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REFERENCES
1. Nielson, K.B., Scott, B., Bauer, J.C., and Kretz, K. (1994) Strategies 7: 64-65.
2. Nielson, K.B., Schoettlin, W., Bauer, J.C., and Mathur, E. (1994) Strategies 7: 27.

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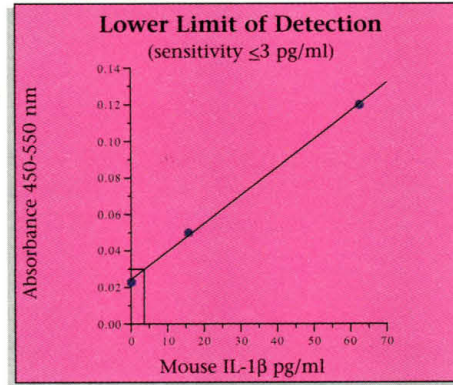
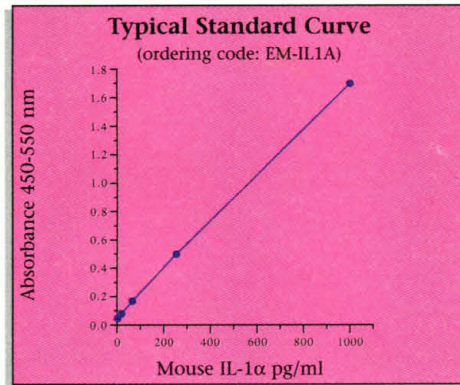
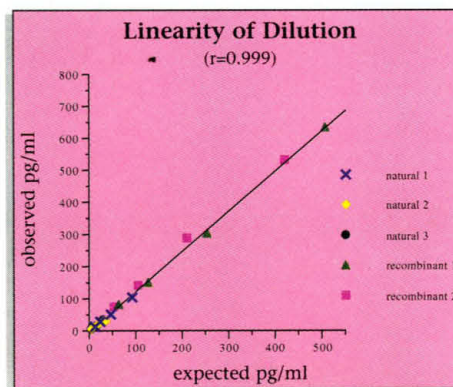
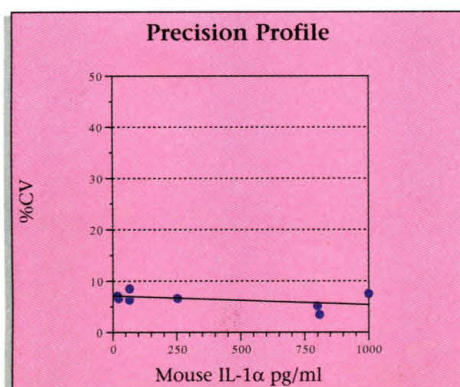
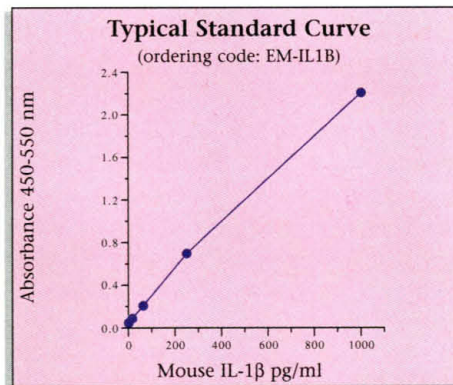
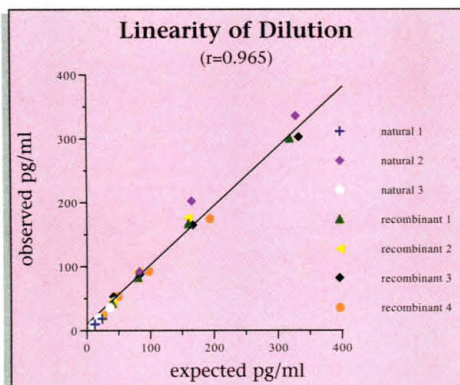
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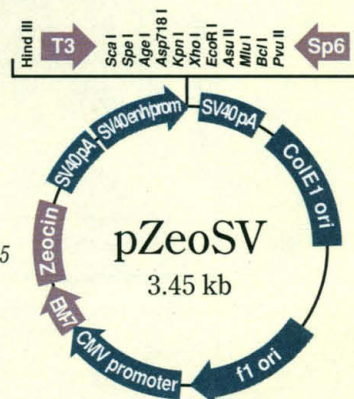
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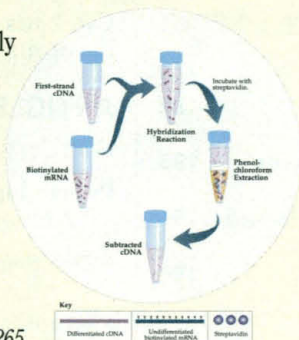
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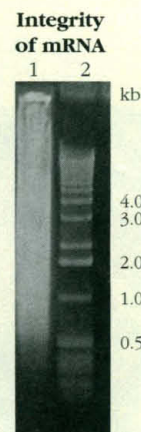
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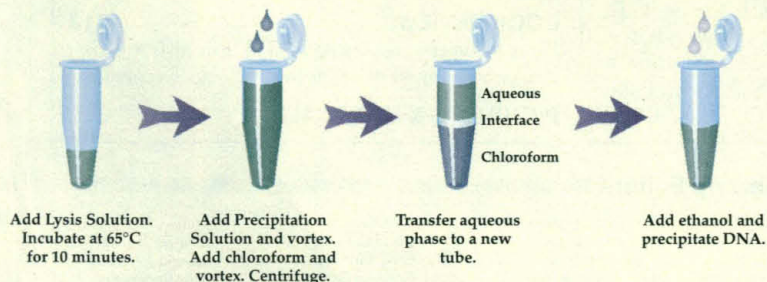


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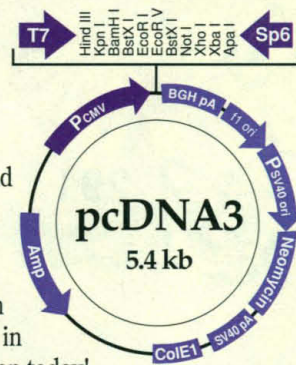
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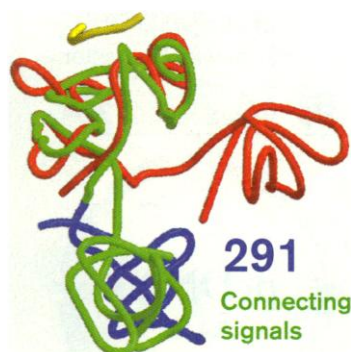
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192

Jack Gibbons, in
the hot seat



NEWS & COMMENT

OSTP: A Mixed Midterm Report 192
Committee, Anyone? 193

U.S. Tells CERN to Wait for Support 195

Senate Votes R&D Cuts, ATP Trimmed 195

Claim-Jumping Charges Ignite 196
Controversy at Meeting

Greenhouse Gases: Rio Signatories to 197
Negotiate New Goals

Amateur Fossil Hunters Dig Up 198
Trouble in Montana

Hubble Gets Help From a Cosmic Lens 199

RESEARCH NEWS

Dendrites Shed Their Dull Image 200

Extreme Ultraviolet Satellites Open New 202
View of the Sky

Found: Ash From the First Stars? 203

Parasitology: Trypanosome Mystery 204
Solved?

Cytokines Move From the Margins Into 205
the Spotlight

ARTICLES

SIGNAL TRANSDUCTION

Protein Lipidation in Cell Signaling 221
P. J. Casey

Notch Signaling 225
S. Artavanis-Tsakonas, K. Matsuno, M. E. Fortini

Integrins and Signal Transduction 233
Pathways: The Road Taken
E. A. Clark and J. S. Brugge

Calcium Signaling in Neurons: 239
Molecular Mechanisms and Cellular
Consequences
A. Ghosh and M. E. Greenberg

Localization of Protein Kinases by 247
Anchoring Proteins: A Theme in
Signal Transduction
D. Mochly-Rosen

Cytokine Signaling Through Nonreceptor 251
Protein Tyrosine Kinases
T. Taniguchi

POLICY FORUM

A Temporary Bridge 261
J. Roberts

DEPARTMENTS

THIS WEEK IN SCIENCE 181

EDITORIAL 183
Signals and Communication

LETTERS 185
Chimpanzee Kinship: C. J. Jolly, J. F. Oates, T. R. Disotell, P. A. Morin, J. J. Moore, D. S. Woodruff •
The Theory of DNA Bending: G. S. Manning •
Biotech Patents and "Usefulness": S. A. Bent, P. M. Booth, K. K. Costantino, P. B. C. Jones, G. L.

Shaffer, M. Blecher, J. P. Isacson, R. C. Peet • Low-Barrier Hydrogen Bonds: P. A. Frey

SCIENCESCOPE 191

RANDOM SAMPLES 207

BOOK REVIEWS 313
Plant Allometry, reviewed by T. J. Givnish • Other
Books of Interest • Vignettes • Books Received

PRODUCTS & MATERIALS 318

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During development of the *Drosophila* compound eye, the correct specification of many different cell types depends on the signaling activity of the Notch receptor protein. In the larval eye imaginal disc, expression of a truncated, nuclear form of Notch (green) prevents cells

from differentiating as neurons (red). See page 225 and other related Articles beginning on page 221 in this special issue on signal transduction. [Image: M. E. Fortini and S. Artavanis-Tsakonas]



PERSPECTIVES

Tyrosine Phosphatases and the Antibody Response 263

A. L. DeFranco and D. A. Law

Green Fluorescent Pets 264

D. C. Youvan

REPORTS

Spin Crossover in a Catenane Supramolecular System 265

J. A. Real, E. Andrés, M. C. Muñoz, M. Julve, T. Granier, A. Bousseksou, F. Varret

Imaging the Condensation and Evaporation of Molecularly Thin Films of Water with Nanometer Resolution 267

J. Hu, X.-D. Xiao, D. F. Ogletree, M. Salmeron

Organic Transistors: Two-Dimensional Transport and Improved Electrical Characteristics 270

A. Dodabalapur, L. Torsi, H. E. Katz

A Strategy for the Chemical Synthesis of Nanostructures 272

W. T. Müller, D. L. Klein, T. Lee, J. Clarke, P. L. McEuen, P. G. Schultz

Testing Cosmogonic Models with Gravitational Lensing 274

J. Wambsganss, R. Cen, J. P. Ostriker, E. L. Turner

Imaging the Pore Structure of Geomaterials 276

J. T. Fredrich, B. Menéndez, T.-F. Wong

A Modular Steel Freeway Bridge: Design Concept and Earthquake Resistance 279

W. H. Wattenburg, D. B. McCallen, R. C. Murray

Specific DNA-RNA Hybrid Binding by Zinc Finger Proteins 282

Y. Shi and J. M. Berg

Killing of Trypanosomes by the Human Haptoglobin-Related Protein 284

A. B. Smith, J. D. Esko, S. L. Hajduk

Identification of a Dual Specificity Kinase That Activates the Jun Kinases and p38-Mpk2 286

A. Lin, A. Minden, H. Martinetto, F.-X. Claret, C. Lange-Carter, F. Mercurio, G. L. Johnson, M. Karin

Crystal Structure of the Mammalian Grb2 Adaptor 291

S. Maignan, J.-P. Guilloteau, N. Fromage, B. Arnoux, J. Becquart, A. Ducruix

Recruitment and Activation of PTP1C in Negative Regulation of Antigen Receptor Signaling by FcγRIIB1 293

D. D'Ambrosio, K. L. Hippen, S. A. Minskoff, I. Mellman, G. Pani, K. A. Siminovitch, J. C. Cambier

Activity-Dependent Action Potential Invasion and Calcium Influx into Hippocampal CA1 Dendrites 297

N. Spruston, Y. Schiller, G. Stuart, B. Sakmann

Synaptic Activation of Voltage-Gated Channels in the Dendrites of Hippocampal Pyramidal Neurons 301

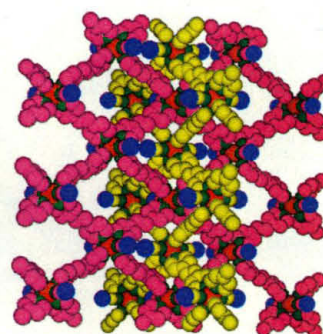
J. C. Magee and D. Johnston

Silver as a Probe of Pore-Forming Residues in a Potassium Channel 304

Q. Lü and C. Miller

Revealing the Architecture of a K⁺ Channel Pore Through Mutant Cycles with a Peptide Inhibitor 307

P. Hidalgo and R. MacKinnon



265

Spins and interlocking layers

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the physics program, Lederman dramatizes the startling uncertainty of subatomic particles. And in chemistry, laureate Dr. Dudley Herschbach probes chemistry's unlikely origins in nature.

Check local listings for dates and times.

Baxter

Water islands ...

The exact manner in which the first layer of water molecules sets down on a surface that is becoming wet has been difficult to follow experimentally. Scanning probe microscopies can in principle achieve atomic resolution, but their probe tips cannot be brought close to a wet surface without capillary forces perturbing the free liquid layer. Hu *et al.* (p. 267) have adapted an atomic force microscope by charging its tip and measuring the polarization forces induced in the surface layer with the tip at a small distance. Water in equilibrium with a mica surface shows two structures: At humidity up to 25 percent, water forms into two-dimensional islands less than 1000 angstroms across, but as the humidity increases the islands grow, and their morphology reflects the underlying geometry of the mica surface.

■

... and latex lands

Self-assembled monolayers (SAMs) and the atomic force microscope (AFM) have been put together to synthesize nanometer-scale structures. Müller *et al.* (p. 272) formed SAMs on a glass slide, terminating them with azide (N_3) groups. A platinum AFM tip, scanning the layers in the presence of hydrogen, selectively converted azides in some areas to amine groups. Derivatized latex beads then reacted only with the converted areas, generating a patterned surface structure.

■

Darkness visible

Comparing the observed distribution of galaxies in the sky with predictions from galaxy formation theories has been problematic because observa-

Signaling back and forth

The complex dendritic structure of hippocampal CA1 pyramidal neurons can transmit many thousands of individual synaptic inputs to the neuronal cell body where, if the integrated signal is high enough, an action potential is initiated. Investigations by Spruston *et al.* (p. 297) and Magee and Johnston (p. 301) into the propagation of signals along the dendrites reveal the complexity of a single neuron's signal-processing capabilities (see also news by Barinaga, p. 200). Spruston *et al.* demonstrate that somatic action potentials are transmitted back into the dendritic tree, activating different branches according to the pattern of the potentials. Magee and Johnston show that input through the tree turns on sodium and low threshold calcium channels but that the backpropagating action potentials are required for activation of the high threshold calcium channels. The backpropagating action potentials thus serve as a sophisticated feedback device to tell the dendritic tree whether and how the cell fired.

tions map out visible matter whereas theoretical universes tend to be dominated by invisible dark matter. Observations of gravitationally lensed quasars, however, whose images are split by galaxies along the line of sight, probe the underlying cosmic mass distribution, and Wambsganss *et al.* (p. 274) use computer simulation and ray-tracing to rule out a standard cosmology of critical density, with cold dark matter and a low Hubble constant, on the grounds that it predicts many more widely separated quasar image pairs than have been seen.

■

Filling in the gaps

The microscopic pore structure of rocks influences many physical properties, such as permeability and elasticity, but elucidating the three-dimensional connectivity of a material's porosity has been difficult. Friedrich *et al.* (p. 276) filled the pores in rock samples with a fluorescent epoxy and used laser confocal scanning microscopy to probe millimeter-thick sections of the material. Even in these relatively opaque

samples, use of intense laser light allowed vertical structure in the sections to be imaged so that a three-dimensional map of the



epoxy's distribution emerged. In a quartz sandstone, regions of high porosity had more sheet-like cracks than regions of low porosity; the loss of connectivity explains why permeability falls sharply with lower porosity.

■

Hybrid attraction

There are as many as a thousand different zinc finger proteins of the Cys₂His₂ type produced in higher vertebrates. Although the function of most of these proteins is unknown, many have been found to bind DNA in a sequence-specific manner. Shi and Berg (p. 282) have found that some zinc finger proteins bind to DNA-RNA hybrids in a sequence-specific manner and with a greater af-

finity than to DNA alone. Because DNA-RNA hybrids occur during replication, transcription, and retroviral reverse transcription, it is possible that some zinc finger proteins may perform a biological function during these processes.

■

Trypanocide identified

Although certain trypanosomes can cause human diseases such as African sleeping sickness, other closely related trypanosomes are harmless to humans and affect only cattle. This difference in host specificity is due to a protective factor in human blood, called trypanosome lytic factor (TLF). Smith *et al.* (p. 284; see also news by Schmidt, p. 204) have identified a key component of TLF as haptoglobin-related protein, an apolipoprotein that binds free hemoglobin in the blood. TLF has peroxidase activity, and may kill the cattle trypanosomes through oxidative damage.

■

Channel mapping

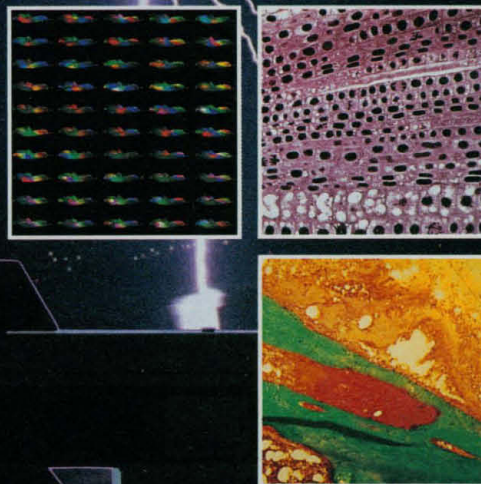
Neuronal function relies on the ability of ion channels to discriminate between sodium and potassium, two comparably sized alkali metal cations. Two reports provide further details of the architecture of the potassium channel pore in which this discrimination occurs. Lü and Miller (p. 304) use silver ions to probe for the sulfhydryl of cysteine residues that have been singly substituted into each of the amino acid positions lining the pore. Hidalgo and MacKinnon (p. 307) map residues framing the pore on the basis of complementary mutations in the channel and an inhibitory scorpion toxin that resides in the vestibule.

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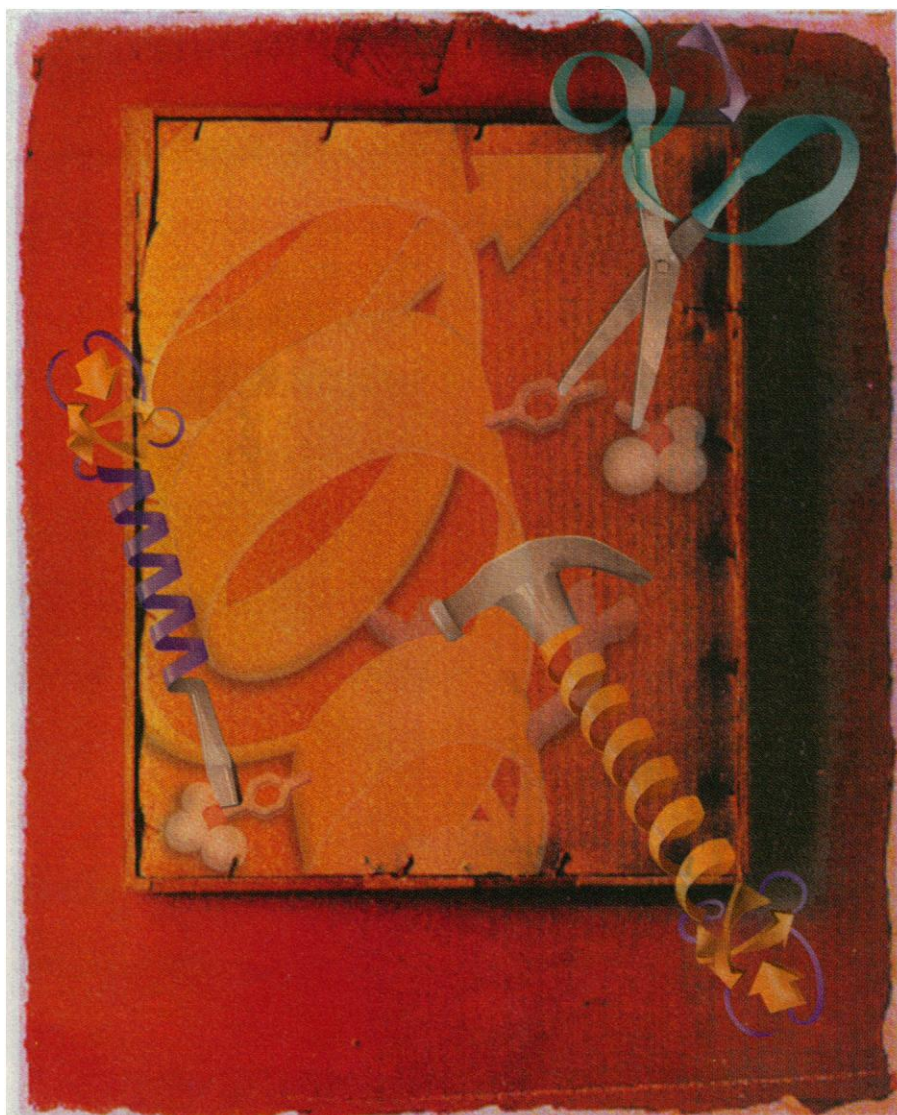
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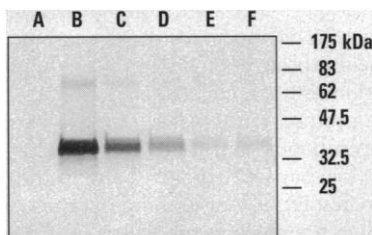
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SDS-PAGE/Autoradiograph of Histone H1 incubated with no enzyme (A) or 2 units of p34^{cdc2}/cyclin B kinase (B-F) under standard reaction conditions. After heat inactivation of kinase, Histone H1 was dephosphorylated using 0.1 (C), 0.2 (D), 0.5 (E), or 1 (F) unit of Protein Phosphatase 1 (PP1). Molecular weights were determined using prestained molecular weight marker (Cat# 7707).

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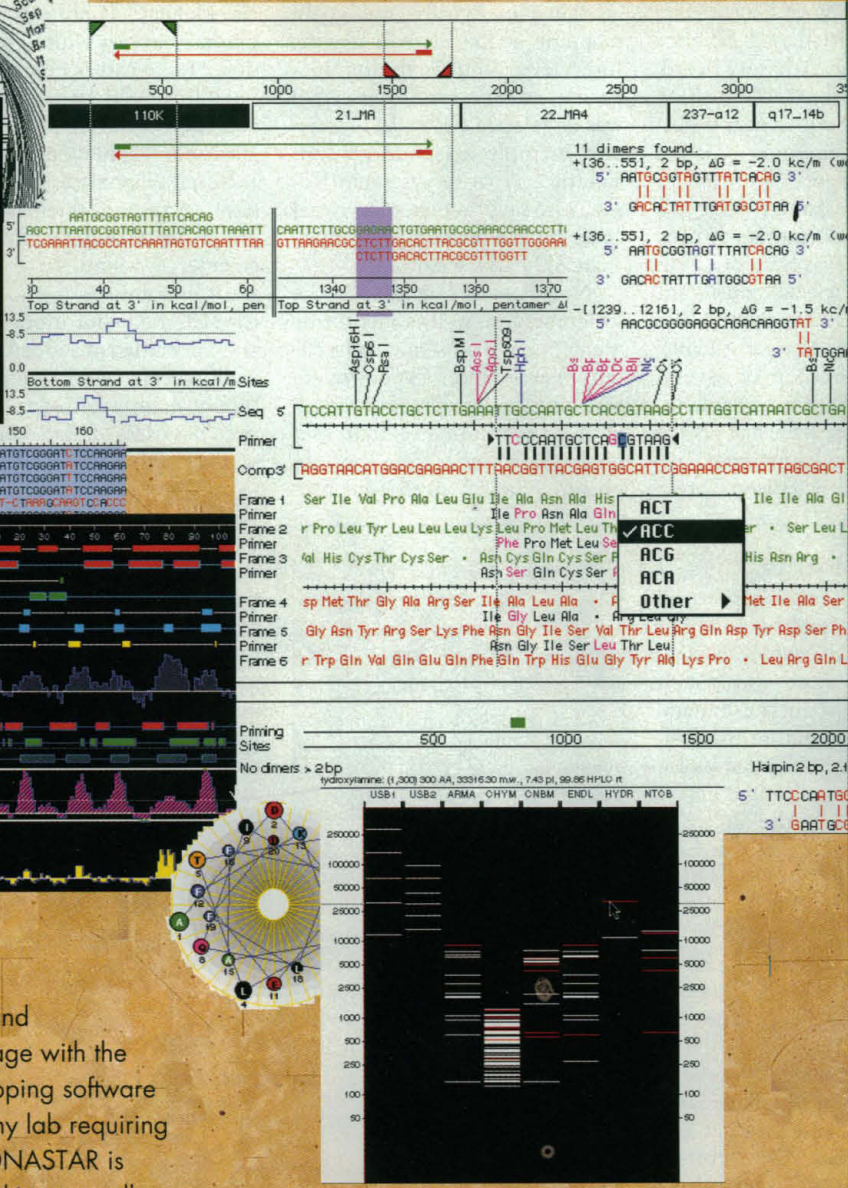
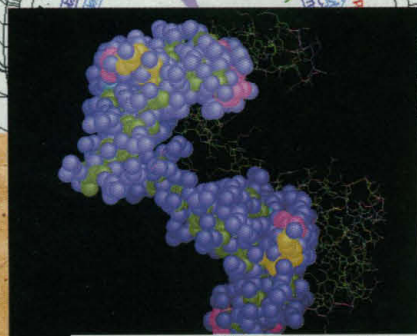
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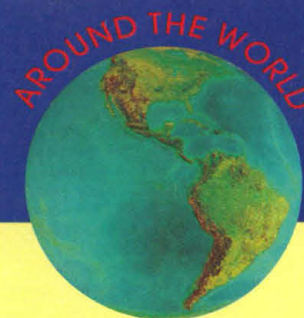
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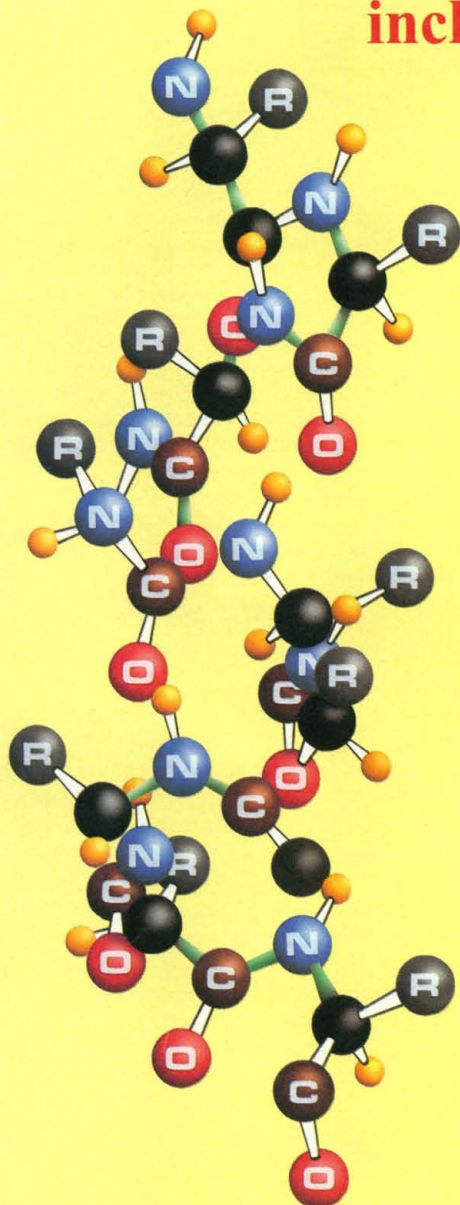
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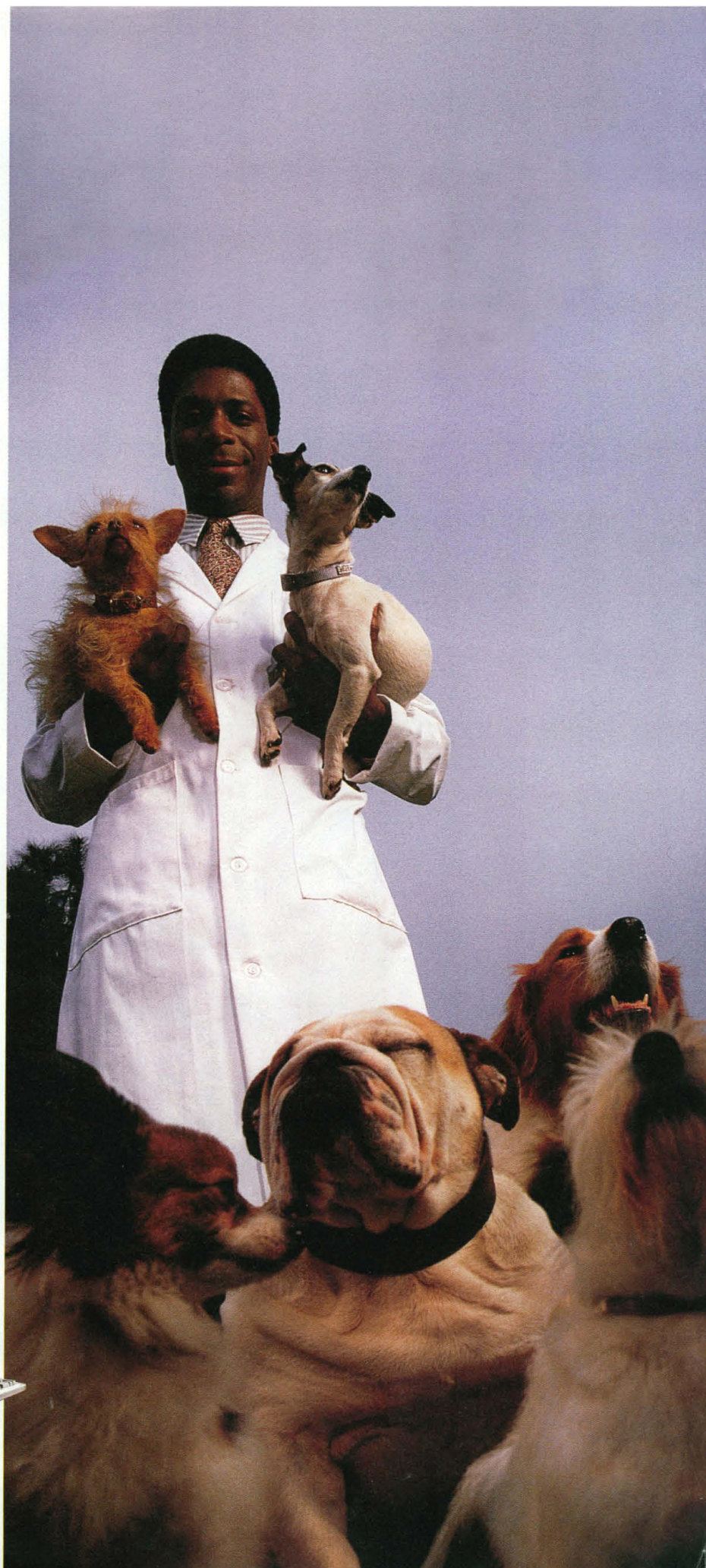
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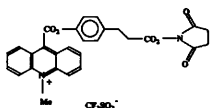


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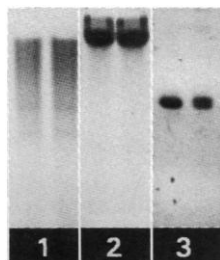
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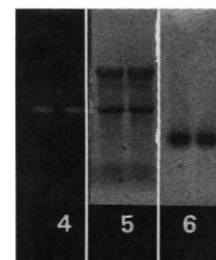
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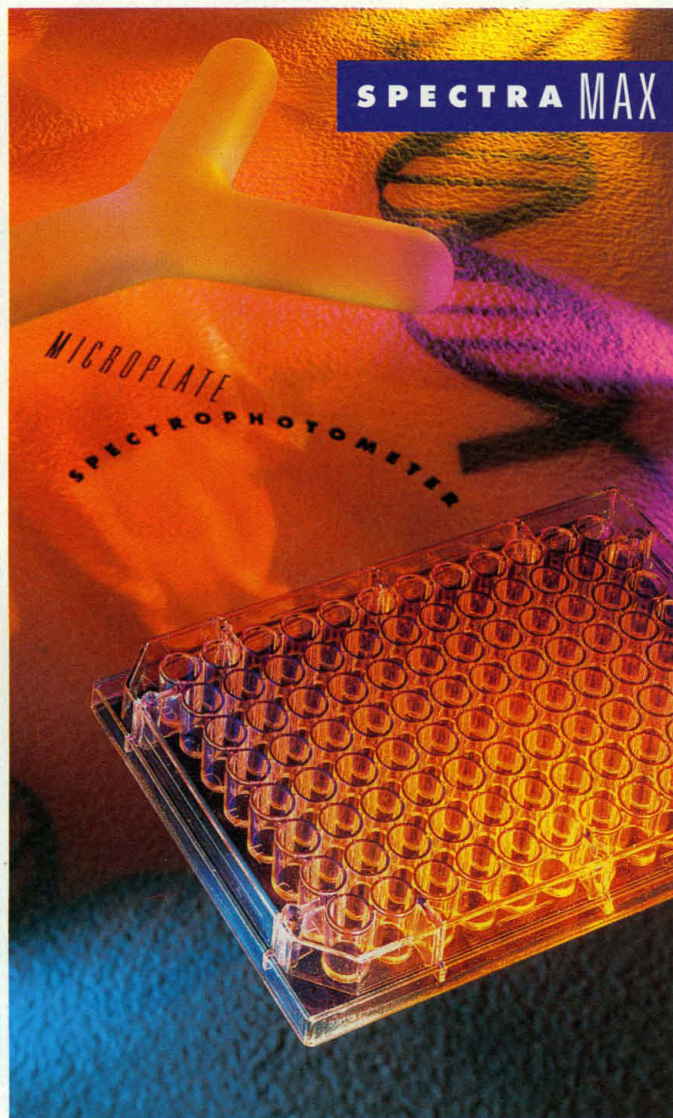
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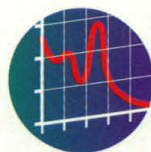
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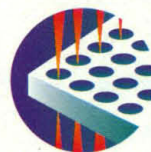
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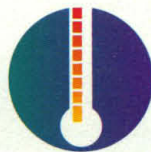
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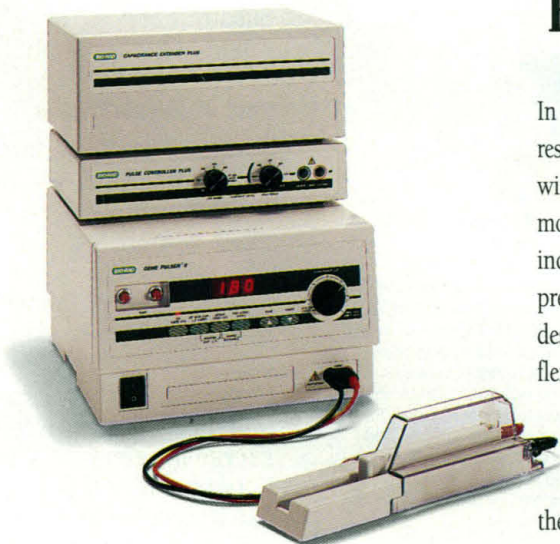
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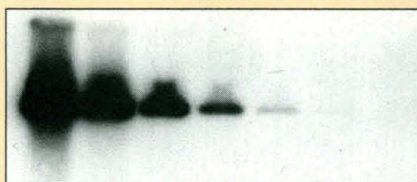
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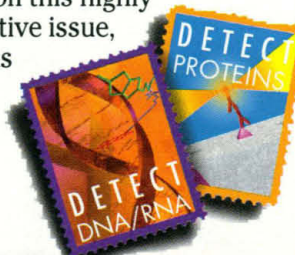
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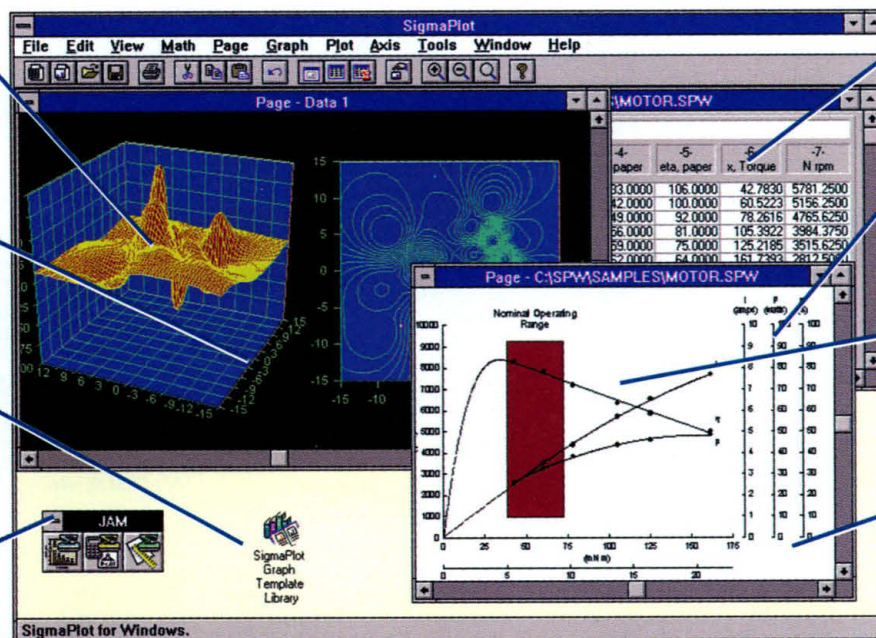
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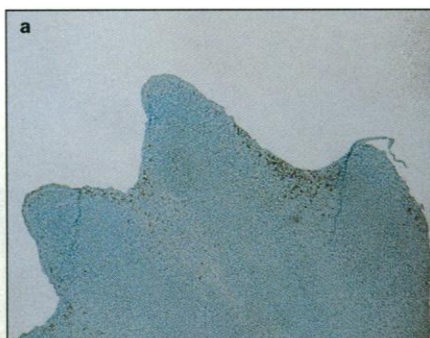
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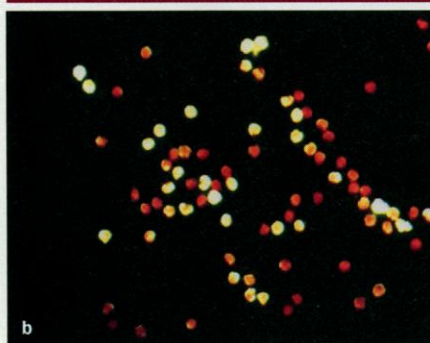
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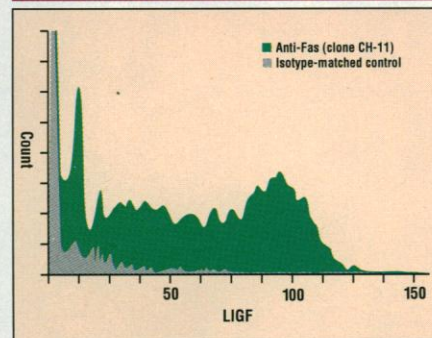
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¹ Yonehara, S., et al, (1989) *J. Exp. Med.* 169:1747-1756.

² JFR Kerr, J Searle, BV Harmon & CJ Bishop, in: Potten, CS (ed) (1987) *Perspectives in mammalian cell death.*

Oxford U. Press, pp. 93-128. Z Zakeri, D Quaglino, T Latham & R Lockshin, (1993) *FASEB Journal*; 7:470-478; and manuscripts submitted.

³ X Li, W James, F Traganos & Z Darzynkiewicz, (1993) manuscript submitted.

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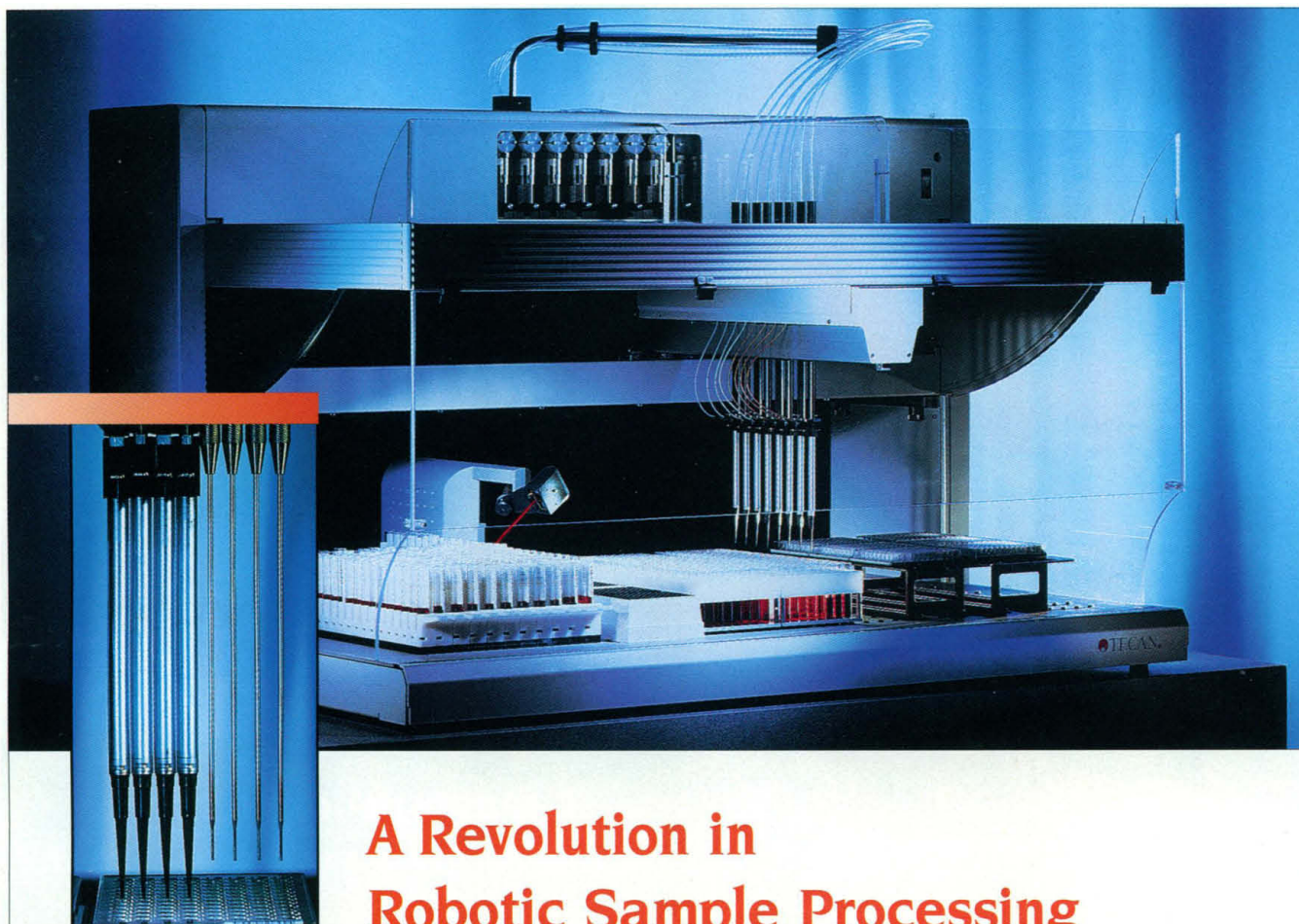
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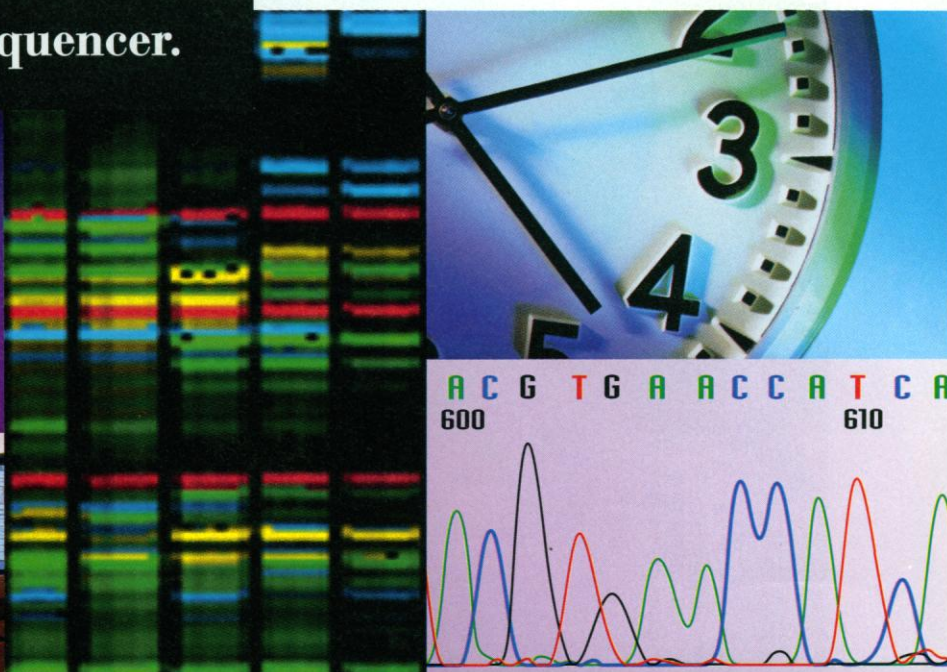
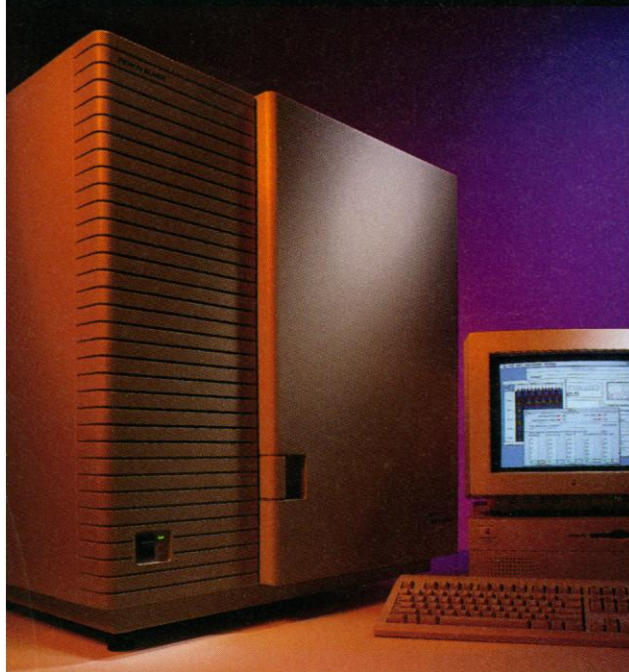
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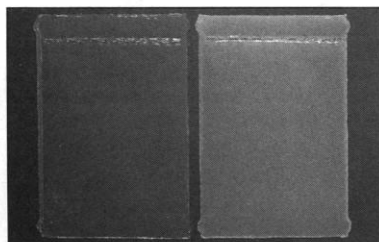
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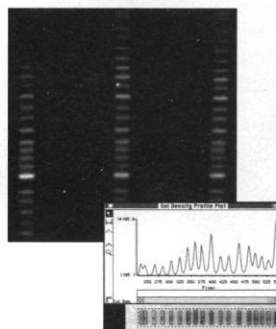
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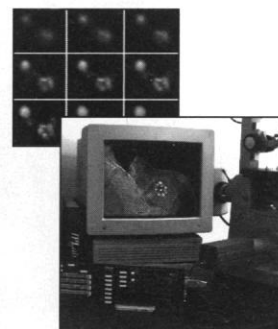
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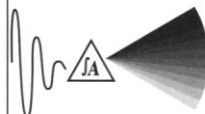
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