

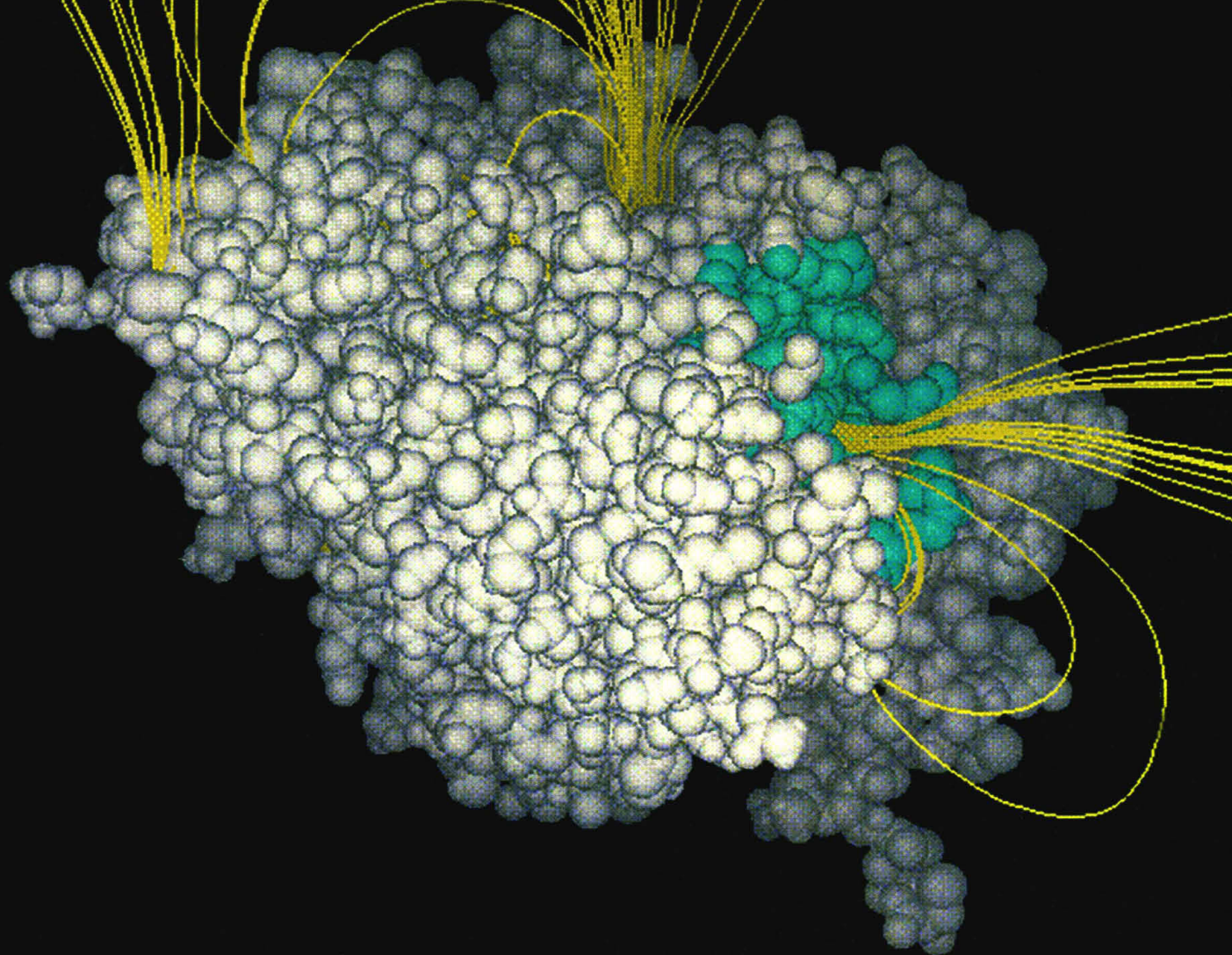
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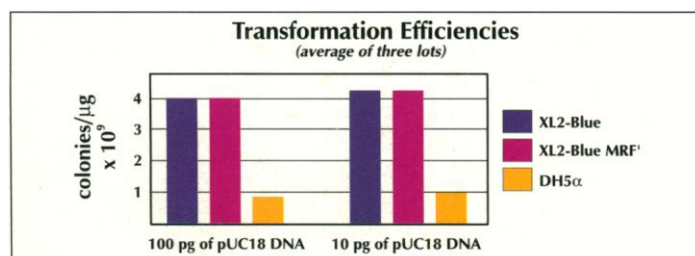
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* Patent pending

** The Polymerase Chain Reaction (PCR) process is covered by patents owned by Hoffmann-La Roche. Use of the PCR process requires a license.



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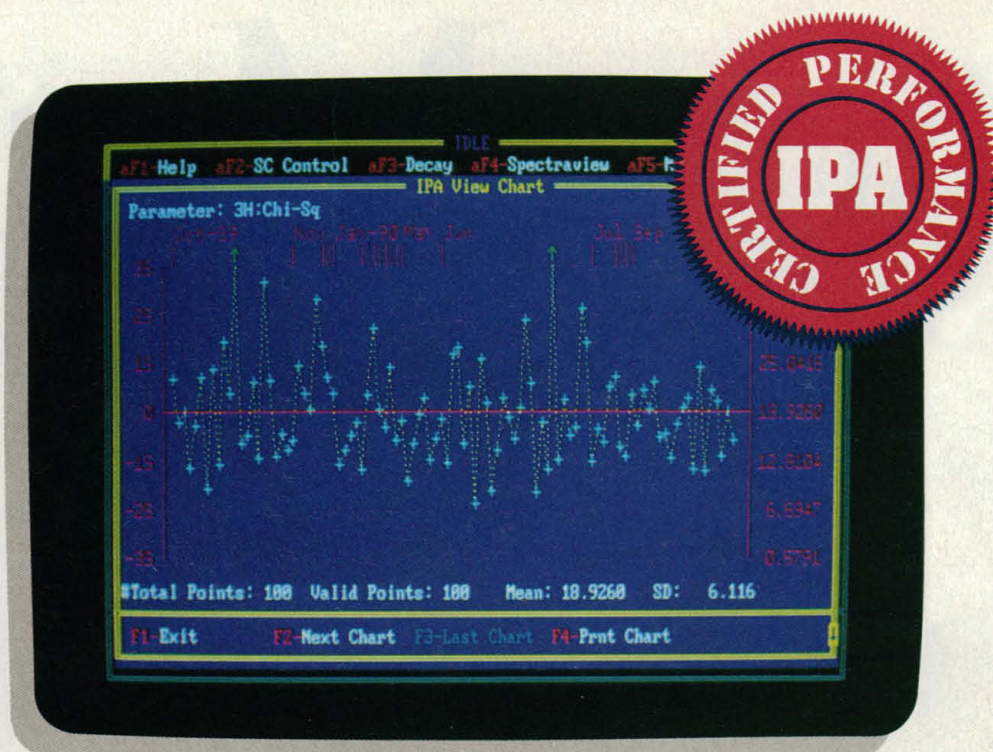


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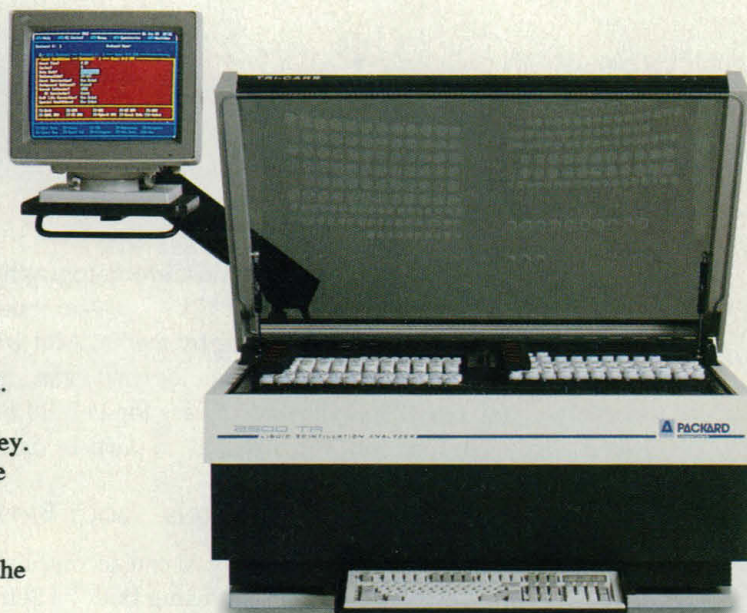
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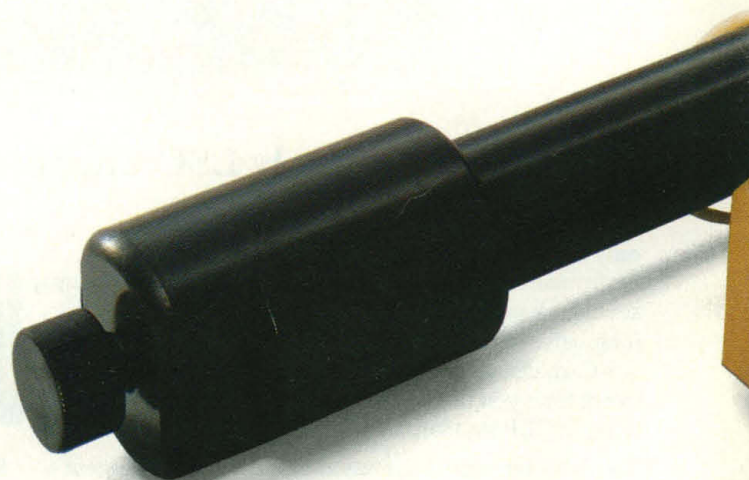


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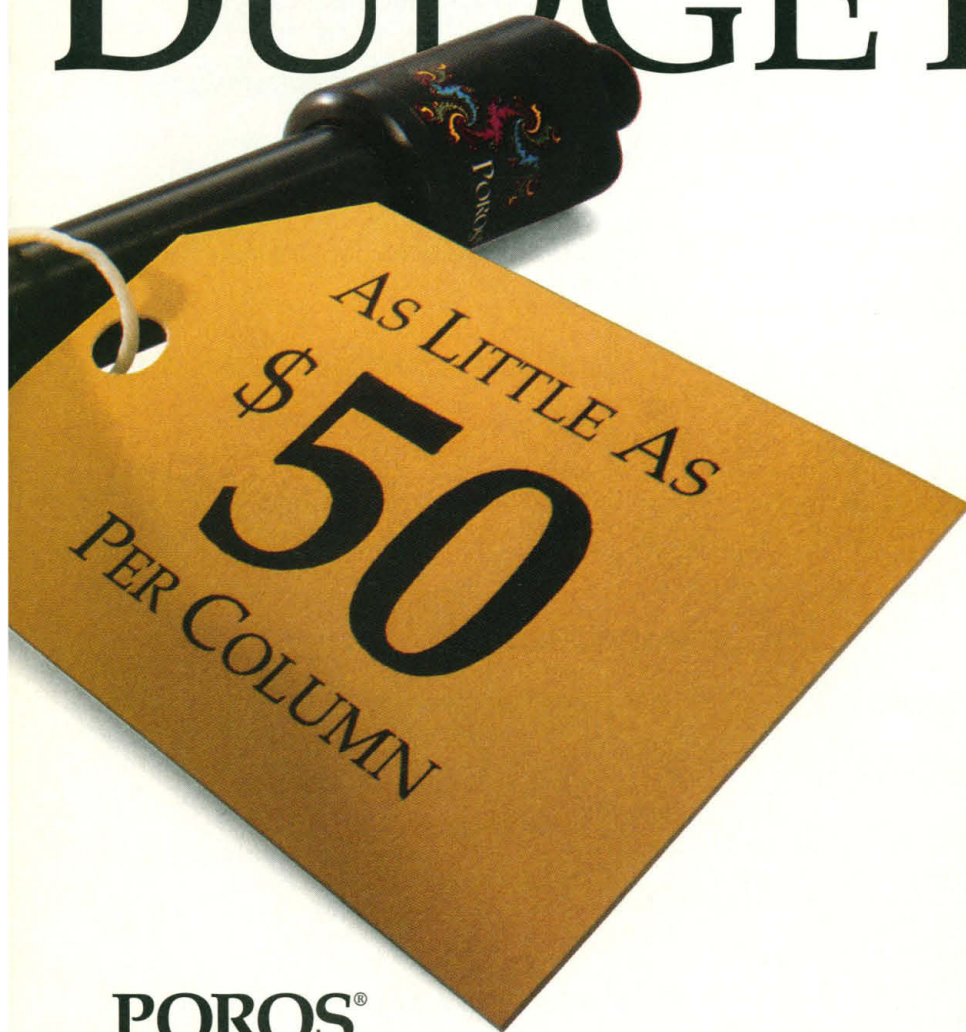
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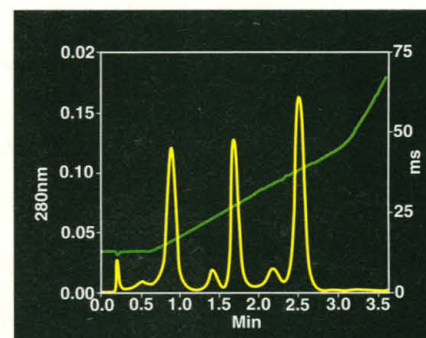
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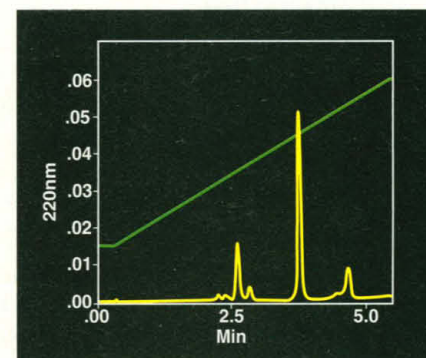


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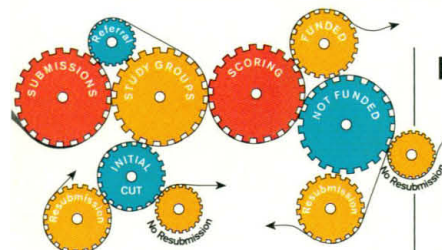
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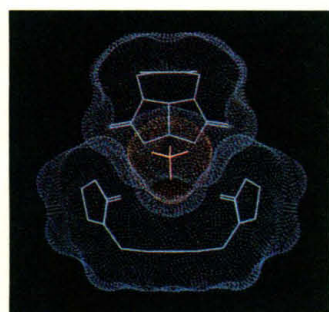
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Model of the enzyme acetylcholinesterase with electrostatic lines of force (yellow) emanating from the interior of the active site (buried). The field lines exit mostly through the main entrance (blue atoms) or through a channel ("back door") to the active site. A

molecular dynamics simulation shows transient opening of this back door (top), which may facilitate the entry or exit of substrate, products, or solvent. See page 1276. [Graphics: Michael K. Gilson, using Insight II software (Biosym)]



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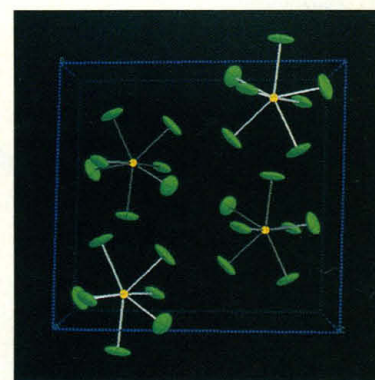
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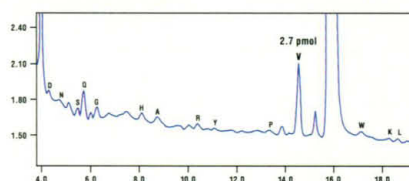
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Raw data from blotted spot of 2D gel of yeast enzyme extract, showing smooth baseline, clean background and yield for the first residue.

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Stopped hotspots?

The past motions of continental and oceanic plates can be inferred in several ways, such as from magnetic anomaly records across ridges, from the tracks of volcanoes produced as a plate moves over mantle hotspots that are presumed to be fixed, or by constructing a circuit through plate boundaries. The last two methods must be used in particular in the Pacific where most of the plates interact along convergent margins. Acton and Gordon (p. 1246) compare these two methods against paleomagnetic data to evaluate past Pacific plate motions and interactions. The predictions from the plate motion circuit are found to be inconsistent with paleomagnetic data, and thus relative motions between hotspots may be much less than implied by earlier work.

Molecular claw trap

Selective trapping of small molecules has usually been achieved with large chemical structures, such as zeolites or macrocyclic molecules. Branda *et al.* (p. 1267; see the news story by Bradley, p. 1222) recently synthesized an organic molecule that can dimerize reversibly through hydrogen bonds; the interface between the molecules resembles the seam of a tennis ball. They now present nuclear magnetic resonance studies which show that this relatively small, self-assembling organic molecule can trap molecules such as methane and ethylene from solution.

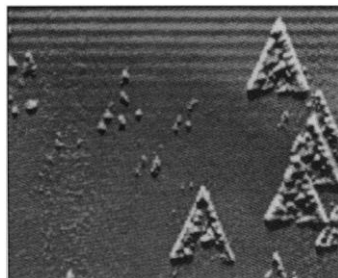
Crystal clear

Atomic force microscopy (AFM) studies of the electrochemical growth of crystals of an organic conductor have revealed differ-

Sizing up coordination number 7

For simple coordination compounds, the electron pair repulsion theory introduced by Gillespie and Nyholm has been remarkably successful in predicting molecular shape. Difficulties arise, however, for atoms with seven ligands, in that several structural types are theoretically possible and because little structural information is available for simple seven-coordinate molecules. Vogt *et al.* (p. 1265) now report the structure of rhenium heptafluoride (ReF_7) in its lowest temperature solid phase. High-resolution powder neutron diffraction studies reveal that, at 1.5 kelvin, the lowest energy solid-state configuration is that of a distorted pentagonal bipyramid.

ent growth modes on various crystal faces. Hillier *et al.* (p. 1261) performed their in situ AFM studies on (tetrathiafulvalene) $\text{Br}_{0.76}$ grown on highly ordered pyrolytic graphite. On most faces, growth modes can be correlated with the anisotropic intermolecular bonding of the crystal. However, unusual self-



similar islands of triangular geometry, 200 to 5000 angstroms on a side, form on the (011) face and reflect the role of molecular topography on growth.

Suddenly sensitive

Finding a temperature-sensitive mutant of a particular protein can be a frustrating problem. Dohmen *et al.* (p. 1273) show how to construct a temperature-sensitive mutant on demand by using the N-degron, the amino-terminal portion of certain proteins that directs the degradation of the protein. With a temperature-sensitive variant of the N-degron, the contiguous protein is only degraded at a tem-

perature high enough to promote partial unfolding of the N-degron. Fusion of this variant N-degron protein subjects the whole fusion protein to the processive degradation directed by the N-degron at the appropriate temperature.

Lymphoma origins

A translocation involving chromosomes 2 and 5 is found in a significant fraction of anaplastic large-cell lymphomas, a common form of non-Hodgkin's lymphoma affecting children and young adults. Morris *et al.* (p. 1281) show that the translocation fuses a protein tyrosine kinase gene, *ALK*, with *NPM*, a gene that encodes a nucleolar phosphoprotein involved in ribosome assembly. The resultant dysregulation of kinase activity may contribute to malignant transformation. Identification of the fused genes could lead to a more sensitive diagnostic test for this cancer, which is frequently misdiagnosed.

Neuronal plasticity

Connections in the adult mammalian brain are not permanent but can undergo changes in response to learning or perceptual tasks. Two reports explore such neuronal plasticity. Pascual-

Leone *et al.* (p. 1287) show that human subjects, as they learned a motor task, exhibited larger cortical motor outputs. Once the subjects learned the task and decreased their reaction times to a stimulus, their cortical motor outputs returned to their base-line levels. Zohary *et al.* (p. 1289) recorded responses from directionally sensitive neurons in rhesus monkeys that were performing a motion discrimination task. Short-term improvements were seen in both neuronal and perceptual sensitivity.

Form follows function

Relatively simple models of cellular interactions, such as gradients in morphogenesis and differences in cell adhesion, can account for the formation of intricate, highly ordered biological structures. Accounting for the precise development of discontinuities and transitions in more complex structures, such as mammalian brain, is trickier. For example, in the primate brain, the lateral geniculate nucleus (LGN), the relay structure between the eyes and the cerebral cortex, has a transition from a six-layer to a four-layer structure. Lee *et al.* (p. 1292; see the Perspective by Stryker, p. 1244) constructed a thermodynamic model for development of the LGN in which inputs from the retina were weighted for positional energies, which favor the six-layer structure, or for correlational energies, which group neurons with similar electrical activity and favor the four-layer structure. This laminar transition occurred in the middle of the LGN. Addition of the blind spot, which projects no retinal ganglion cells, introduced a discontinuity in the weighting that localized the transition to the portion of the LGN coding for the blind spot.

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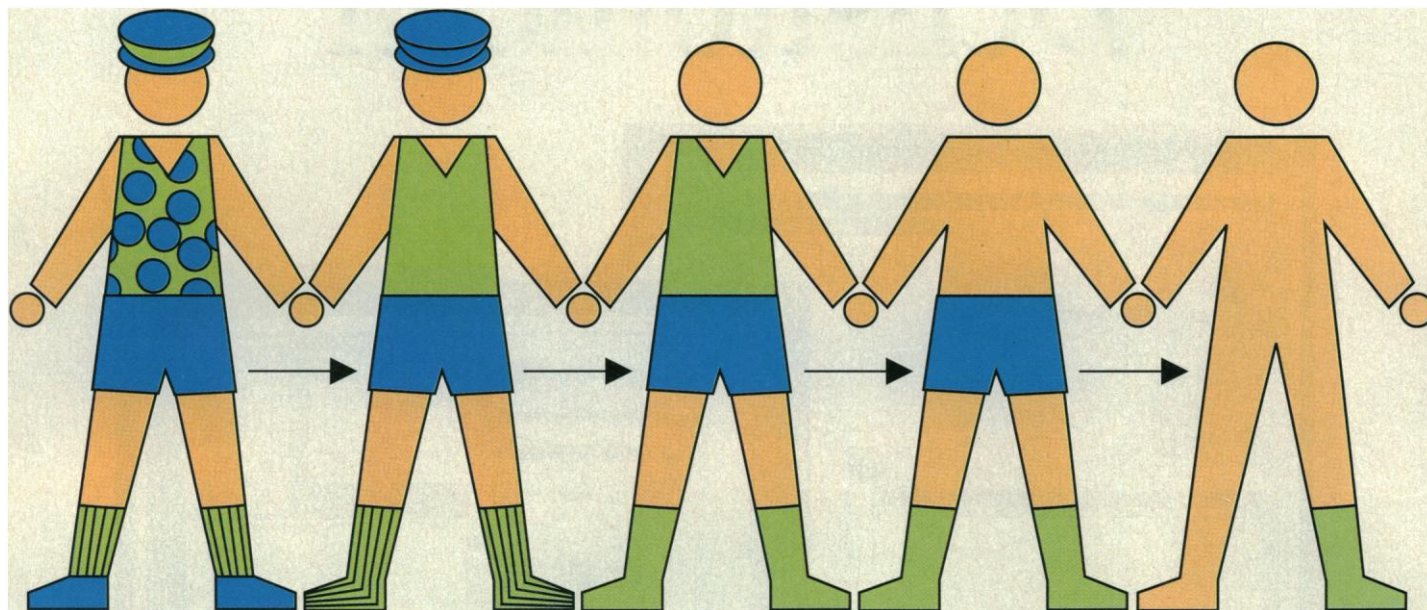
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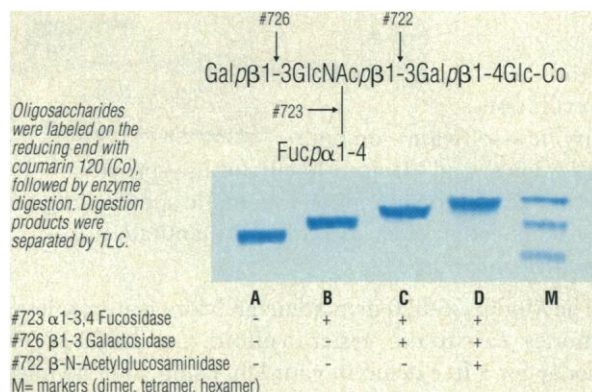
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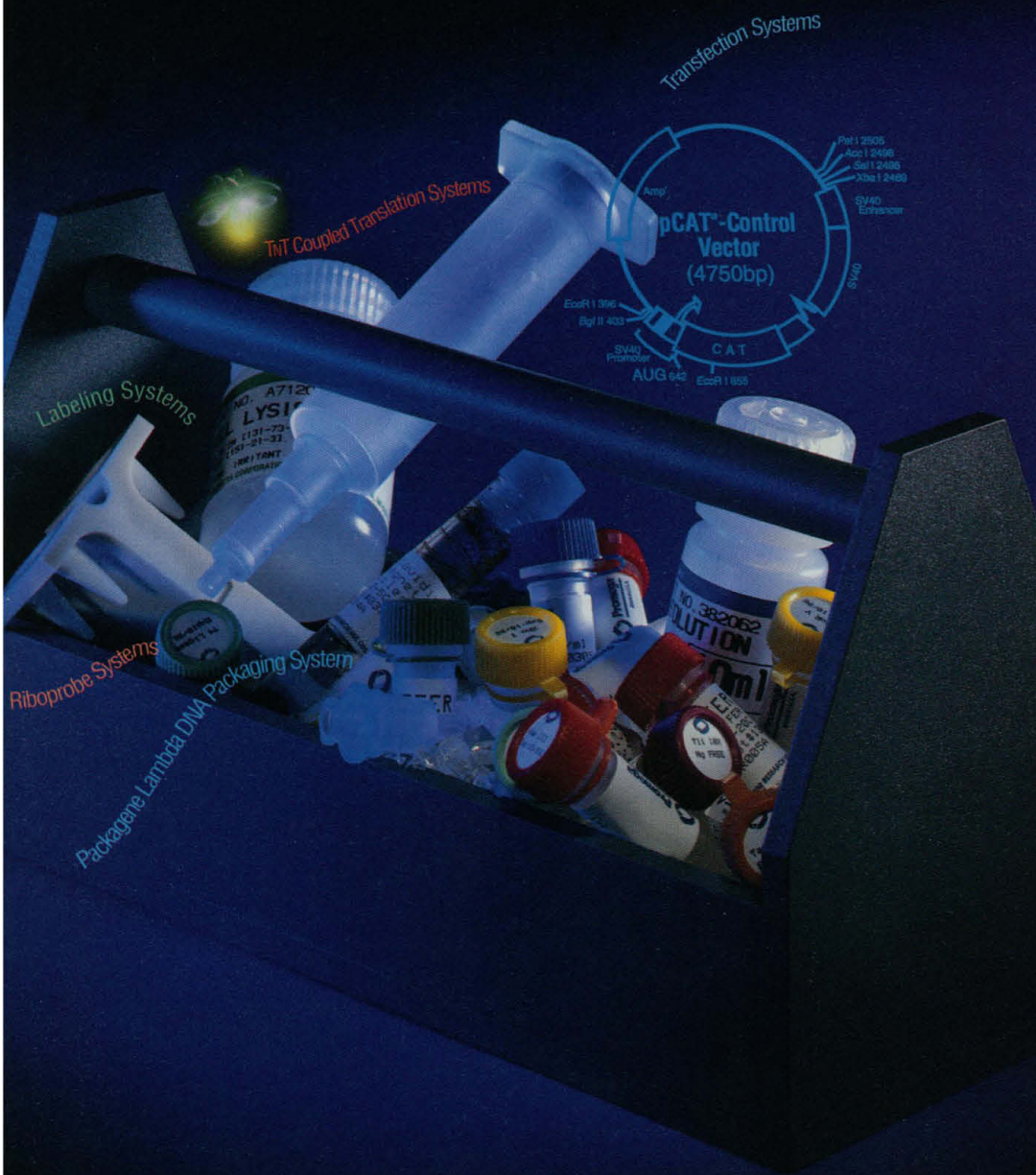
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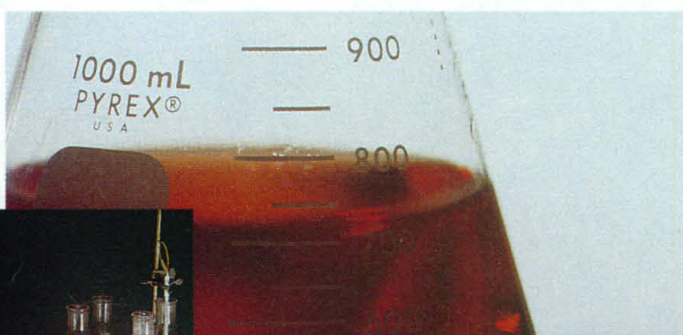
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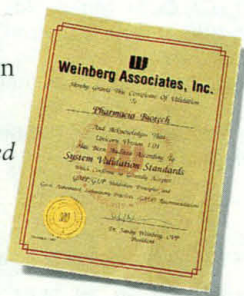


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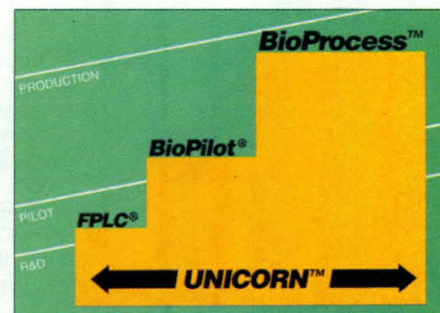
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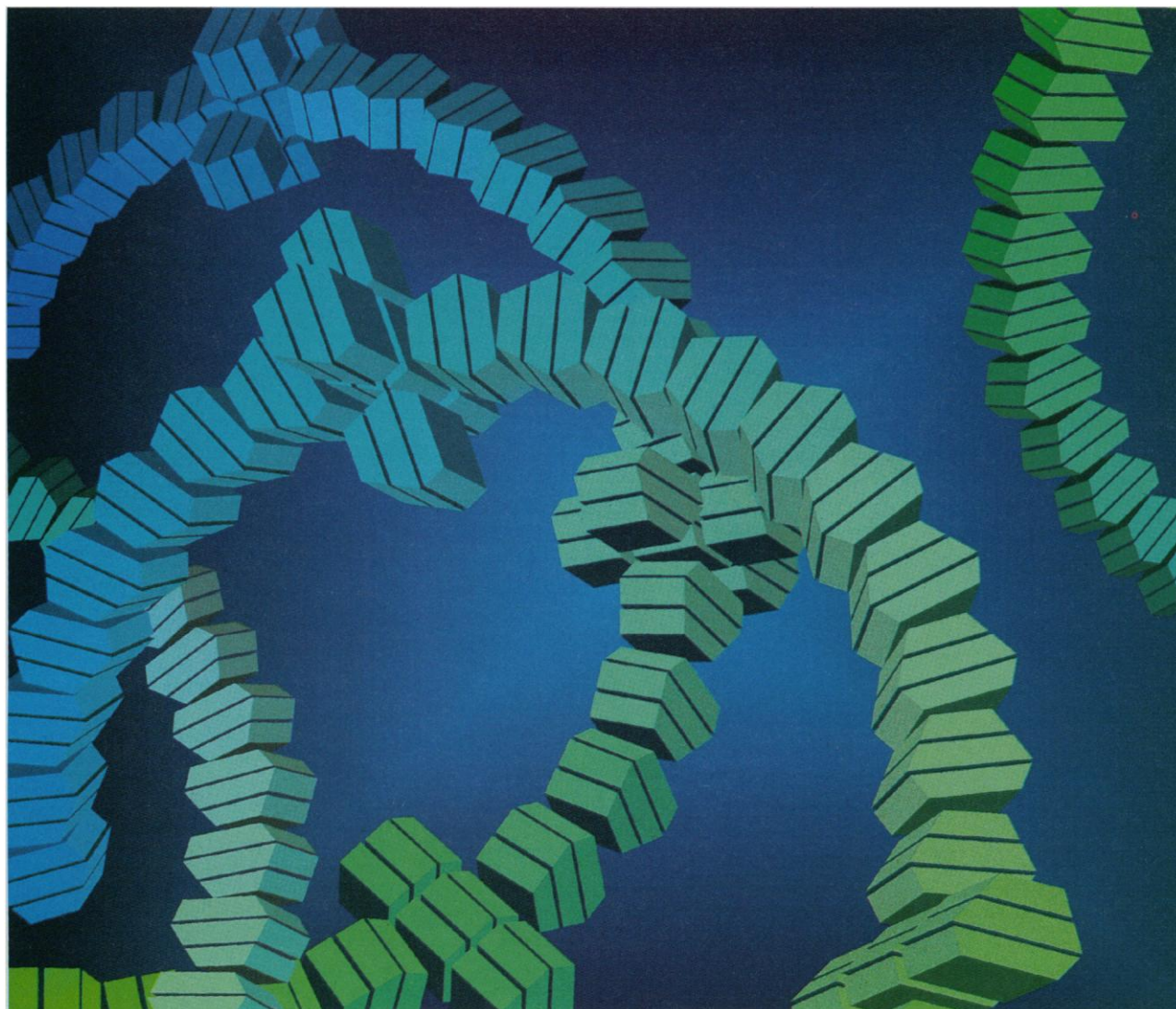
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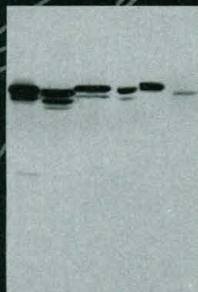
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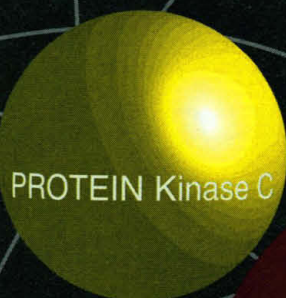
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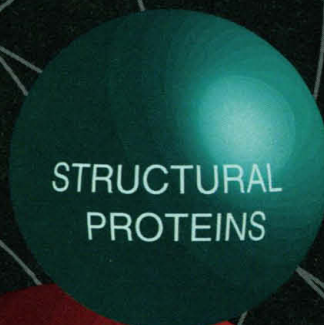
Anti-ISGF3,
Western blot.



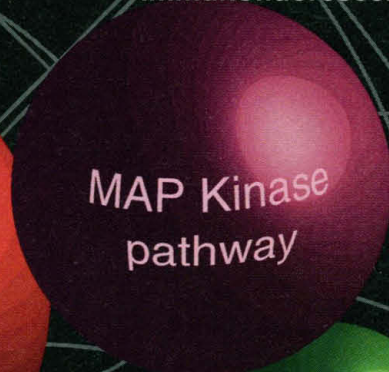
Anti-inducible
Nitric oxide synthase (NOS),
Immunofluorescence.



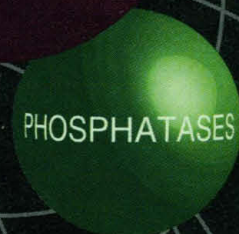
PROTEIN Kinase C



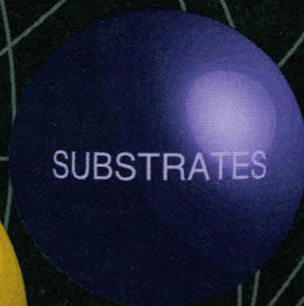
STRUCTURAL
PROTEINS



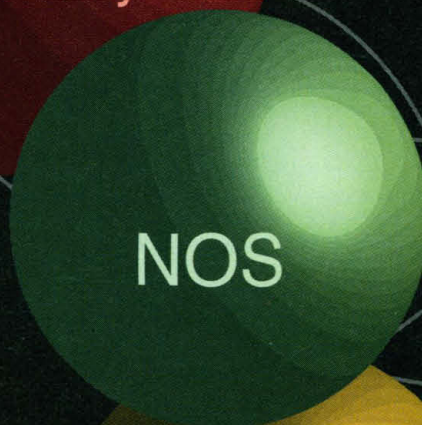
MAP Kinase
pathway



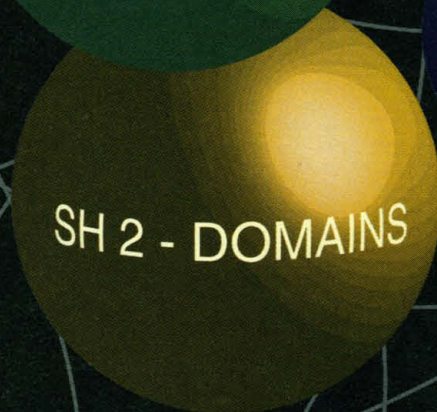
PHOSPHATASES



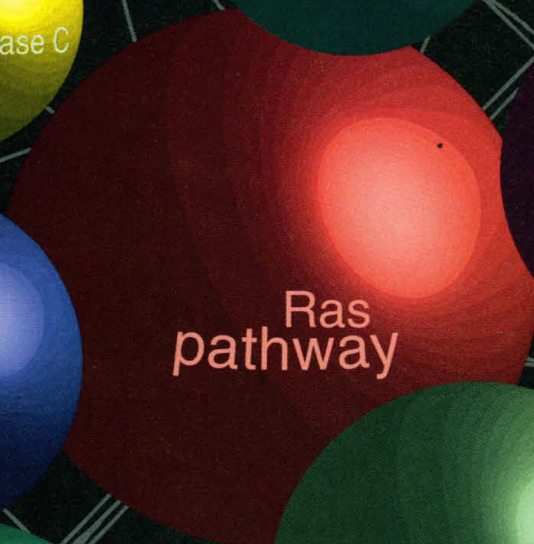
SUBSTRATES



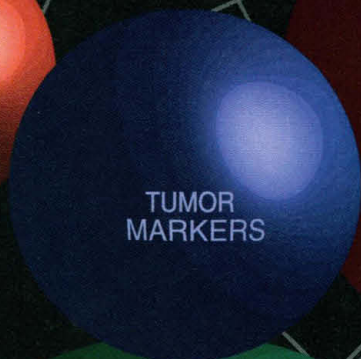
NOS



SH 2 - DOMAINS



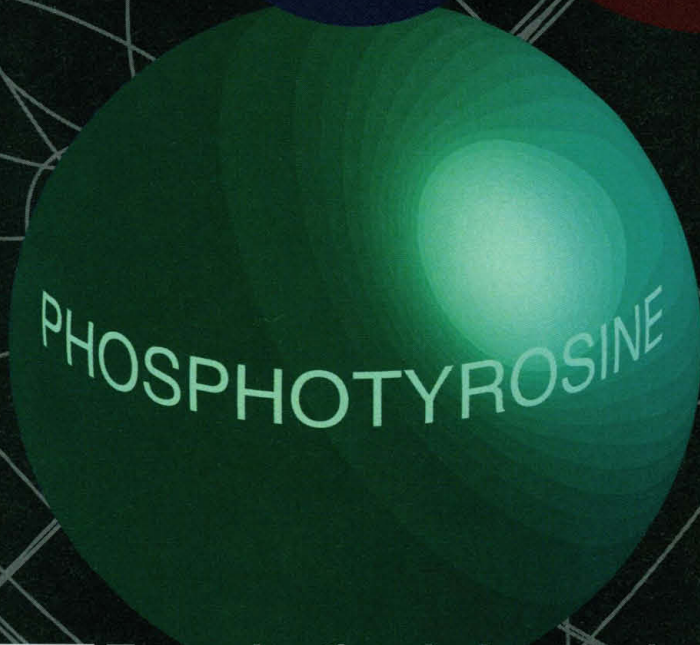
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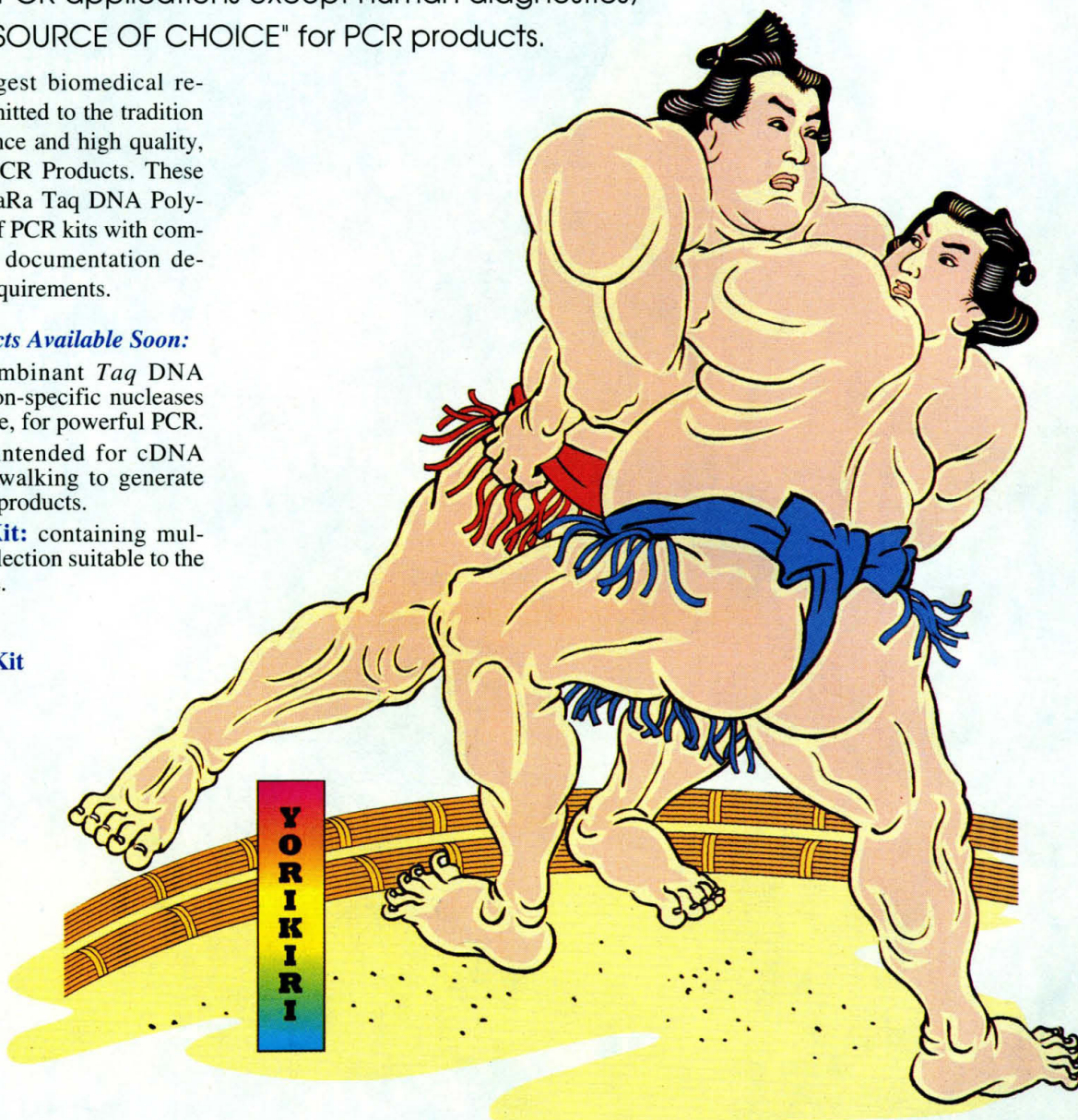
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Stresa, Italy • September 9-10

Endothelins in Endocrinology

Scientific Organization: I. T. Cameron (UK) • M. J. Dunn (USA) • M. Serio (I)

Florence, Italy • October 6-8

Immunology

Differentiation Therapy

Scientific Organization: A. Kimchi (IL) • G.B. Rossi (I) • S. Waxman (USA)

Herzlia, Israel • March 7-10

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Scientific Organization: A. K. Abbas (USA) • S. Romagnani (I)

Florence, Italy • March 28-30

Primary Immunodeficiency Diseases

Scientific Organization: F. Aiuti (I) • M. D. Cooper (USA) • F. S. Rosen (USA)

Orvieto, Italy • June 18-21

New Horizons in Gynaecological Malignancies

Scientific Organization: D. Ayalon (IL)

Eilat, Israel • November 16-18

Reproduction

Puberty: Basic and Clinical Aspects

Scientific Organization: C. Bergadá (ARG)

Buenos Aires, Argentina • April 6-8

Male Factor in Human Infertility

Scientific Organization: J. Tesarik (F)

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Immunocontraception

Scientific Organization: O. Nilsson (S)

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Scientific Organization: P. Burckhardt (CH) • R. P. Heaney (USA)

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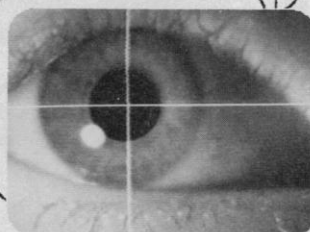
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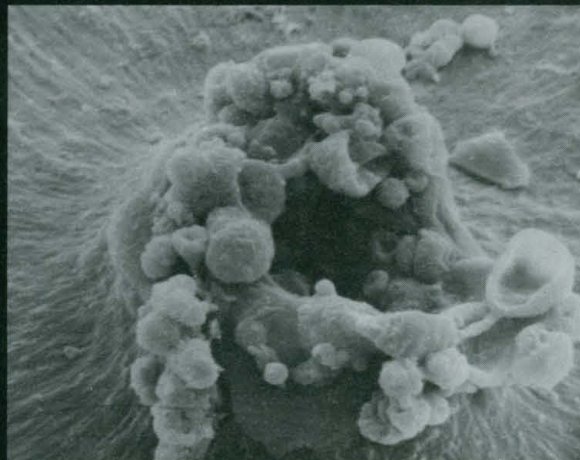
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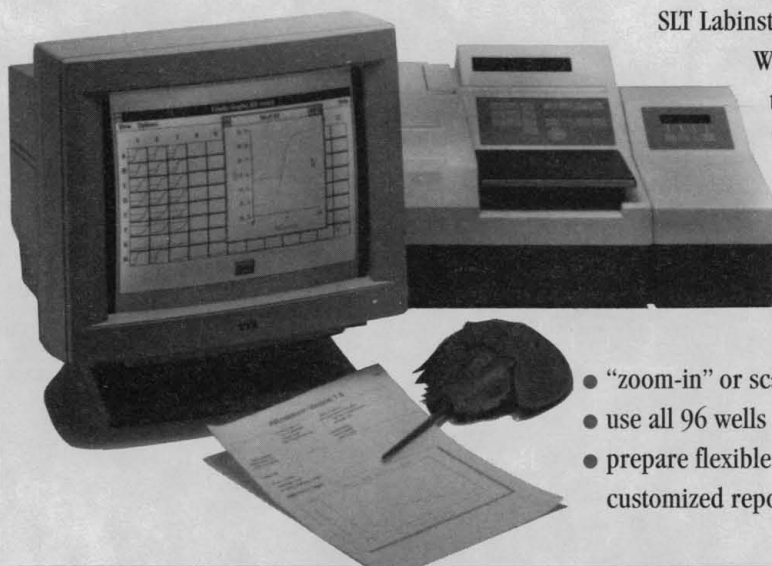
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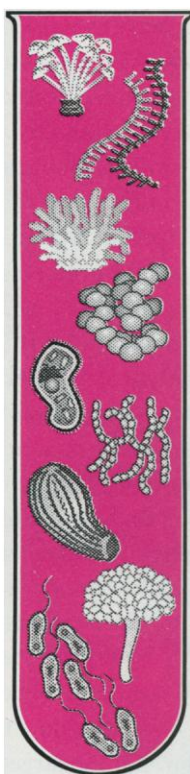
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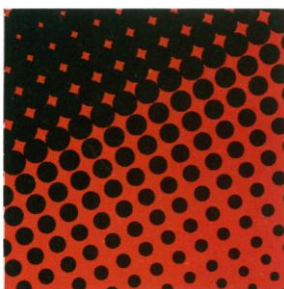
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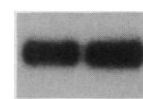
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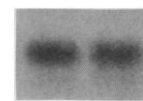
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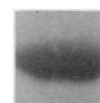
Northern blot of rat
growth hormone
(rGH) mRNA (1 kb)



Southern blot of EcoR1
rGH gene fragment
(11.4 kb)



Western blot of rGH
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