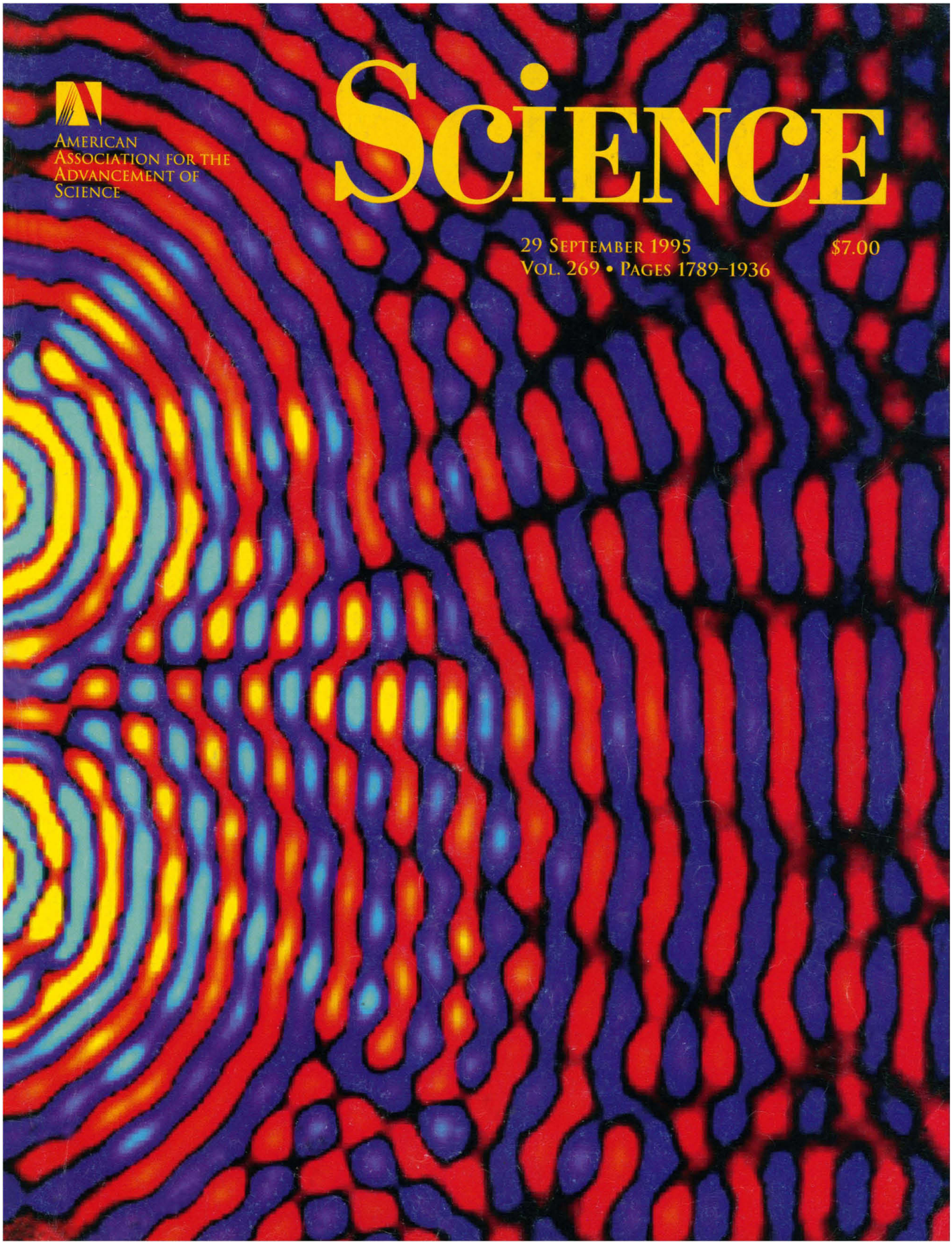

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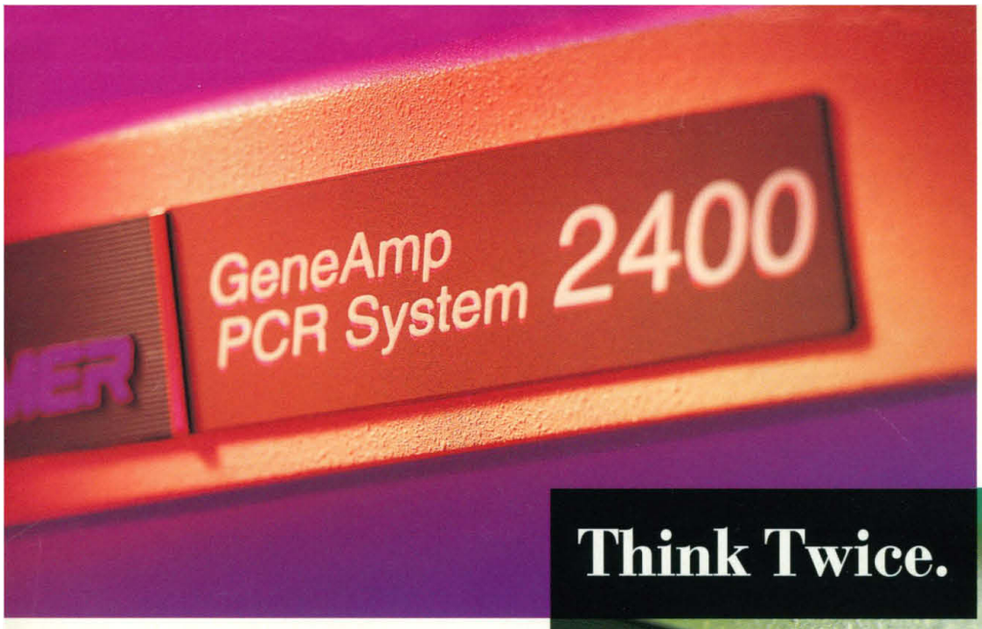

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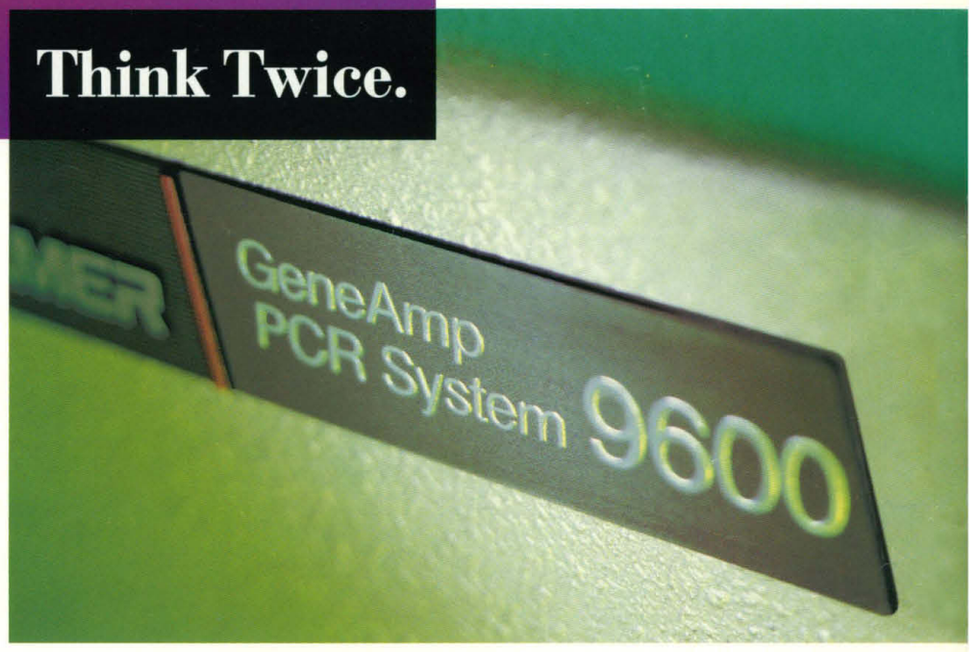

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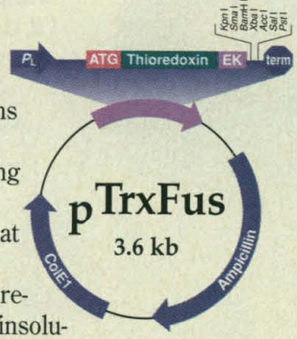

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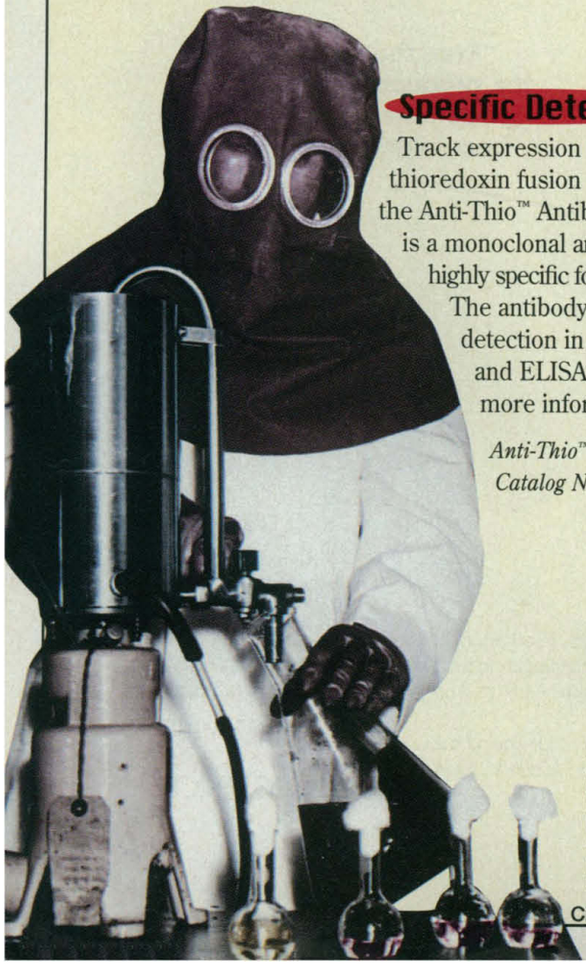

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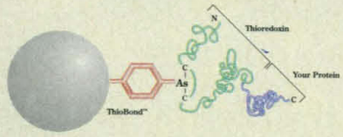

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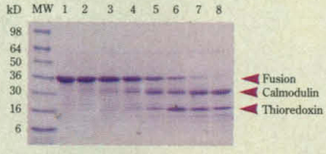

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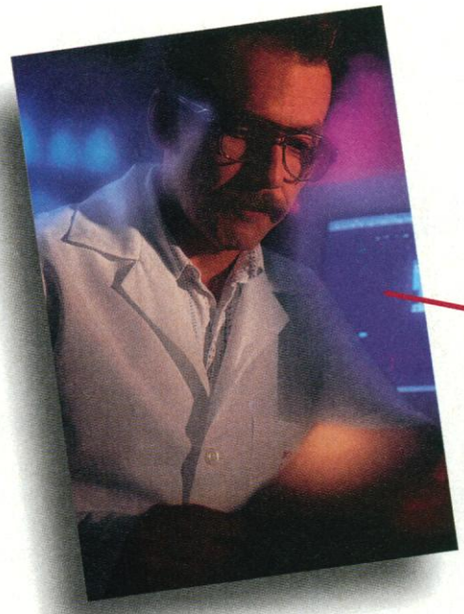
Brian Ward, Ph.D.

- Presently working on DNA sequence recognition methods.
- Invented a novel method to qualitatively and quantitatively determine a DNA sequence recognition event.
- Solved dideoxy sequencing stalling by temperature ramping the termination reactions.
- Has worked in the Molecular Biology Department of Sigma for eight years.
- Received his Ph.D. from Michigan State University.



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Brian is presently concentrating his efforts on DNA sequence recognition methodologies. In addition, he is also an important part of a team working with nucleic acid isolation, recombinant protein expression, and transcription/translation technologies. You can find the products of Brian's work, as well as his co-workers', in the Molecular Biology section of the Sigma Catalog. And just like all the Sigma products you know and trust, your satisfaction is guaranteed.

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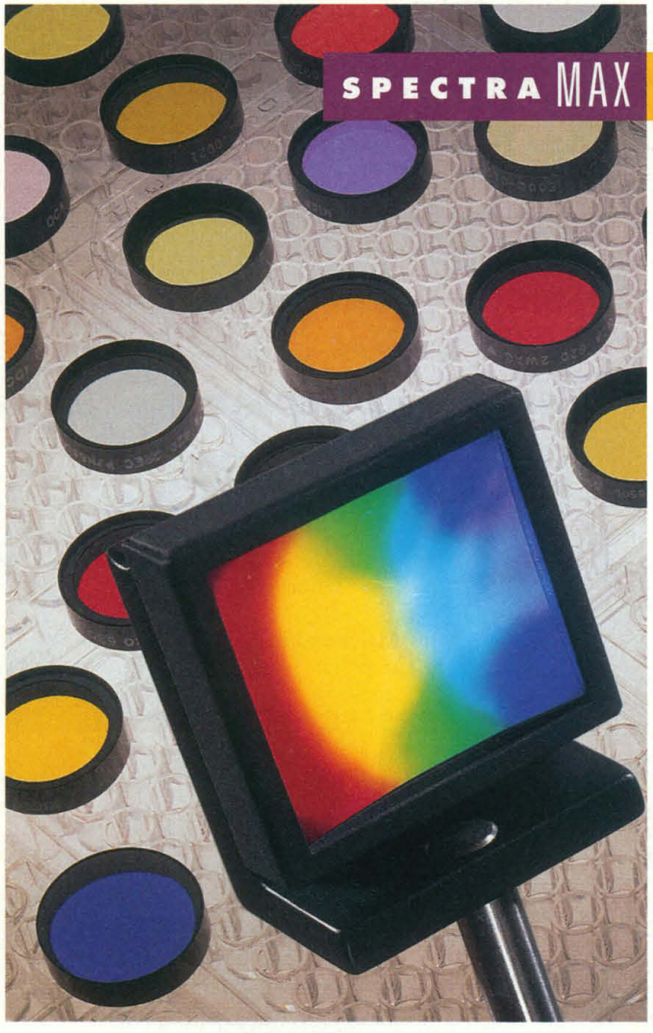

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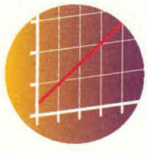

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1822

What sets apart the sexes?

NEWS

SPECIAL NEWS REPORT

SEX DETERMINATION

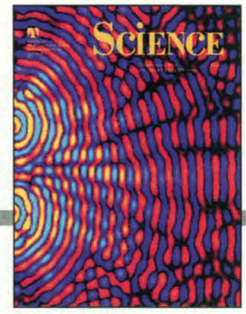
PERSPECTIVES

ARTICLE

DEPARTMENTS

COVER

Propagating acoustic strain waves depicted by magnetic resonance imaging (MRI). The dual-source interference pattern arose from 500-hertz mechanical shear waves applied to a tissue-simulating gel at two points (54 millimeters apart, at left). The MRI technique used can quantitatively depict mechanical waves with amplitudes on the order of hundreds of nanometers and could lead to the development of a medical imaging modality that emulates the clinical technique of palpation. See page 1854. [Image: Richard L. Ehman]



RESEARCH ARTICLE

REPORTS

TECHNICAL COMMENTS

1883
Control of DNA replication center formation

◩ Indicates accompanying feature

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Protein-RNA binding assays
Lutz, C.S. and Alwine, J.C. (1994) *Gen. Devel.* **8**, 576.

DNA binding
Loh, L.C. *et al.* (1994) *Virology* **200**, 413.

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Patrick, D.R. *et al.* (1994) *J. Biol. Chem.* **269**, 6842.

Fusion protein binding assays
Lukac, D.M. *et al.* (1994) *J. Virol.* **68**, 5184.

Analysis of truncation mutations in MDS
Screening for translation-terminating mutations in MDS
Roest, P.A. *et al.* (1993) *Human Mol. Gen.* **2**, 1719.

Mutational analysis

Easy, rapid method of screening large number of mutants. Safety assessment prior to large scale culture of toxins
Johnson, V.G. and Nicholls, P.J. (1994) *J Biol Chem.* **269**, 4349.

Confirmation of ligand-binding region, analysis of mutants
Kallio, P.K. *et al.* (1994) *Endocrinology* **134**, 998.

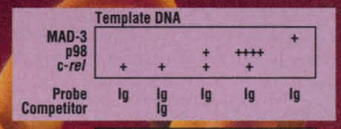
Gel shift analysis of deletion mutants
Palvimo, J.J. *et al.* (1993), *Mol. Endo.* **7**, 1399.

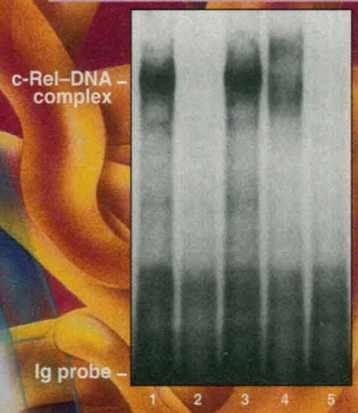
Verification of cloned genes

Verification that clone expressed a protein of the predicted size
Daigle, I. and Li, C. (1993) *Proc. Natl. Acad.Sci. USA*, **90**, 12045.

Verification of clone and immunoprecipitation
Greig, A. *et al.* (1994) *Circulation Research*, **74**, 41.

***In vitro* evolution studies**
Joyce, G.F. (1993) *Pure & Appl. Chem.* **65**, 1205.





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edited by PHIL SZUROMI

Oxidizing C–H bonds

Oxidation is one way of activating normally unreactive carbon-hydrogen single bonds. Gardner and Mayer (p. 1849; see the Perspective by Labinger, p. 1833) have studied the mechanism of toluene oxidation by permanganate ion in water and inorganic solvent. In water, toluene transfers an H^- species, but in neat toluene an H· atom is transferred. The energetics of O–H bond formation can be used to predict oxidation rates and may lead to understanding C–H bond oxidation by metalloenzymes and metal oxide surfaces.

Unwanted travelers

Organochlorine compounds, such as lindane and DDT, are widely used as pesticides. Some of these compounds are carcinogens or estrogen mimics, and their use may be restricted or even banned in many countries. However, the global distribution of the compounds through atmospheric transport leads to contamination even of remote regions such as the Arctic. Simonich and Hites (p. 1851) have analyzed tree bark samples from worldwide sites for 22 organochlorine compounds; their results relate the volatility of the compounds to their global distribution. Such data is vital for future restrictions on the use of these hazardous compounds.

Elastic images

Patterns of local mechanical response in a material are important for understanding wave propagation, but few methods exist for mapping this response. Muthupillai *et al.* (p. 1854) have used magnetic resonance imaging to quantitatively image the spatial distribution of displacement of a gel in response to mechanical excitation. The method was also used to map the mechanical properties of a tissue specimen. The technique offers a resolution of less than 200 nanometers and may find application in ultrasonics and medical imaging.

Programming of chemical oscillations

Complex chemical systems often show oscillating behavior; the propagation of the resulting chemical waves is affected by inhomogeneities in the reaction system. This is of particular importance for biological systems because of their cellular nature. Steinbock *et al.* (p. 1857) have adapted an ink jet printer to study the effect of regular and irregular inhomogeneities on oscillating reactions. The methodology should be easily applicable to a variety of systems, giving important insight into the effects of local features on global behavior for wave propagation.

Sorted out

Integral membrane proteins are targeted to their final destination by sorting signals in their cytoplasmic domains (sequences of four to six residues that include a critical tyrosine residue). Ohno *et al.* (p. 1872) used a yeast two-hybrid approach to screen more than 2 million clones for proteins that interact with the tyrosine-based signal. The medium chains of the clathrin-associated protein complexes (μ_1 of AP-1 and μ_2 of AP-2) were found to specifically interact with the tyrosine signals of several integral membrane proteins and with isolated hexapeptide signals. The medium chains apparently serve as the signal-binding components in the clathrin-dependent sorting apparatus.

Vital for virulence

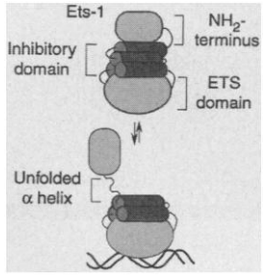
Leishmania are heteroxenous parasites: One stage of their lives is spent in the blood or tissues of a vertebrate host, while other stages live in the intestines of bloodsucking invertebrates. The infectious cycle is controlled in part by surface glycoconjugates, such as lipophosphoglycan (LPG), and regulation of expression of these molecules is a topic of keen interest. Descoteaux *et al.* (p. 1869) report a novel gene, *LPG2*, which encodes a Golgi membrane protein. *LPG2* is specifically involved in the intracellular compartmentalization and assembly of LPG and other virulence-associated glycoconjugates. This may represent an evolutionarily specialized activity, as the yeast homologs of *LPG2* are required for general Golgi function.

Foci on replication

In eukaryotic cells, DNA replication is initiated at many discrete subnuclear locations called foci. These foci contain an aggregation of 300 to 1000 DNA loops. The single-stranded DNA binding protein RP-A that is required for the initiation of DNA replication is associated with foci before replication initiation. Yan and Newport (p. 1883) have isolated a protein, focus-forming activity 1 (FFA-1), that is required for the association of RP-A with foci. In association with other components of the foci, FFA-1 may generate binding sites for RP-A.

Molecular foldout

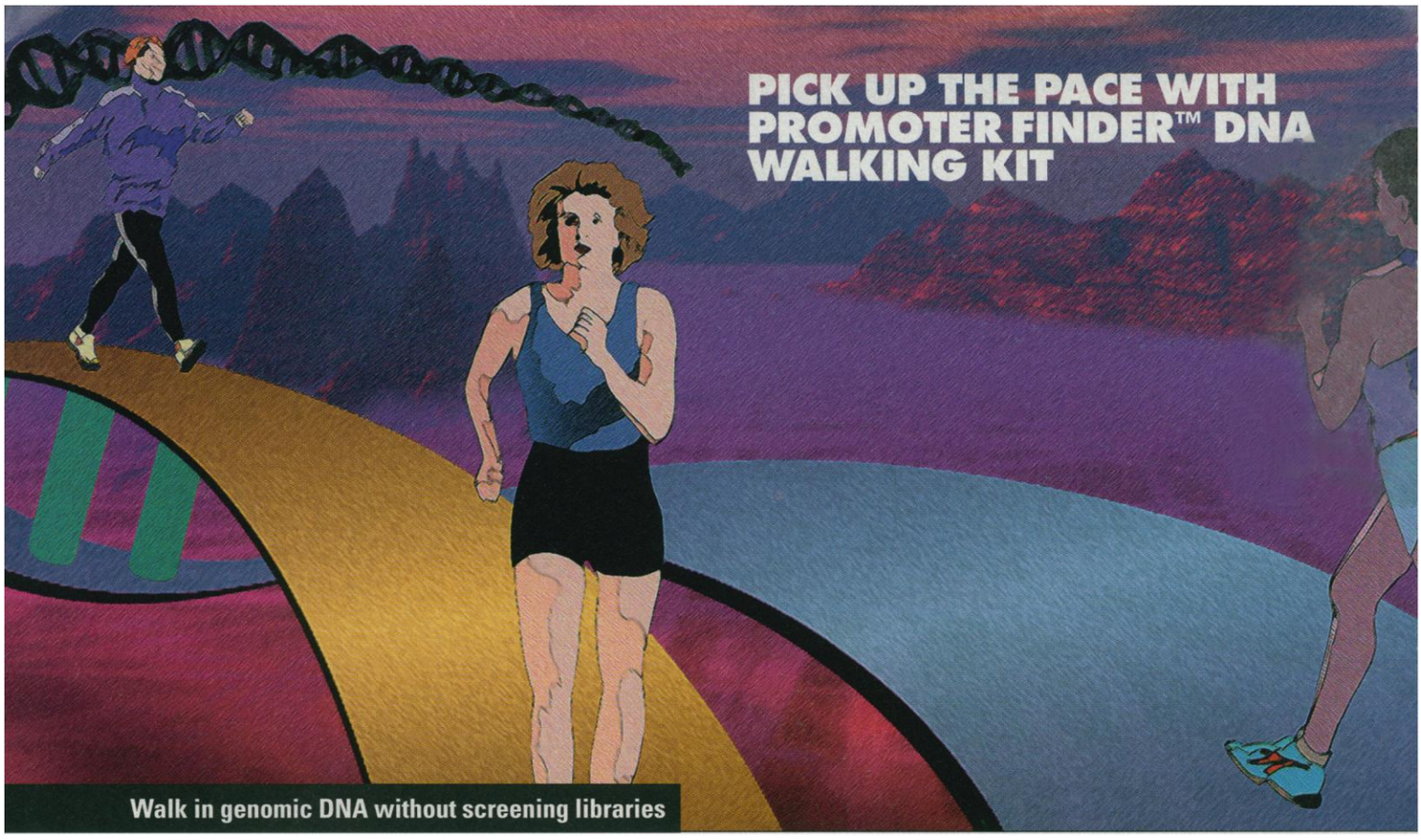
Members of the *ets* family of transcription factors contain a winged helix-turn-helix DNA-binding domain. Many members are negatively regulated by inhibitory sequences that affect the DNA-binding domain. Petersen *et al.* (p. 1866) have examined the conformational changes that occur during the DNA binding of Ets-1. Although the secondary structure

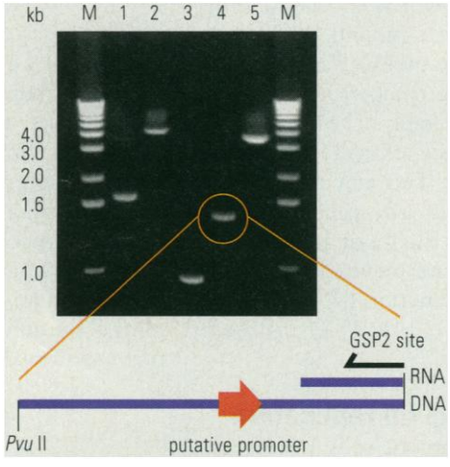


of the Ets-1 DNA-binding domain is unchanged in the presence of DNA, an α helix in the inhibitory domain is unfolded. Unfolding represents a means of transcription factor regulation. Both specific and nonspecific DNA sequences can change the conformation, so Ets-1 sampling of the unfolded conformation can precede recognition.

Freezing out ICE

The p35 protein encoded by baculovirus can block apoptosis, a defense mechanism against infection in multicellular organisms. Bump *et al.* (p. 1885) used a recombinant form of p35 to show that this protein blocks the proteolytic activity of interleukin-1β converting enzyme (ICE) and three of its homologs. This enzyme acts autocatalytically by cleaving its proform. Because p35 blocks several apoptotic pathways, ICE and related proteins may play a central role in apoptosis.





Results of PromoterFinder amplification. Each PromoterFinder kit contains 5 restriction enzyme digested, adaptor-ligated genomic DNA "libraries" ready for PCR. Nested PCR amplifications of the human t-PA gene were performed using each of the 5 "libraries" with gene-specific and adaptor primers. Lane 1: *Eco*R V library–1.8 kb. Lane 2: *Sca* I library–4.5 kb. Lane 3: *Dra* I library–0.9 kb. Lane 4: *Pvu* II library–1.5 kb. Lane 5: *Ssp* I library–3.9 kb. Lanes M: DNA size markers. The observed PCR products span the genomic DNA from the particular restriction site to the inner gene-specific primer (GSP2).

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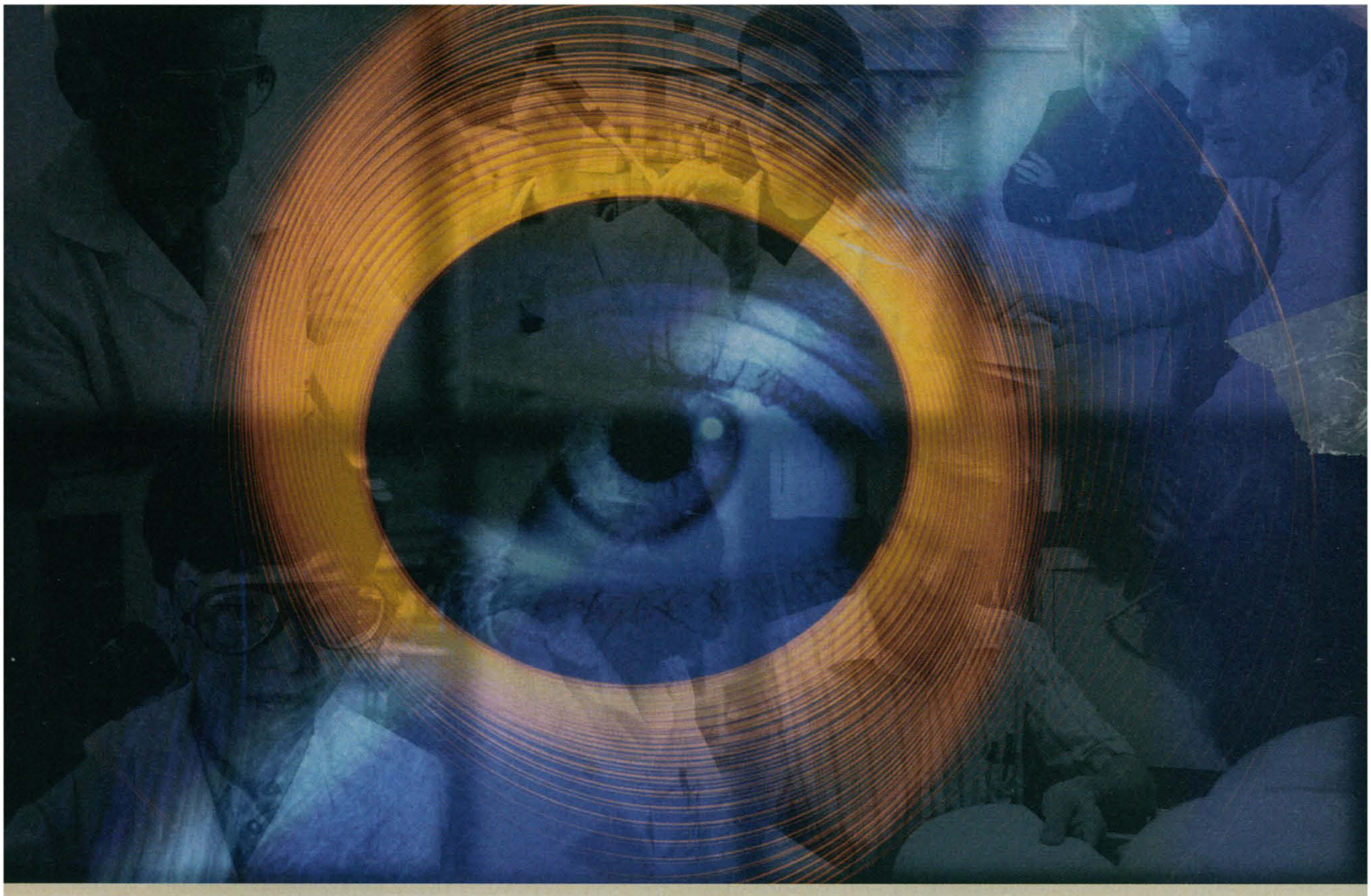

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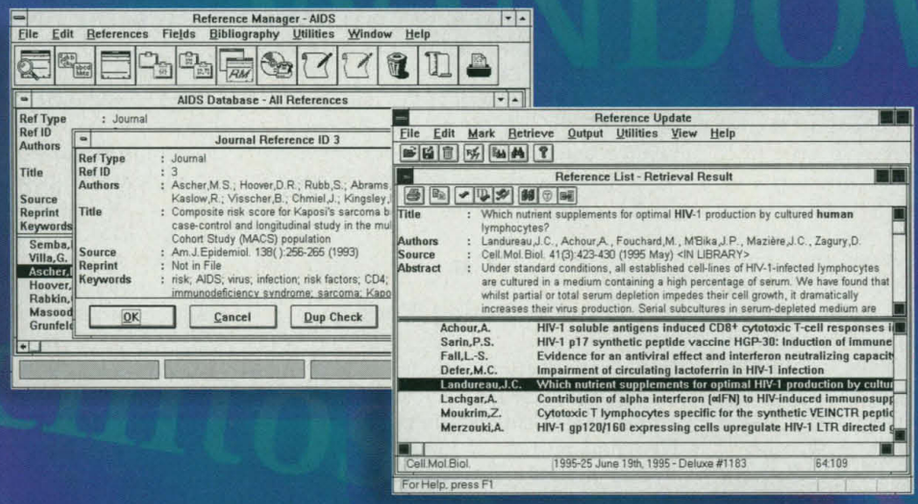

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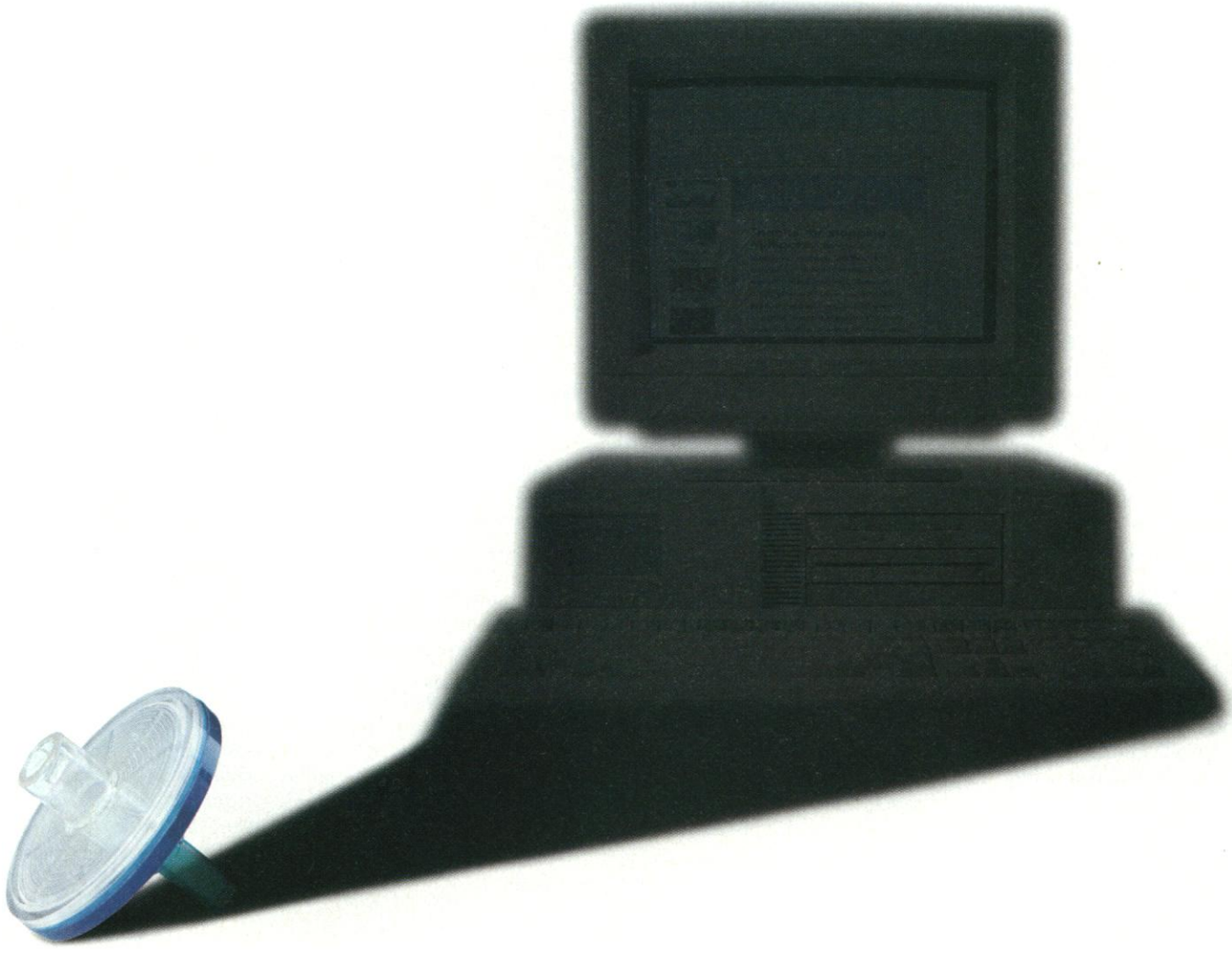

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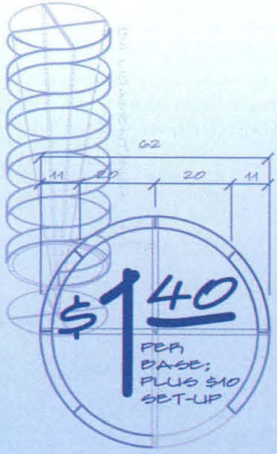

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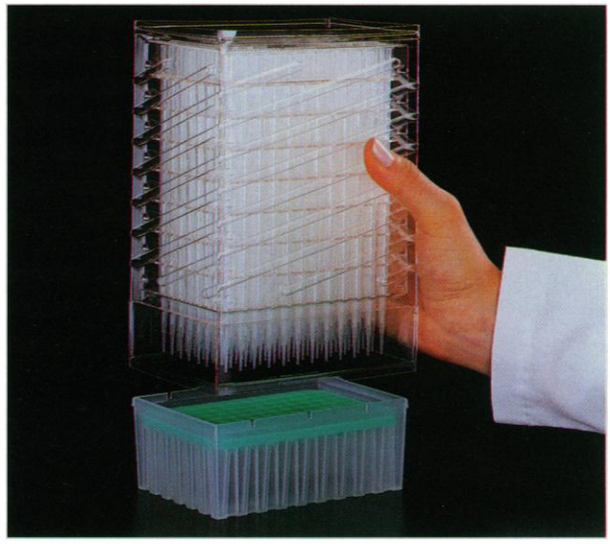
Green-Pak SpaceSaver™

The environmentally-friendly refill system for pipette tip racks

Now Available Presterilized!

New Green-Pak SpaceSaver tip reloading system refills racks in seconds. Just position the SpaceSaver over an empty Rainin 96-place tip rack and press down on the top. Each set of 96 tips pops into place instantly – in perfect alignment – without contacting hands, fingers or other sources of contamination. The next set is automatically lined up for the next rack.

SpaceSaver comes individually shrinkwrapped for protection. During loading the tips are protected on all sides by a plastic sleeve and on top by a plastic cover. A new presterilized version is also available.

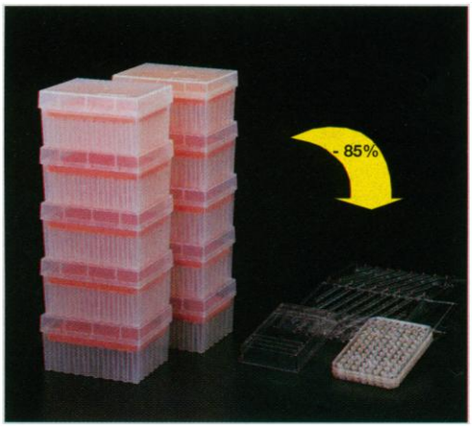


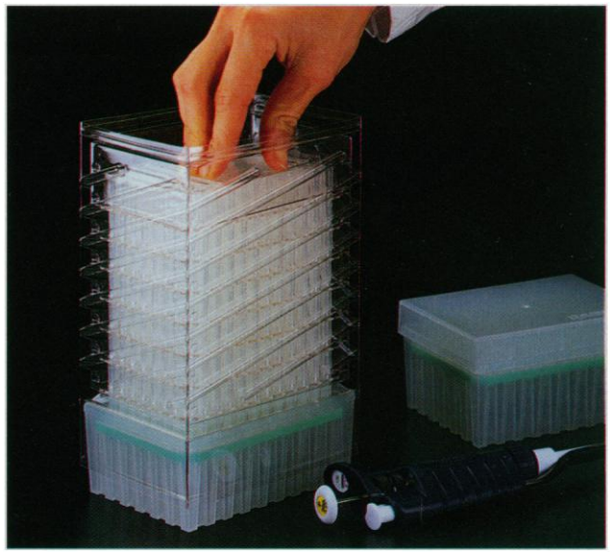
Position SpaceSaver over empty rack, press down, tips pop into place

■ reduces plastic waste by 85%

■ uses 68% less space

Green-Pak SpaceSaver takes up one-third the space and uses 85% less plastic than conventional 96-tip rack packaging. And when you've used all ten refills, just flatten the sleeve and recycle through community recycling or Rainin's recycle program.





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Cat. No.	Description	Price
GPS-96	Green-Pak SpaceSaver, to 250 µL Ten stacked refills, each with 96 FinePoint™ Tips (includes one preloaded reusable rack and lid).	$38.50
GPS-96S	Green-Pak SpaceSaver Same as above, Presterilized	48.50
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The new LEICA MZ12 stereomicroscope with 12.5:1 zoom

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