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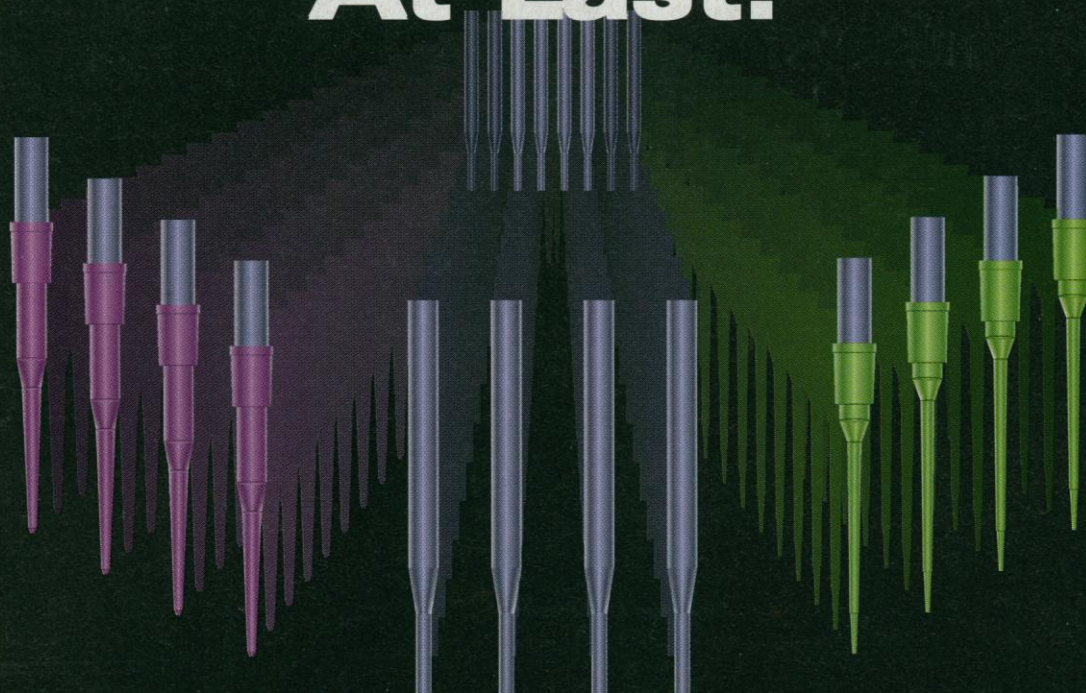
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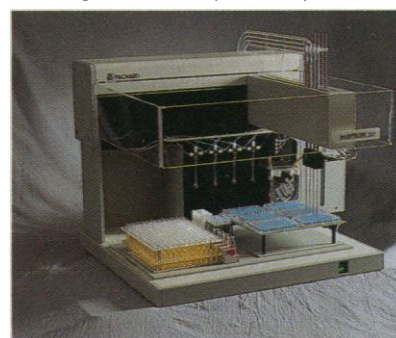
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It's not easy being green



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Genes that
do the
legwork



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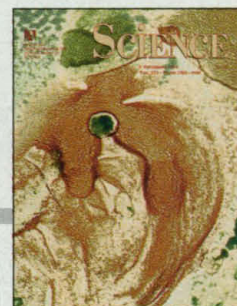
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COVER

Mutants in complementary chromatic adaptation isolated from the filamentous cyanobacterium *Fremyella dislophosphon*. Each of the four mutants shown has a lesion in a separate step of the signal transduction pathway controlling complementary chromatic adaptation

and shows a different color during growth. The red cells (center, red mutants) are response regulator mutants, and the grayish colonies (upper left, black mutants) are defective in a sensor with similarity to plant phytochromes. See page 1409. [Image: Gregory O. Lam-Niemeyer]



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Crystal control

Indicates accompanying feature

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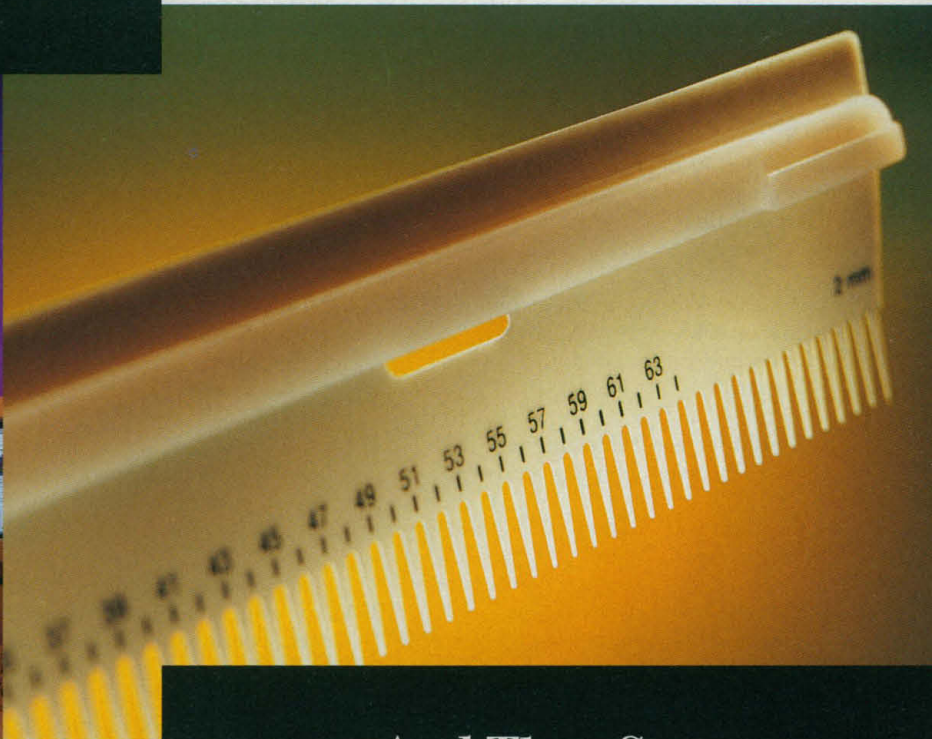
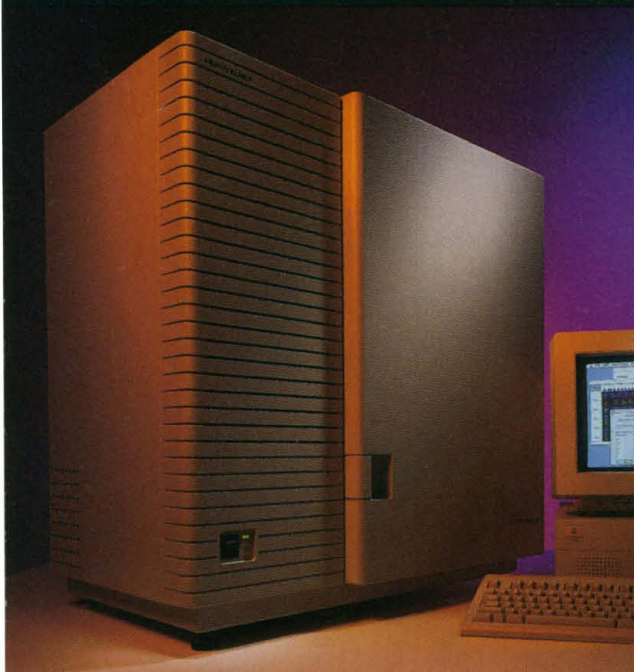
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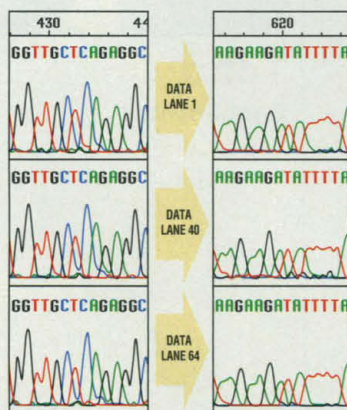
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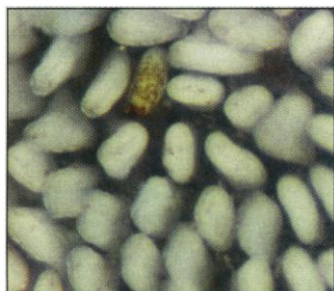
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THIS WEEK IN SCIENCE

edited by DAVID VOSS

Gut development

The mammalian intestine plays host to a diverse and exotic flora—the commensal bacteria. What, if anything, do these gut microbes contribute to the host? Bry *et al.* (p. 1380) show that mice raised under germ-free conditions have abnormal intestinal epithelial glycosylation patterns in comparison to conventionally reared animals. A normal profile can be restored by the introduction of



Bacteriodes thetaiotaomicron, a single component of the microflora; furthermore, a mutant strain of the bacterium that is unable to grow on fucose does not restore the normal pattern of glycoconjugates. Thus, the indigenous bacterial flora appears to be essential for the completion of intestinal epithelial cell differentiation.

Reversing tumorigenesis

Tumor development is thought to occur when cells accumulate a series of genetic changes that help maintain the transformed state. Ewald *et al.* (p. 1384) tested this hypothesis by investigating the reversibility of tumorigenesis in a transgenic mouse model in which expression of the SV40 T antigen gene can be turned on and off. Expression of T antigen in the submandibular gland of the mice produced the characteristic cellular changes that pre-

Made to order

Inclusion compounds, in which guest molecules are trapped within the pores or layers of a host crystal, have been used by Hollingsworth *et al.* (p. 1355) to study crystal growth. They found that *n*-alkanones or alkanediones included in urea crystals could form superstructures with ordering in one dimension (within the channels) or in three dimensions (between adjacent channels), depending on the match to the urea lattice. The more ordered structures grew additional layers as flat plates, whereas the less ordered structures tended to grow long, hexagonal needles off of the protruding guest molecules.

cede tumor development. These changes were reversed when T antigen was silenced after 4 months of expression but not after 7 months of expression. These results support a model of time-dependent tumorigenesis in which cells acquire changes that prohibit reversal of the transformed state, even when the initial transforming stimulus is removed.

Synapse remodeling

Nerves interact with one another at synapses. The strength of synapses can be varied in a process known as synaptic plasticity, thought to play a role in learning and memory. Neurotrophic factors can induce synaptic plasticity. Kang and Schuman (p. 1402) show that the mechanism mediating neurotrophin-induced synaptic plasticity, unlike other forms of plasticity, requires new proteins to be synthesized in the neurons involved, thus remodeling particular synapses.

Seeing with C₆₀

Theoretical studies have predicted that point defects on a graphite surface should exhibit an unusual threefold-symmetric electron-scattering pattern,

but studies with conventional metal tips in scanning tunneling microscopy (STM) do not reveal this. Kelly *et al.* (p. 1371) show that this pattern can be observed when the density of states at the STM tip is modified by adsorbing a single C₆₀ molecule.

Core problem

Some iron meteorites are assumed to be samples of metallic cores from asteroids. Olsen *et al.* (p. 1365) have studied a relatively rare silicate inclusion in a IIIA iron meteorite that provides more details about the origins of this class than from studies of the dominant iron-nickel metal phases alone. The mineral assemblage and isotopic compositions of the inclusion suggests that it is a sample of the lower mantle or that masses of iron may have pooled together in the lower mantle of the asteroid.

Mantle viscosity

The rebound of the Earth's surface following the last deglaciation depends primarily on the viscosity of Earth's mantle, which varies with depth, and the thickness of the ice sheets. These two effects must be sepa-

rated to infer either. Peltier (p. 1359) presents an analysis based on a numerical model of the deforming Earth and fits to coastal records of uplift or subsidence. The analysis suggests that the increase in viscosity from the upper to lower mantle is less than previously thought.

Cargo receptors

Inside cells, various organelles exchange contents by budding and fusion of transport vesicles. Such transport may occur, for example, from the endoplasmic reticulum to the Golgi complex and back again. The mechanisms controlling what will be packaged in the lumen of these vesicles remains unknown. Fiedler and colleagues (p. 1396) present evidence that cargo receptors in transport vesicle membranes interact with specific coat components to drive transport either forward or backward through the secretory pathway.

Volcanic volatiles

Detecting the distribution of magmatic volatiles in regions of active volcanism has been difficult because in most systems the magmatic fluids are swamped by the large amount of meteoric water in vigorous hydrothermal systems. Rose and Davidson (p. 1367) present an investigation of hydrothermal springs in the southern Cascades using carbon isotopes; because magmatic waters are old, they contain essentially no carbon-14. Analyses near Mount Lassen show a broad region where magmatic carbon dioxide was present in the hydrothermal system.

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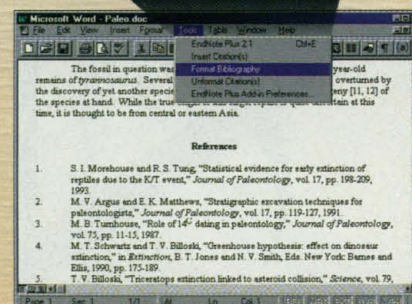
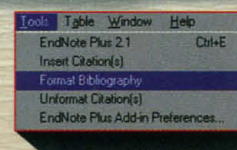
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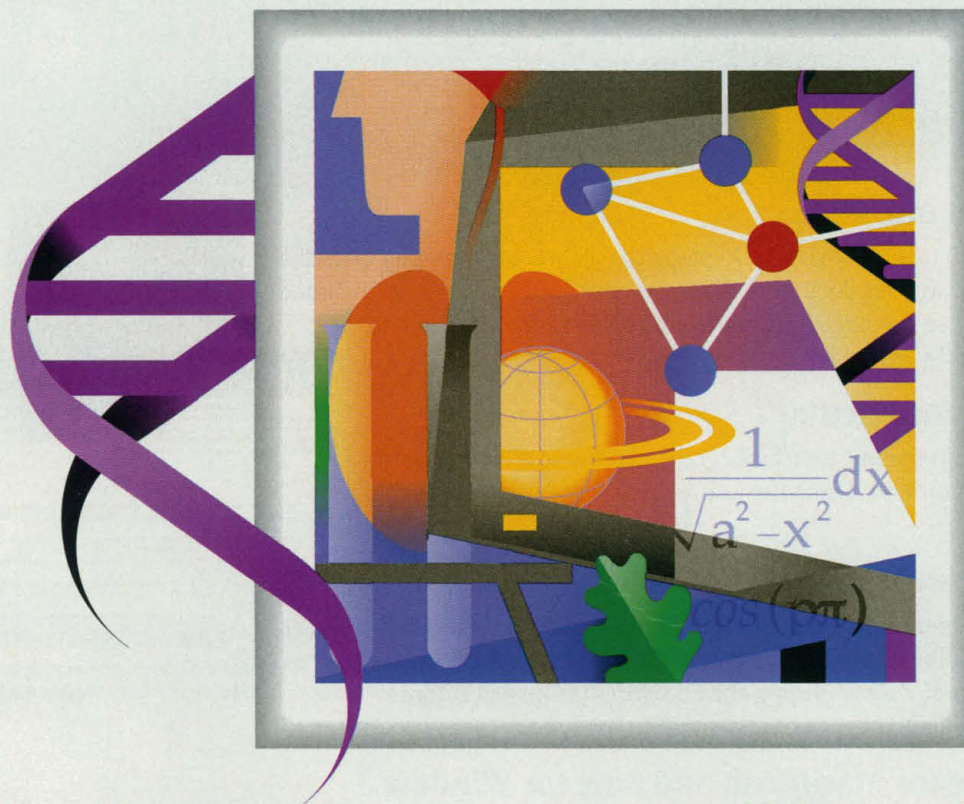
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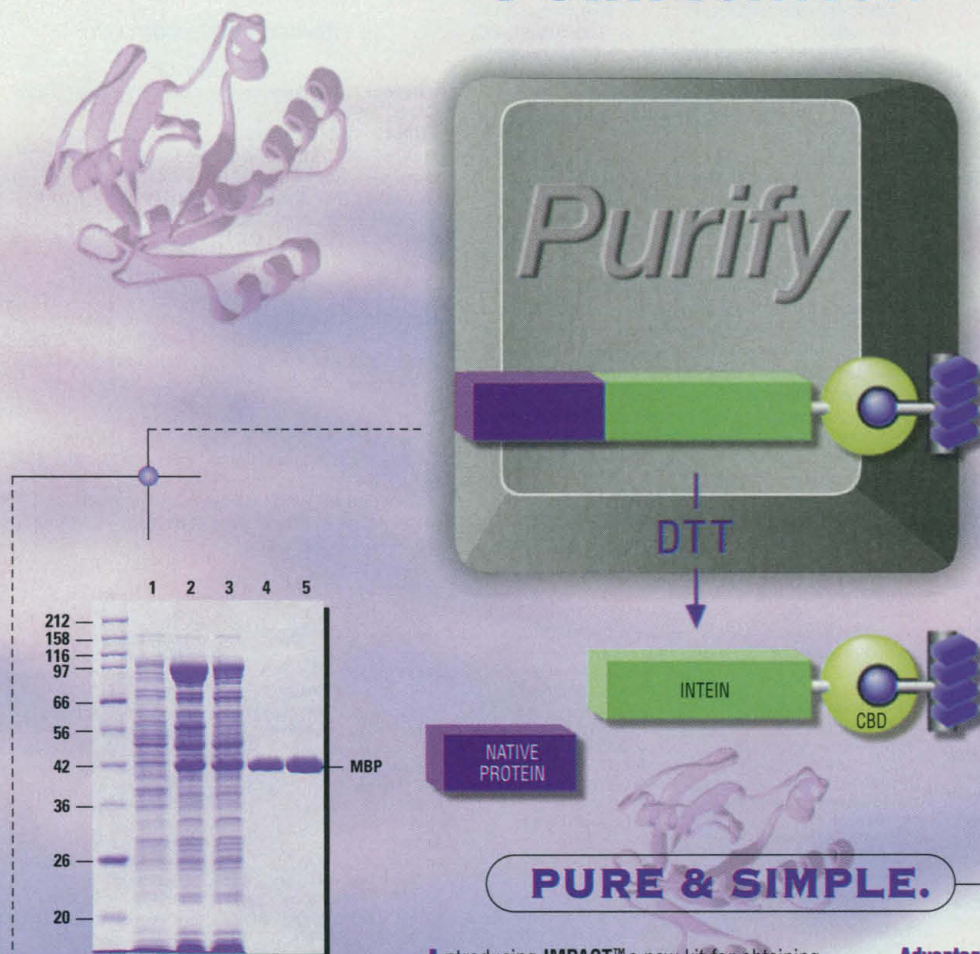
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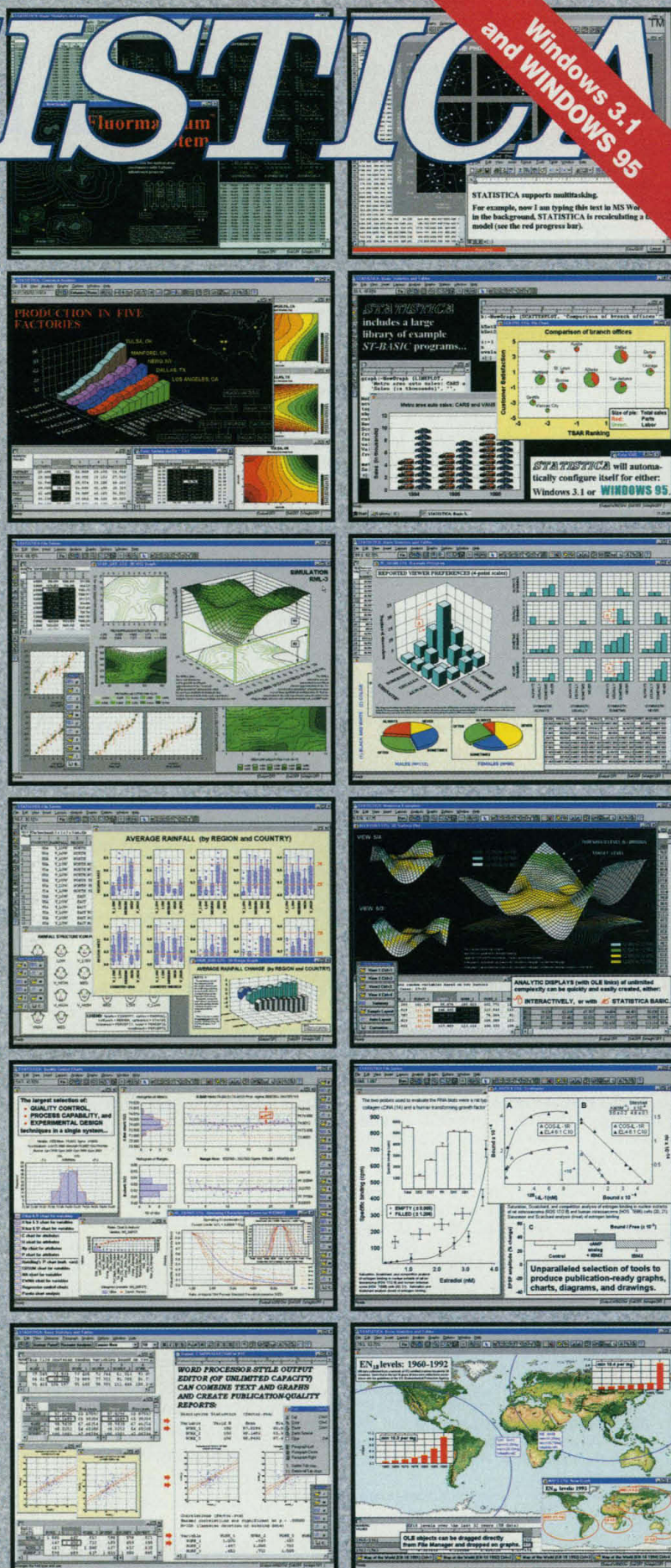


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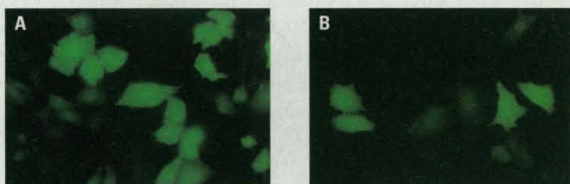
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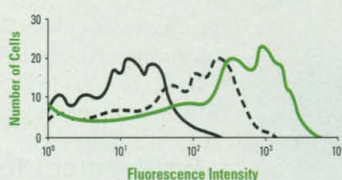
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Expression of pEGFP-C1 (Panel A) and pEGFP-N1 (Panel B). CHO-K1 cells were transfected with the indicated vector using a liposome-mediated method. Cells were fixed in 4% paraformaldehyde/PBS 48 hr post-transfection and examined with a fluorescence microscope using a double-pass filter set for FITC/PI (Chroma Technology Corp. #CZ909).



FACS analysis of CHO-K1 cells expressing GFP with S65T mutation (Heim *et al.*, 1995; solid black line), "humanized" GFP-S65T (Zolotukhin *et al.*, 1996; dotted black line), and Enhanced GFP (GFPmut1; Cormack *et al.*, 1996 & Haas *et al.*, 1996; green line). Enhanced GFP demonstratively gives the most intense fluorescence.

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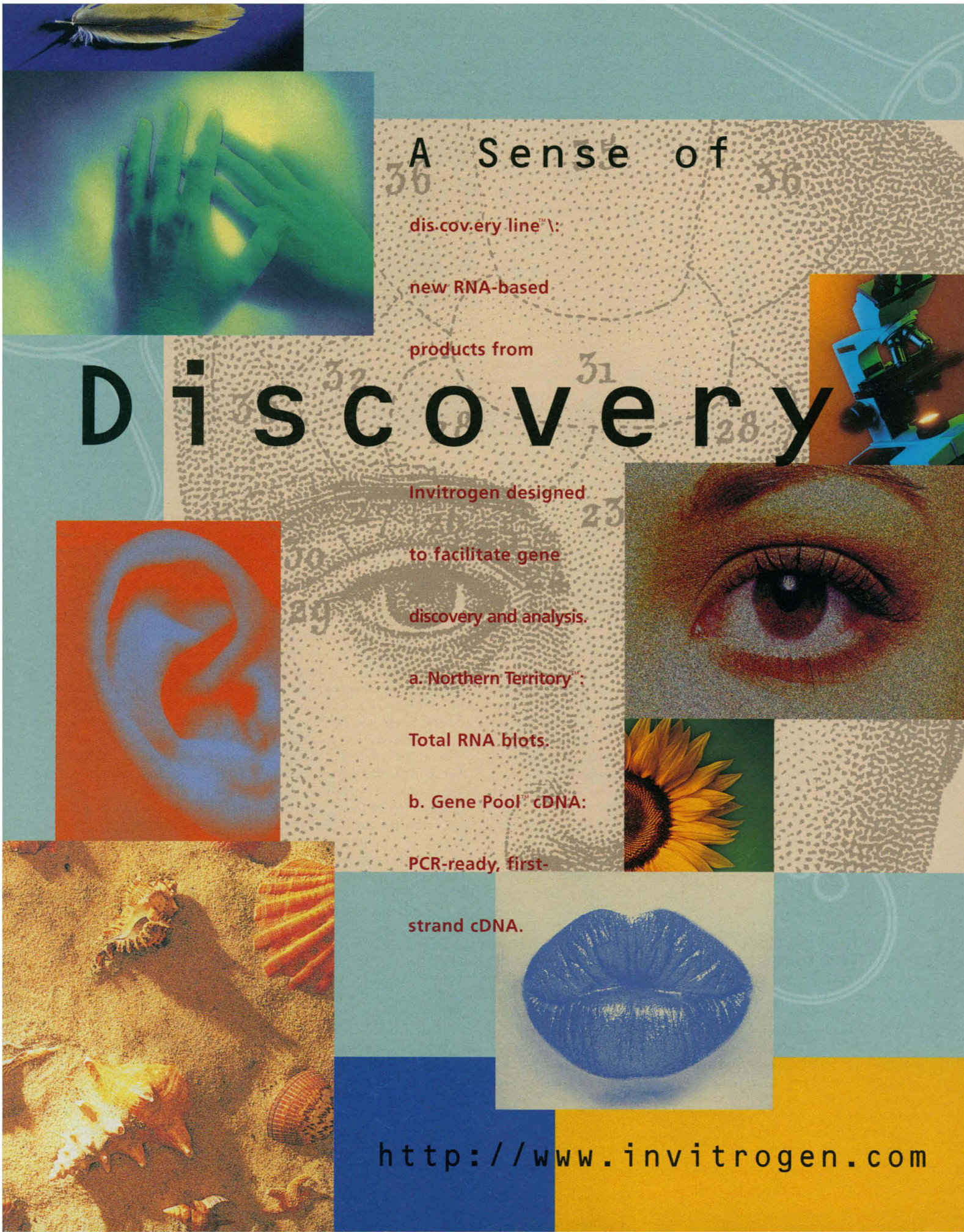
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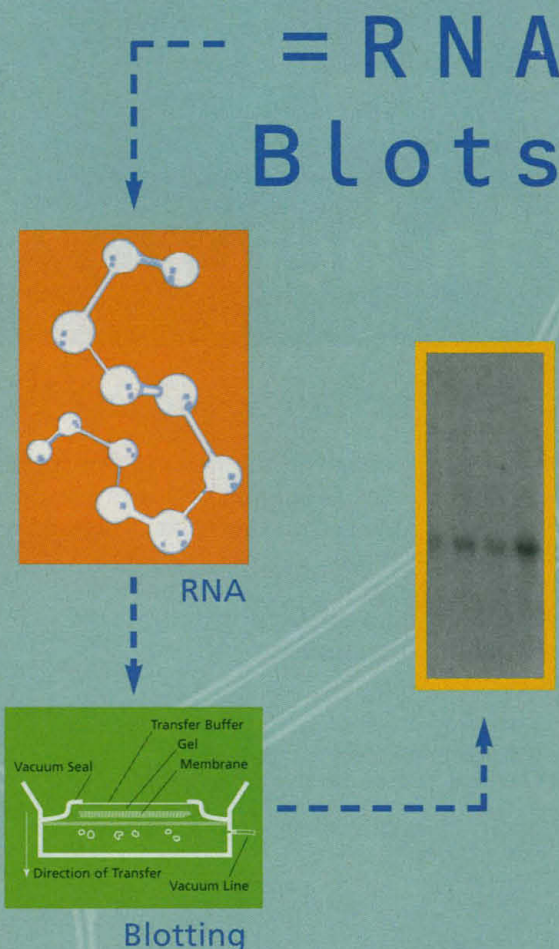
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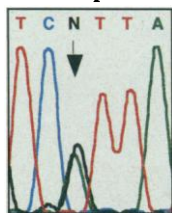
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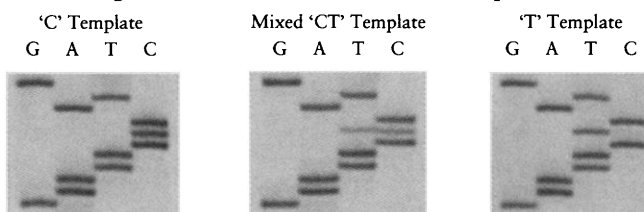
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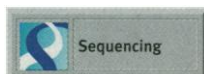
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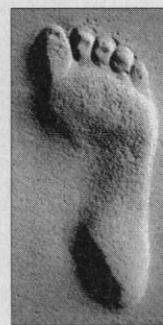
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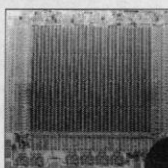
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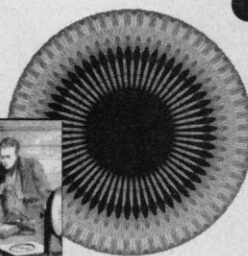
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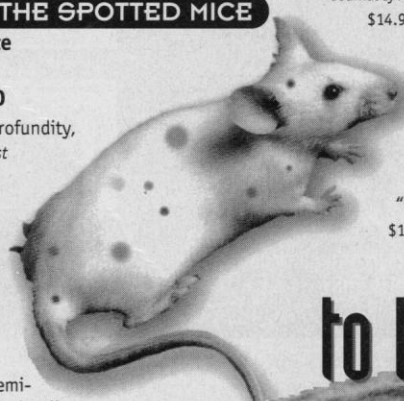
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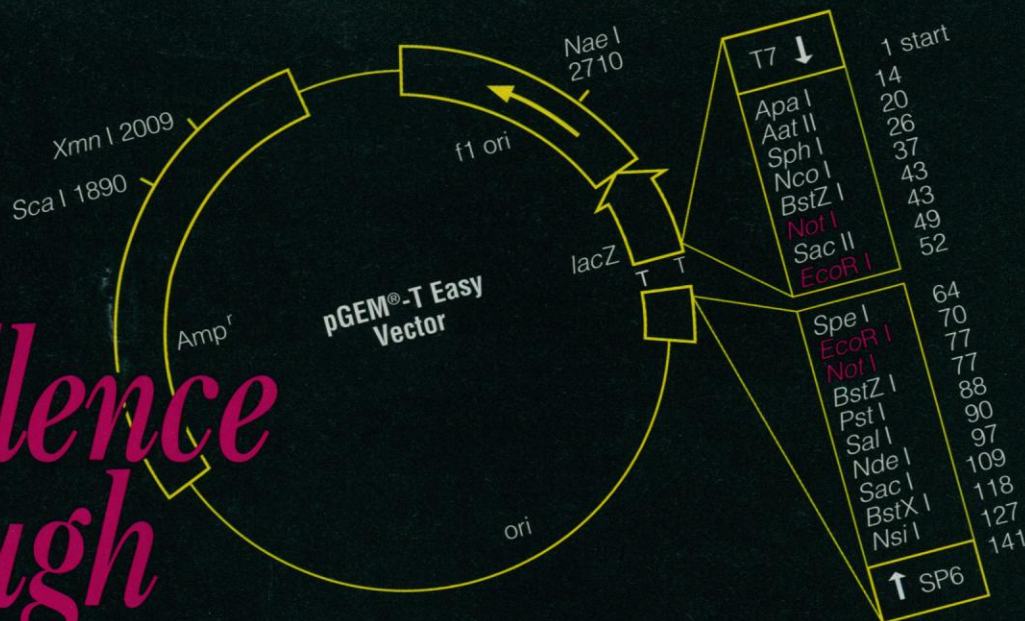
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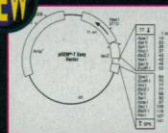
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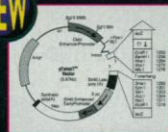
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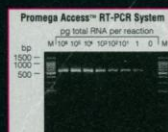
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