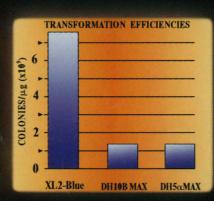


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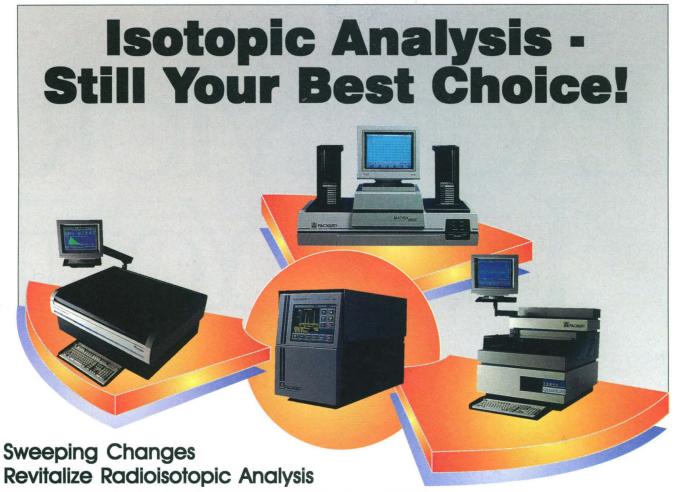
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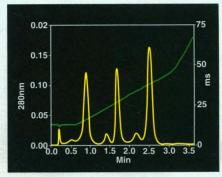
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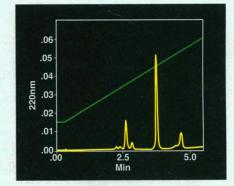
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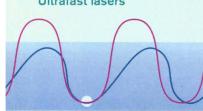
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Fragment of an elastomeric stamp used to print selfassembled monolayers on curved surfaces. The colors are light-diffracted from patterns of micrometer-scale relief features on one surface of the stamp. Contact printing with a flexible stamp circumvents some of the limitations of narrow depth-of-field that restrict photolithography to flat surfaces. (The stamp is 15 millimeters wide and 0.4 millimeter thick.) See page 664. [Image: Felice Frankel]



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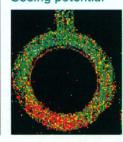
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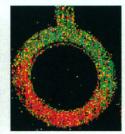




The En-2 gene can substitute for En-1

668 Seeing potential







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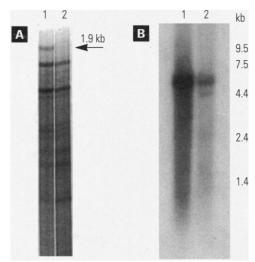
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Differentially expressed RNAs identified by the Delta RNA Fingerprinting Kit (Panel A) and confirmation of results (Panel B). ss cDNA was synthesized from 2 μ g of total RNA from either adult or fetal human liver, then amplified using T8 & P9 primers. Lane 1: RNA fingerprint of adult liver. Lane 2: RNA fingerprint of fetal liver. To confirm the results, the 1.9 kb differentially expressed band was eluted, reamplified, labeled with [cc. 22 P]dATP, then used to probe a Northern blot containing 2 μ g each of poly A⁺ RNA from human adult liver (Lane 1) and fetal liver (Lane 2). On average, about 85% of the bands identified by the Delta RNA Fingerprinting Kit have been confirmed in this manner.

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Catching the waves

Autocatalytic chemical reactions can form spatial patterns such as traveling waves if the concentration of a reactant is controlled by diffusion. Another possibility for wave formation can occur in electrochemical systems, where potential gradients due to the voltage drop at the electrode can control the state of a reaction. Flätgen et al. (p. 668) used a surface plasmon resonance technique to image potential waves on silver electrodes. These waves travel at speeds on the order of meters per second, which is comparable to that of excitation waves in nerve fibers.

Colorful receptor

A molecule designed by Bell *et al.* (p. 671) specifically recognizes creatinine, an end product of nitrogen metabolism that is an indicator of renal function. Binding of creatinine causes proton transfer from one end of the molecule to another and produces a distinct color change. This effect might form the basis for a simpler creatinine assay.

Out of the Red

The diffuse interstellar bands are prominent visible absorption features of the interstellar medium, but their origin, either dust or free molecules, has been difficult to determine. Sarre et al. (p. 674) obtained high-resolution spectra of bands from 579 to 662 nanometers from the Red Rectangle nebula at varying distances from its central A0-type star. Band wavelengths shifted with increasing distance from the star to limiting values that correspond to known values of some of the sharper diffuse interstellar bands, suggest-

Binding, folding, and unraveling

The crystal structure of Bam HI endonuclease bound to 12 base pairs of DNA containing the cleavage recognition element shows that the DNA retains its B-form structure. However, Newman *et al.* (p. 656) found that the enzyme undergoes major changes; subunits rotate, disordered regions fold, and carboxyl-terminal helices disorder to bind to the minor groove and the sugar-phosphate backbone.

ing that these particular bands arise from molecular electronic transitions.

A question of when

Mice with mutations in the En-1 gene die at birth and have large mid-hindbrain deletions, whereas En-2 mutants are viable and have cerebellar defects. Although these genes presumably arose by gene duplication, they are only 55 percent identical, and En-1 is expressed earlier than *En-2* in the presumptive mid-hindbrain domain. Hanks et al. (p. 679; see news story by Marx, p. 633) replaced En-1 by inserting En-2 in the En-1 locus and rescued the En-1 mutants. The En-1 and En-2 proteins have retained similar biochemical activity but have acquired new roles during development through alterations in their expression pattern.

Nested algorithms

When an insect colony builds an intricate nest, how does each individual know what to do at



each step? Theraulaz and Bonabeau (p. 686) developed computer algorithms of building in which large numbers of agents moving at random deposit blocks when they recognize a particular configuration of blocks. Several of the resulting shapes resemble wasp nests.

Better together

Viral resistance limits the usefulness of drugs such as AZT and 3TC in trying to inhibit the replication of HIV in AIDS patients. Larder et al. (p. 696) found from in vitro studies that the phenotype of AZT-resistant mutations of HIV reverse transcriptase was suppressed through a mutation induced by 3TC at residue 184. Mutants resistant to AZT did not develop during a similar in vitro treatment of the wild-type virus with both AZT and 3TC. Patients receiving both drugs developed AZTresistant mutations more slowly over a 24-week trial than patients receiving AZT alone.

Allergy advance

A detailed understanding of allergic reactions is still lacking. Nine years ago, a factor was described that can induce human basophils to release histamine. This histamine-releasing factor (HRF) was dependent on immunoglobulin E (IgE) and defined a heterogeneity in IgE which in turn was linked to the intensity of the allergic reac-

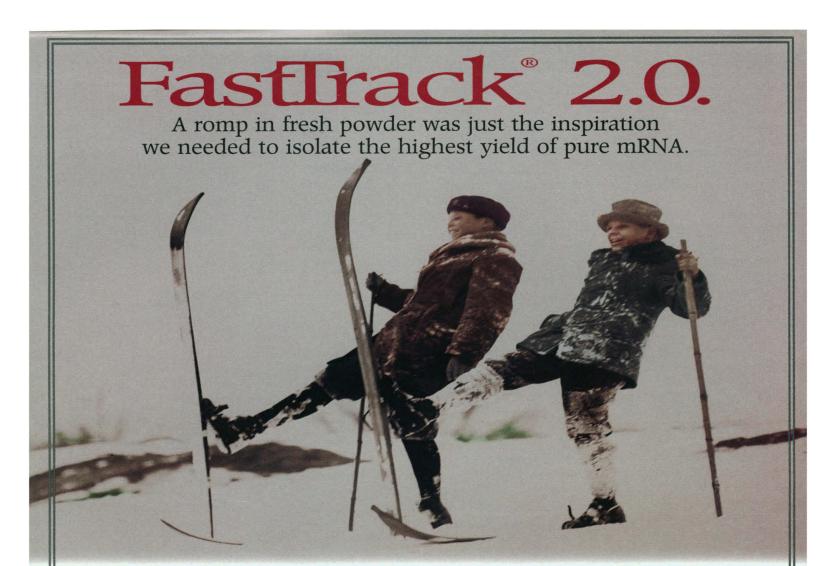
tion in patients. HRF has defied molecular characterization until now. MacDonald *et al.* (p. 688) describe its cloning, sequencing, and expression, opening up new possibilities for understanding and treating allergy.

Double duty

Eukaryotic DNA polymerase β (pol β) has been implicated in the DNA synthesis step of base excision DNA repair. Matsumoto and Kim (p. 699) report that pol B has a second, distinct role in the repair process—it catalyzes the release, by β-elimination, of 5'-terminal deoxyribose phosphate residues from incised apurinic-apyrimidinic sites, which are common intermediates in the repair reaction. The excision activity resides in the amino-terminal 8-kilodalton fragment of pol β . This physical association of the excision and polymerase activities may enhance repair efficiency.

See and do

How does cognition influence motor processing? Pellizzer et al. (p. 702) monitored neuronal activity in the motor cortex of monkeys performing a contextrecall task. The monkeys had to make a directional movement dictated by circumferentially presented stimuli. In an earlier study in which the target was specified by a fixed angular rotation, the summed activity of the neurons shifted smoothly from the orientation of the start signal to the signal plus the angular increment. In contrast, when the direction of the target was specified by the order of presentation, the summed activity displayed a discrete shift from the orientation of the start signal to that of the target.



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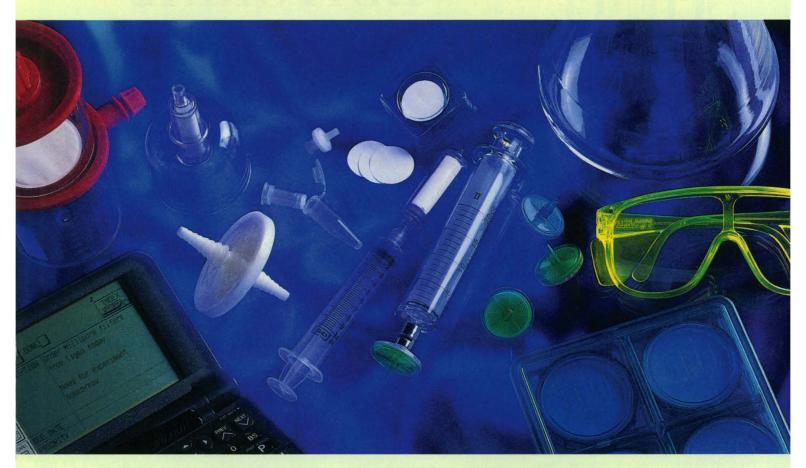
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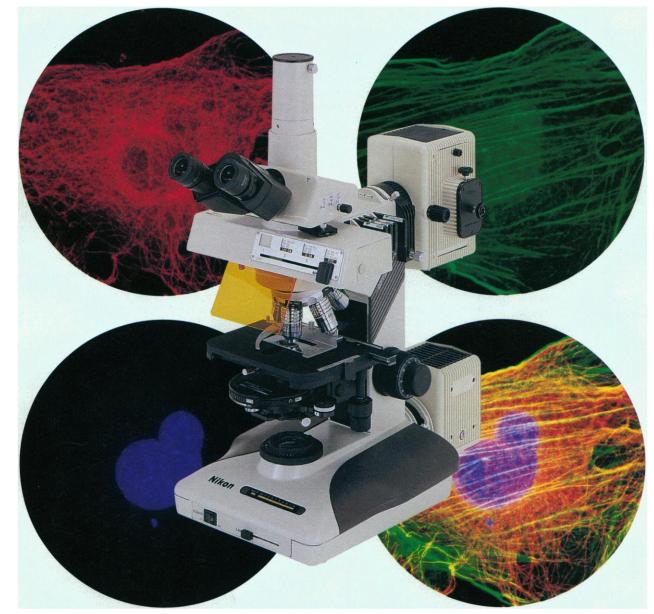
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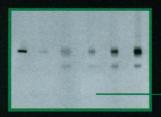


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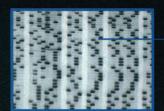
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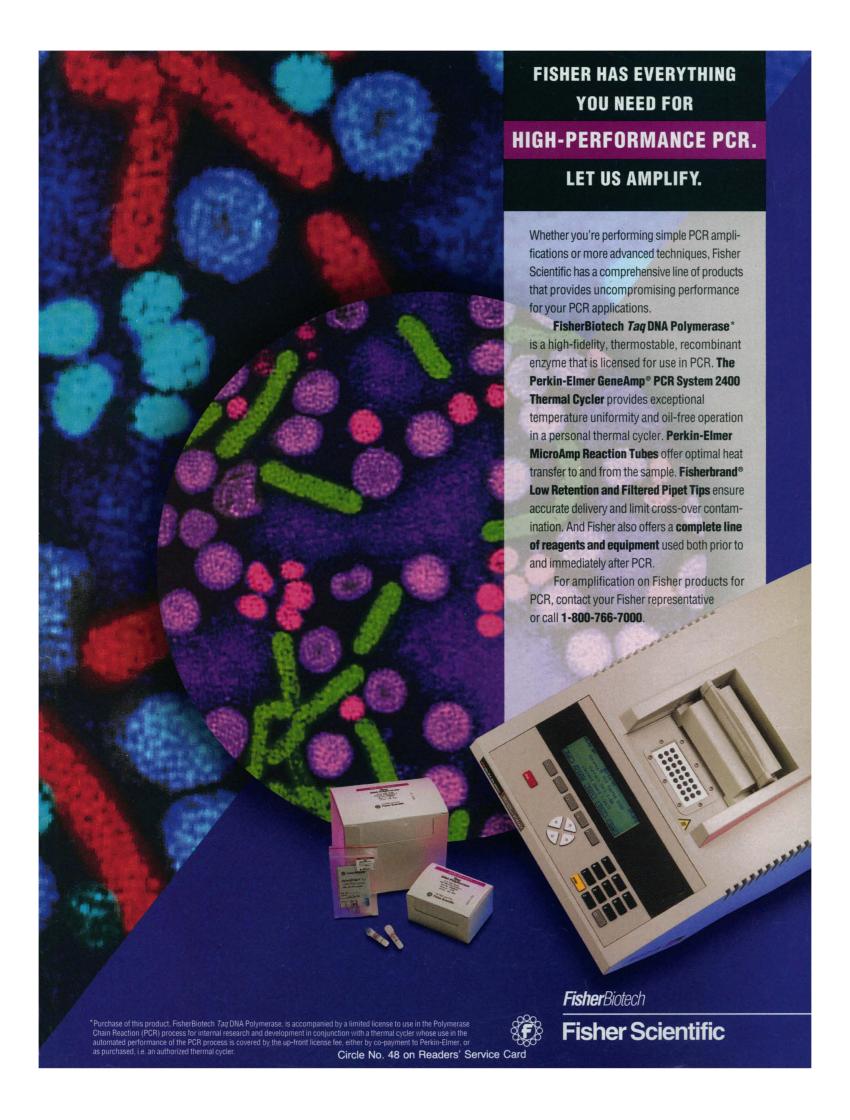




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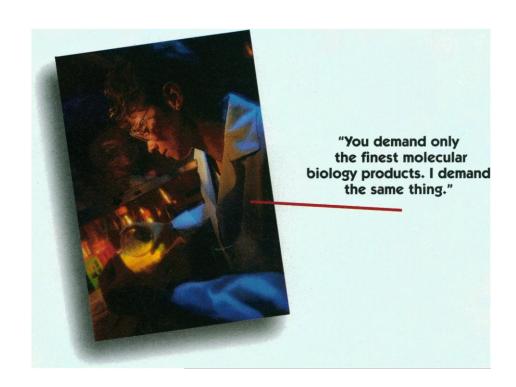
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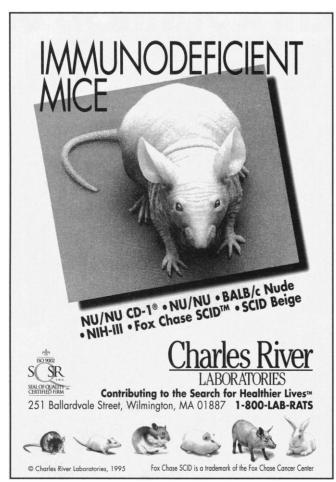
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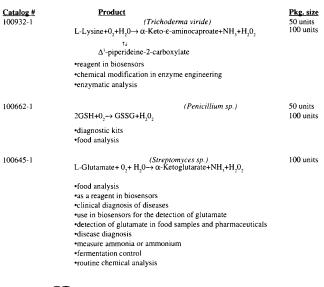
Doris Dixon

- Presently researching protein expression and DNA/RNA isolation and purification systems.
- Published in Gene, Journal of Immunology, and Molecular Biology of the Cell.
- Presented abstracts at Symposium for Protein Society and ASBMB/DBC-ACS Joint Meeting.
- Prior to Sigma, worked four years in the Department of Molecular and Cellular Biology at a major pharmaceutical company.
- Also worked ten years in academia at the University of Missouri, the University of Texas and the Wadsworth Research Institute at the New York State Department of Health.





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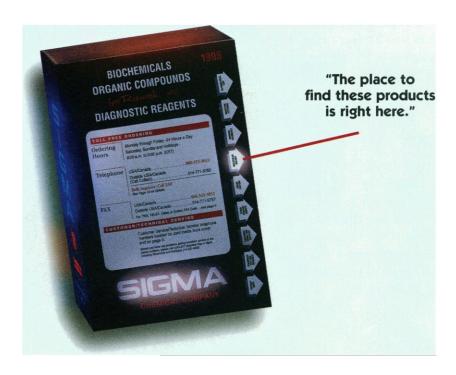


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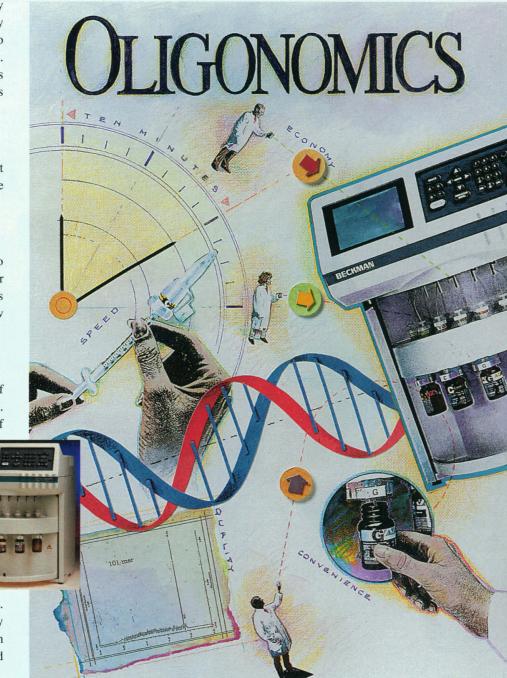
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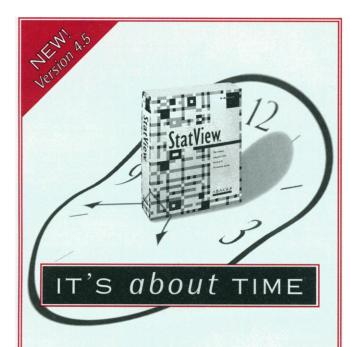
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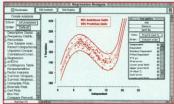
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