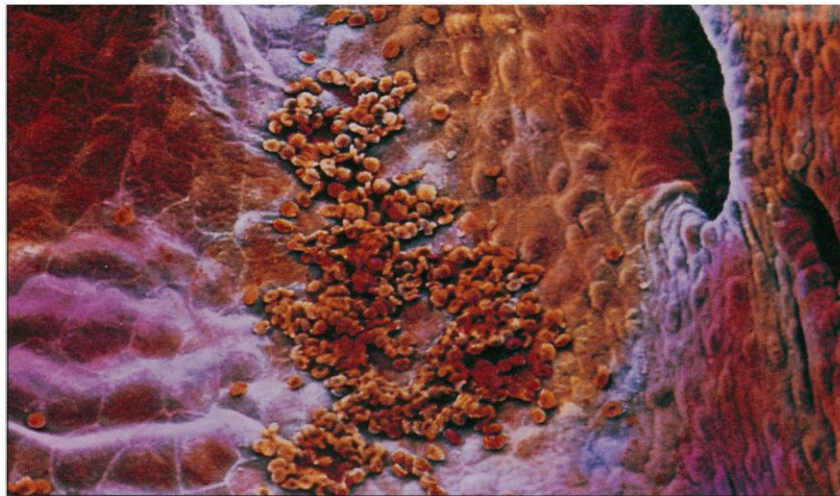
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