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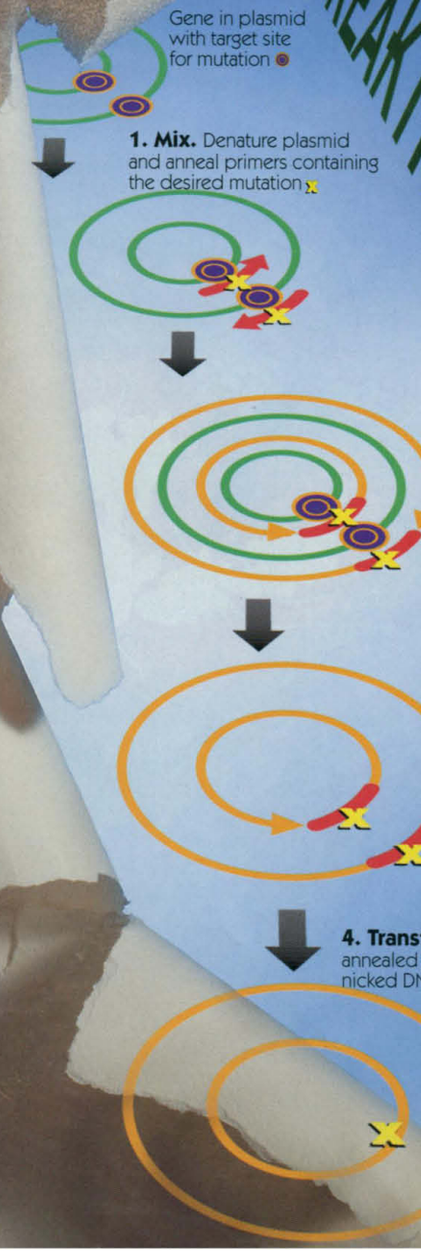

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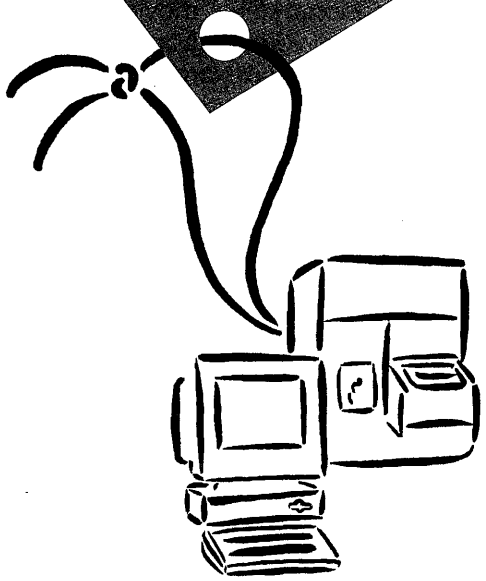

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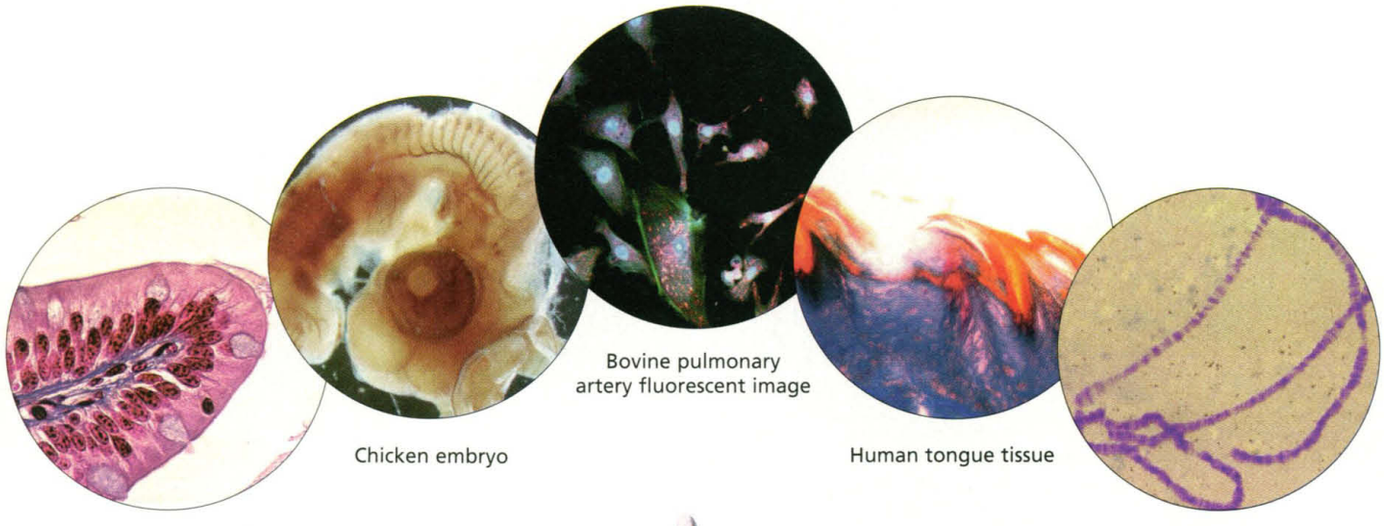

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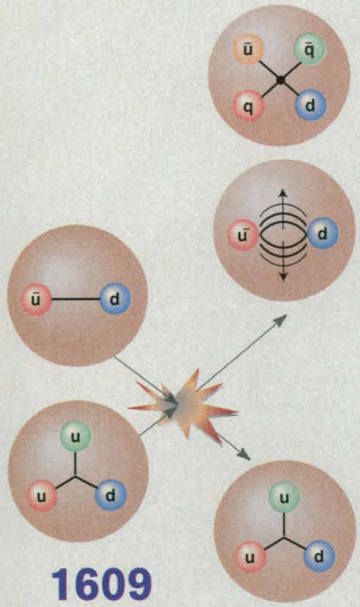

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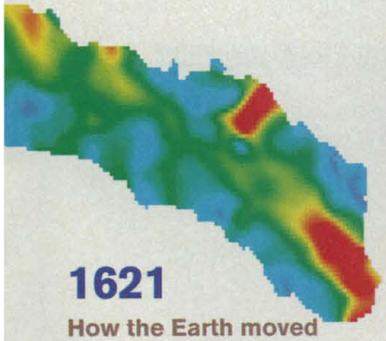

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COVER

The radiation of animal life around the Precambrian-Cambrian boundary (the "Cambrian Explosion") was a major event in the history of life. The cover shows phosphatized fossil embryos (~0.5 millimeters in diameter) of two animals from that time, a probable cnidarian (rear) and a segmented worm (front). Both appear to have been direct developers (no larval stage) with large, yolk-filled eggs. The fossilization of soft embryos opens windows on the study of developmental biology of extinct organisms. See page 1645. [Image: S. Bengtson and Y. Zhao]

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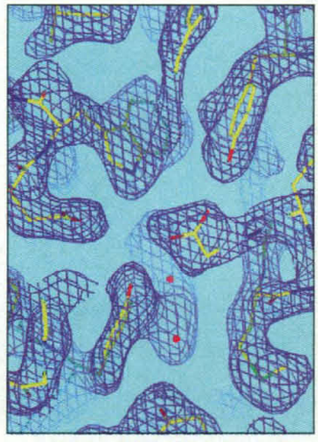
www.sciencemag.org/feature/data/deutschman/index.htm



1607 & 1676
A closer look at an old friend

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Rocks northward bound

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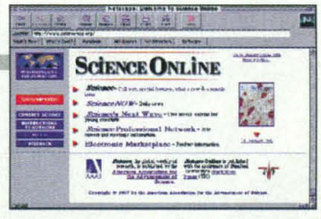

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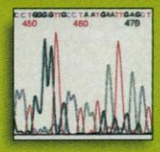

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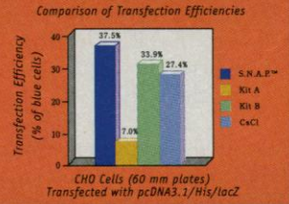

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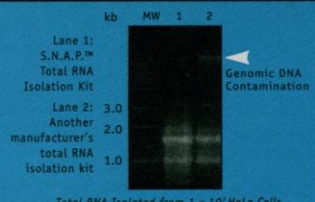

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Steadier light

Convection in Earth's atmosphere refracts light and thus significantly reduces the resolution of astronomical observations. Max *et al.* (p. 1649) present a means to correct for this atmospheric distortion using observations of laser-produced sodium fluorescence in Earth's mesosphere. The approach improved two measures of resolution by about a factor of 2 and may allow ground-based telescopes to attain the diffraction limit.

Smoke clouds

The effects of aerosols and particles suspended in the atmosphere on the radiative properties of clouds have been difficult to quantitate; direct measurements are scarce, and the different effects involved are not readily isolated. Kaufman and Fraser (p. 1636) analyzed satellite data over South America to establish the dependence of climate forcing by smoke particles from biomass burning on the availability of water vapor. The results indicate that smoke increases cloud reflectance and allow an estimate of climate forcing by smoke clouds to be made.

Playing several roles

Human herpesvirus–8 is associated with Kaposi's sarcoma and appears to encode several proteins that resemble human cell signaling molecules. Kledal *et al.* (p. 1656) show that one of these proteins, vMIP-II, is unusual in its ability to act as a ligand—it can bind with high affinity to the human chemokine receptor CXCR4 and the structurally different receptors CCR5, CCR2, CCR1, and the cytomegalovirus-encoded receptor US28. In the presence of vMIP-II, the normal rapid movement of calcium from intracellular storage in response to chemokines did not occur and chemotaxis induced by RANTES was blocked. As CXCR4 and CCR5 are major co-receptors for entry of human immunodeficiency virus–type 1 into cells, vMIP-II may provide insight into new therapeutic candidates against AIDS.

A long trip up the coast

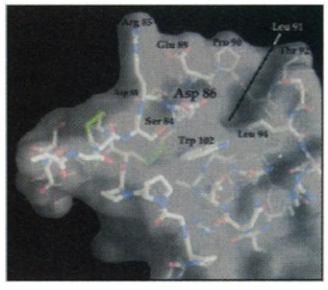
A large part of coastal British Columbia and Alaska has been suggested to have originated at low latitudes and migrated northward, but the primarily paleomagnetic evidence has been controversial because original inclinations (which give paleolatitudes of rocks) may have been altered or rotated. Ward *et al.* (p. 1642; see the news story by Kerr, p. 1608) identified a series of sedimentary rocks in Vancouver Island that are near horizontal and remarkably unaltered. Paleomagnetic data from these rocks indicate that the rocks were at the latitude of Baja California during the Cretaceous.

Life and lipids

When cells are in the process of dying, their lipid metabolism changes. Some of the lipids, like ceramide, are thought to be intimately involved in the death pathway, which can be triggered by "death receptors" on the surface of cells or by radiation. De Maria *et al.* (p. 1652) show that GD3 gangliosides accumulate when death is induced, and that these lipids can also induce death if overproduced. When their synthesis is inhibited, the death program is prevented. These natural products can disrupt the transmembrane potential of the mitochondria, a critical event in the death pathway, thereby providing a link from initiation to execution.

Leukemia virus structure

The x-ray crystal structure to 2.0 angstrom resolution of a fragment of Friend murine leukemia virus containing the receptor-binding activity (RBD) has been determined by Fass *et al.* (p. 1662). The RBD is an L-shaped molecule that contains a conserved β-sheet core which acts as a scaffold to display helical variable regions that appear to determine receptor specificity. These findings have importance both for basic virology and in the design of vectors for gene therapy.



Licking stress

A warm and loving childhood is thought to have a greater likelihood of yielding well-adjusted offspring that can cope with stress. Liu *et al.* (p. 1659; see the Perspective by Sapolsky, p. 1620) examined the neuroendocrine responses in adult rats as a function of the mother-pup contact during the early postnatal life. Greater licking and grooming as a pup yielded an adult with a more effective glucocorticoid regulation of adrenalcorticotropin release; in brief, the response to stress was less severe and shorter lived.

Older bird divergence

The origin of the great variety of North American bird species has been thought to coincide with the glaciation of the Late Pleistocene. Individual populations of any given species that were isolated by encroaching barriers of inhospitable territory would each be allowed to follow their own genetic path and diverge into separate species. Klicka and Zink (p. 1666; see the Perspective by Rosenzweig, p. 1622) analyzed mitochondrial DNA of various bird species and now find that the evolutionary history of species divergence recorded in the DNA extends much further back than the Pleistocene. The divergence of North American bird species was more gradual than expected and well under way before this glacial cycle.

Arrested growth

The stages of metazoan development, from early cleavage to hatched young adults, have been identified in fossils. Bengtson and Zhao (p. 1645; see the cover) report the discovery of many fossilized embryos of metazoans from the Lower Cambrian about 550 million years ago. The authors suggest that such fossils might be quite common but have been previously overlooked because of their small size and nondescript morphology.

Providing oxygen

The placenta forms as embryonic cells invade the maternal uterine wall. Genbacev *et al.* (p. 1669) show how specific cellular responses to the microenvironment regulate this process. Cytotrophoblasts of the placenta respond to the lack of oxygen by proliferating, unlike most other cells of the developing embryo. Early in gestation, when the embryo has yet to establish good connections with the uterus, the embryo develops slowly while the placenta proliferates and invades the uterine wall. Once a robust utero-placental blood circulation is established, oxygen levels rise and the embryo develops more rapidly while the placental cells cease to proliferate.

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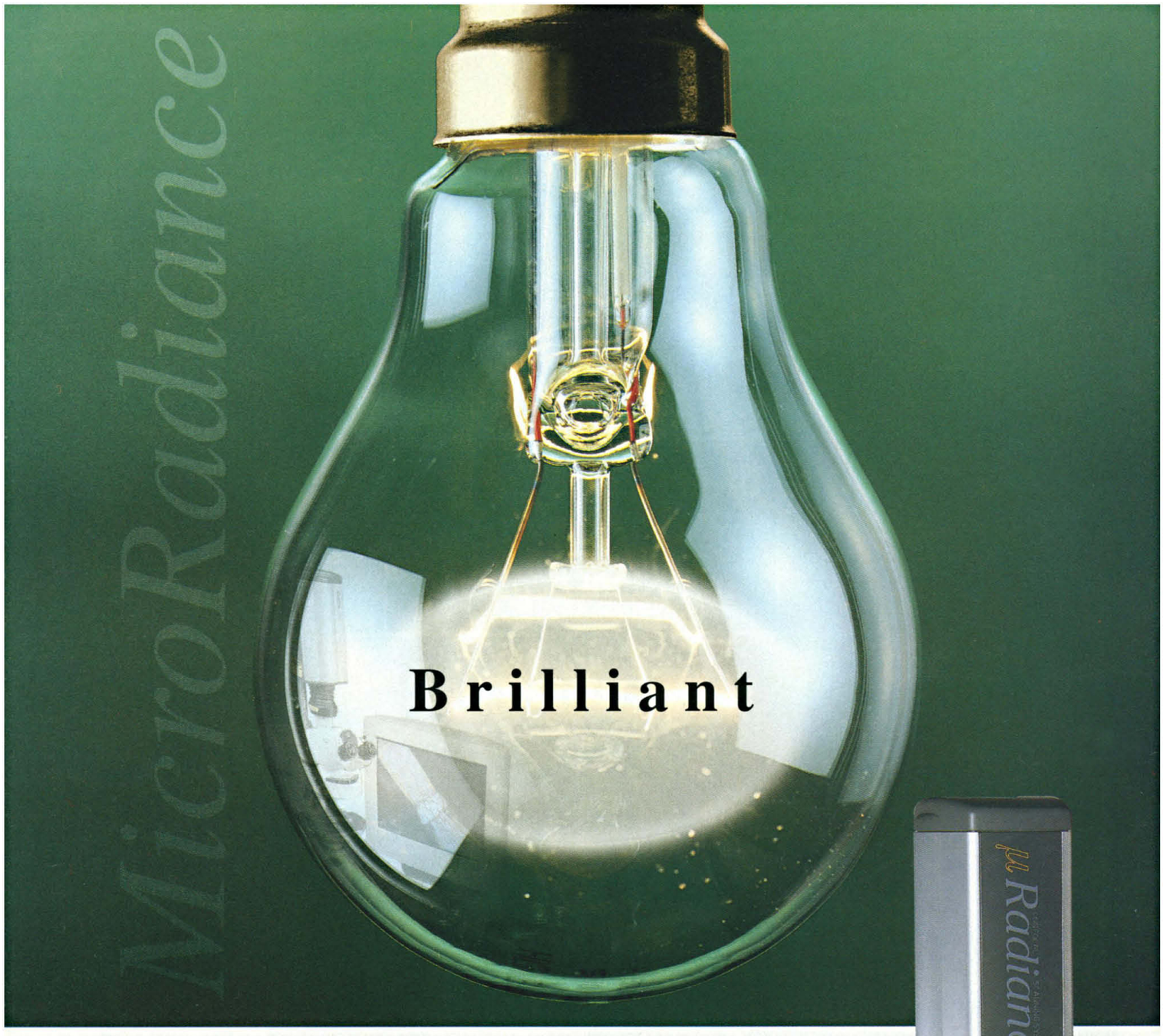

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Amino acid micrographs are courtesy of Michael W. Davidson, director of the Optical Microscopy Division of the National High Magnetic Field Laboratory, a joint venture of The Florida State University, the University of Florida, and Los Alamos National Laboratory.

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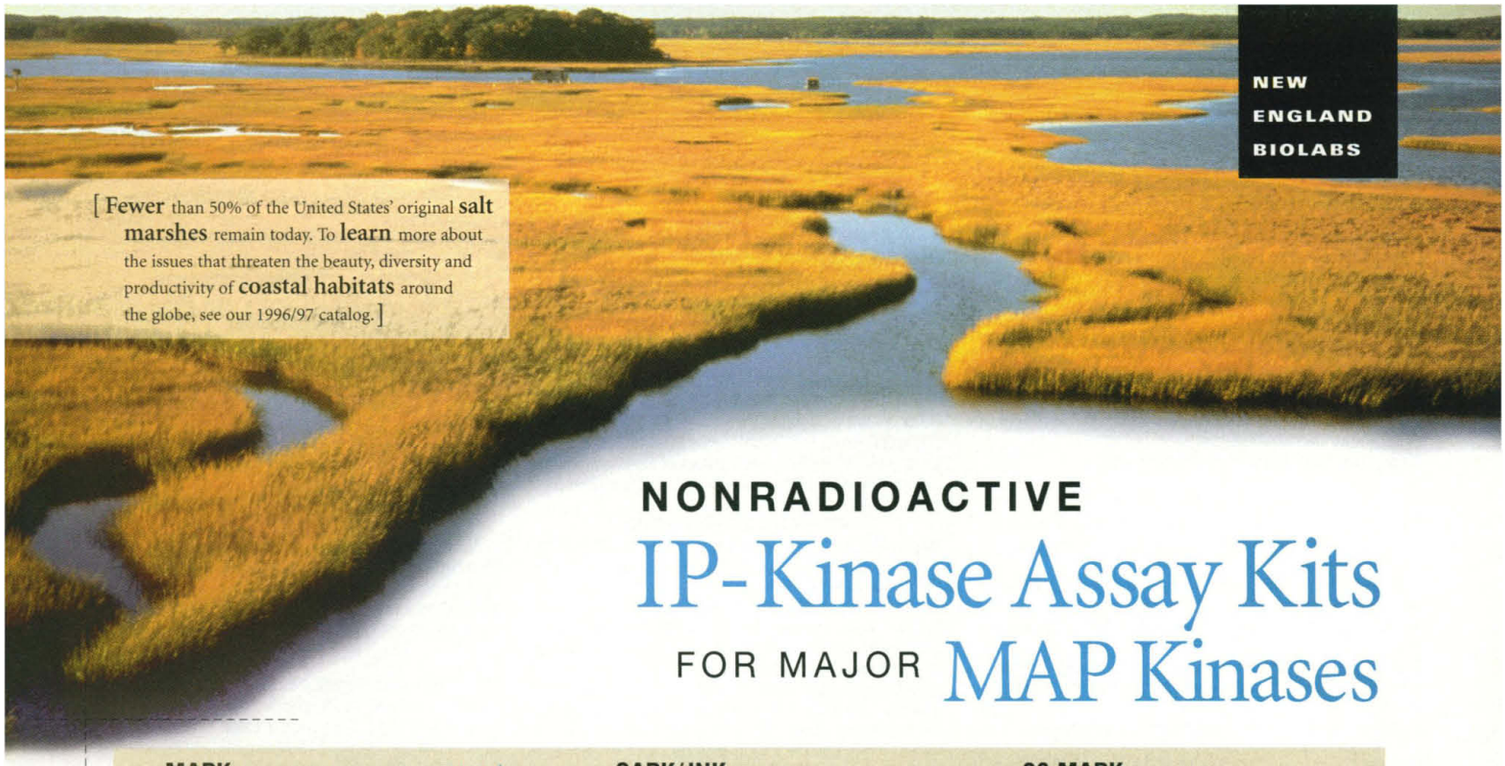

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MAPK Assay Kit *Improved sensitivity*†

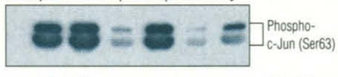
Phospho-Elk1 (Ser383) Antibody

0 10 20 50 100 200 500 FGF treated extracts (µl)

MAP Kinase activity in extracts of FGF-treated SK-N-MC cells was analyzed by phospho-MAPK antibody IP/Kinase assay using Elk1 as a substrate. Phosphorylation of Elk1 at Ser383 was visualized by immunoblotting with Phospho-Elk1 (Ser383) Antibody.

SAPK/JNK Assay Kit

Phospho-c-Jun (Ser63) Antibody

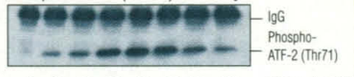


— 10 30 — — — — UV (min)
— — — 10 30 — — arsenite (min)
— — — — — 10 30 anisomycin (min)

SAPK/JNK activity in extracts of treated SK-N-MC cells was analyzed by c-Jun "pull down"/kinase assay. Phosphorylation of c-Jun at Ser63 was visualized by immunoblotting with Phospho-c-Jun (Ser63) Antibody.

p38 MAPK Assay Kit

Phospho-ATF-2 (Thr71) Antibody



0 5 15 30 60 120 240 360 anisomycin (min)

Time course of p38 MAP Kinase activity of anisomycin-treated C6 cells by IP/Kinase assay. Phosphorylation of ATF-2 at Thr71 was measured by western blot using Phospho-ATF-2 (Thr71) Antibody.

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Transcription Factors:	
IκB-α (S32)	#9240
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ATF-2 (T71)	#9220
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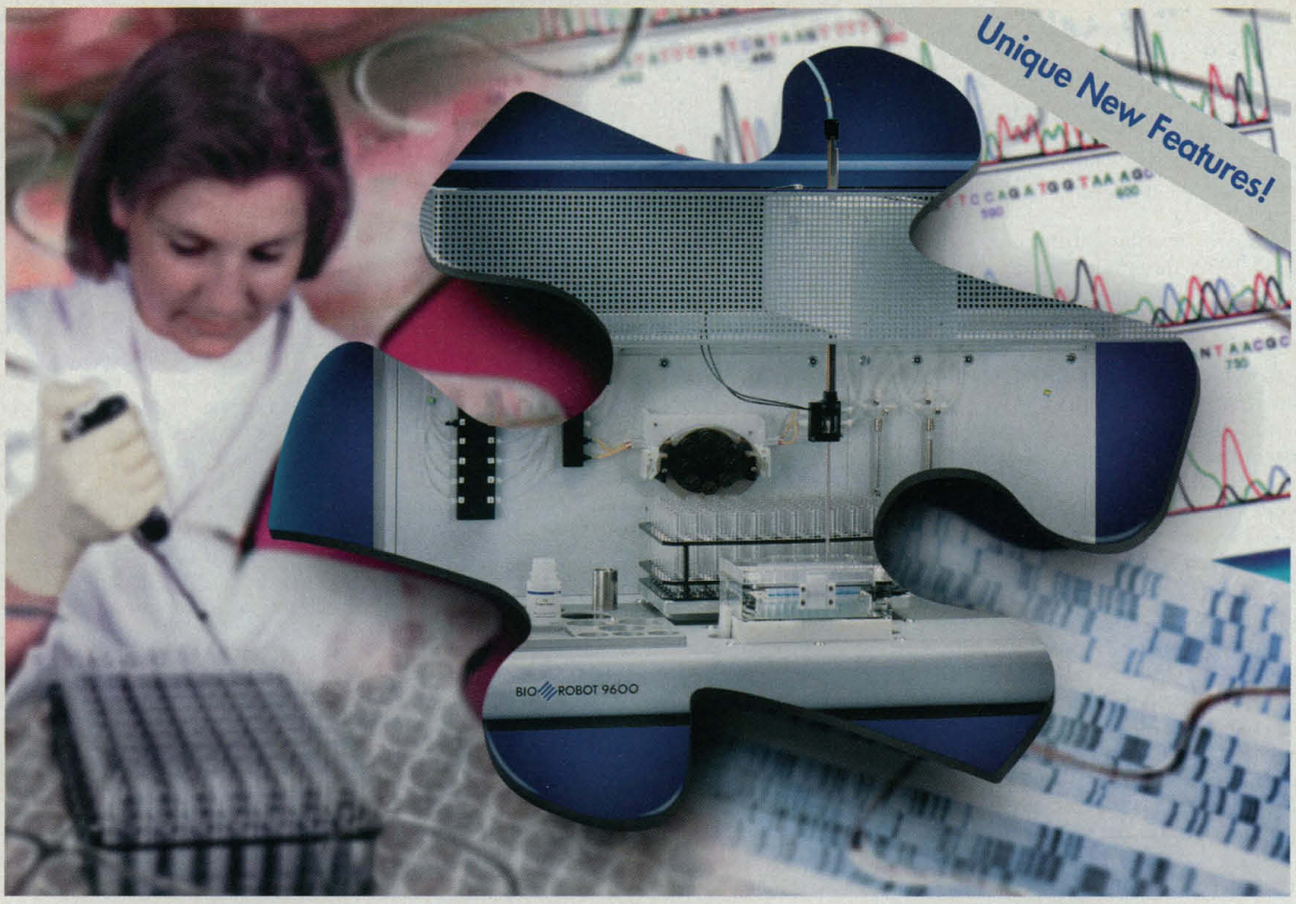

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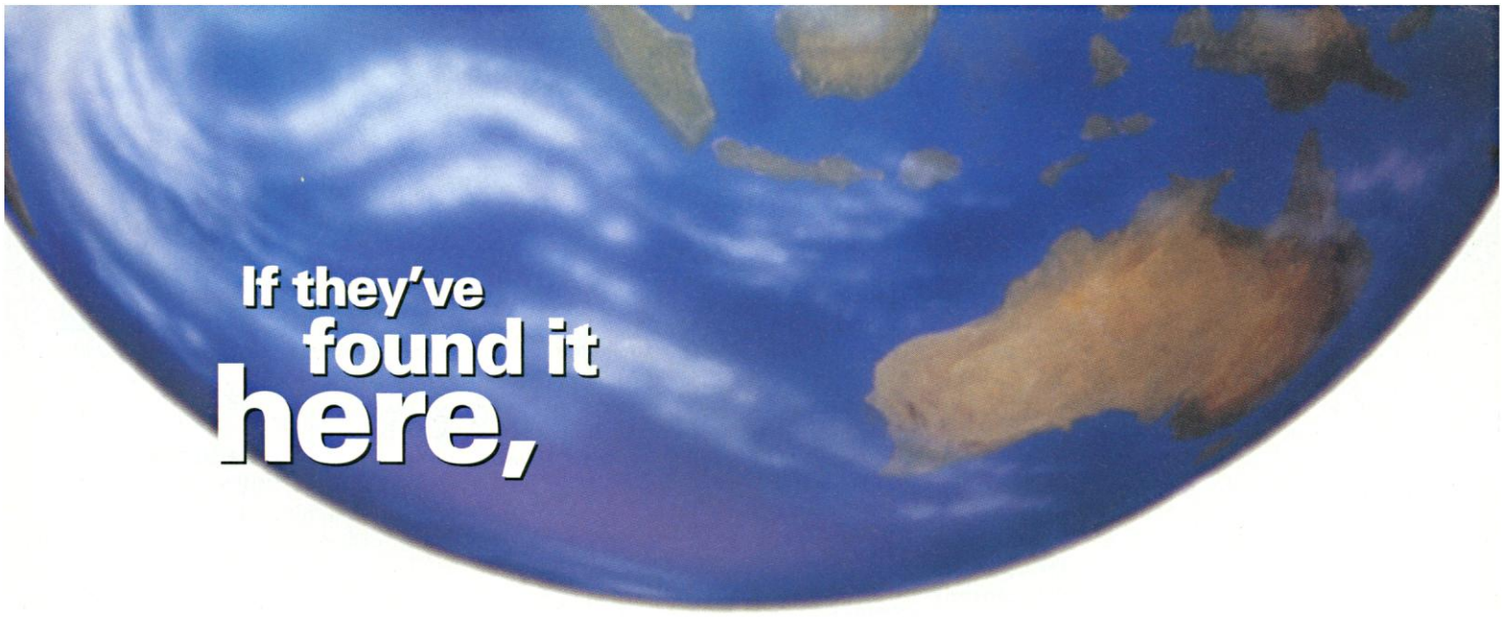

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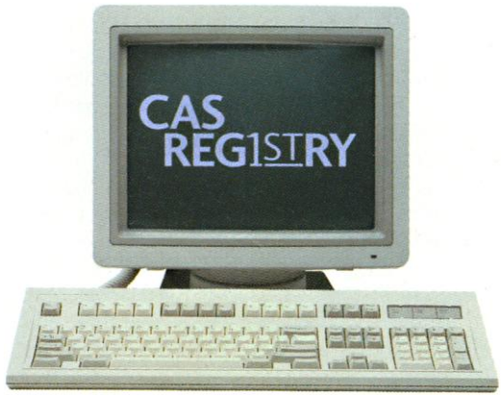

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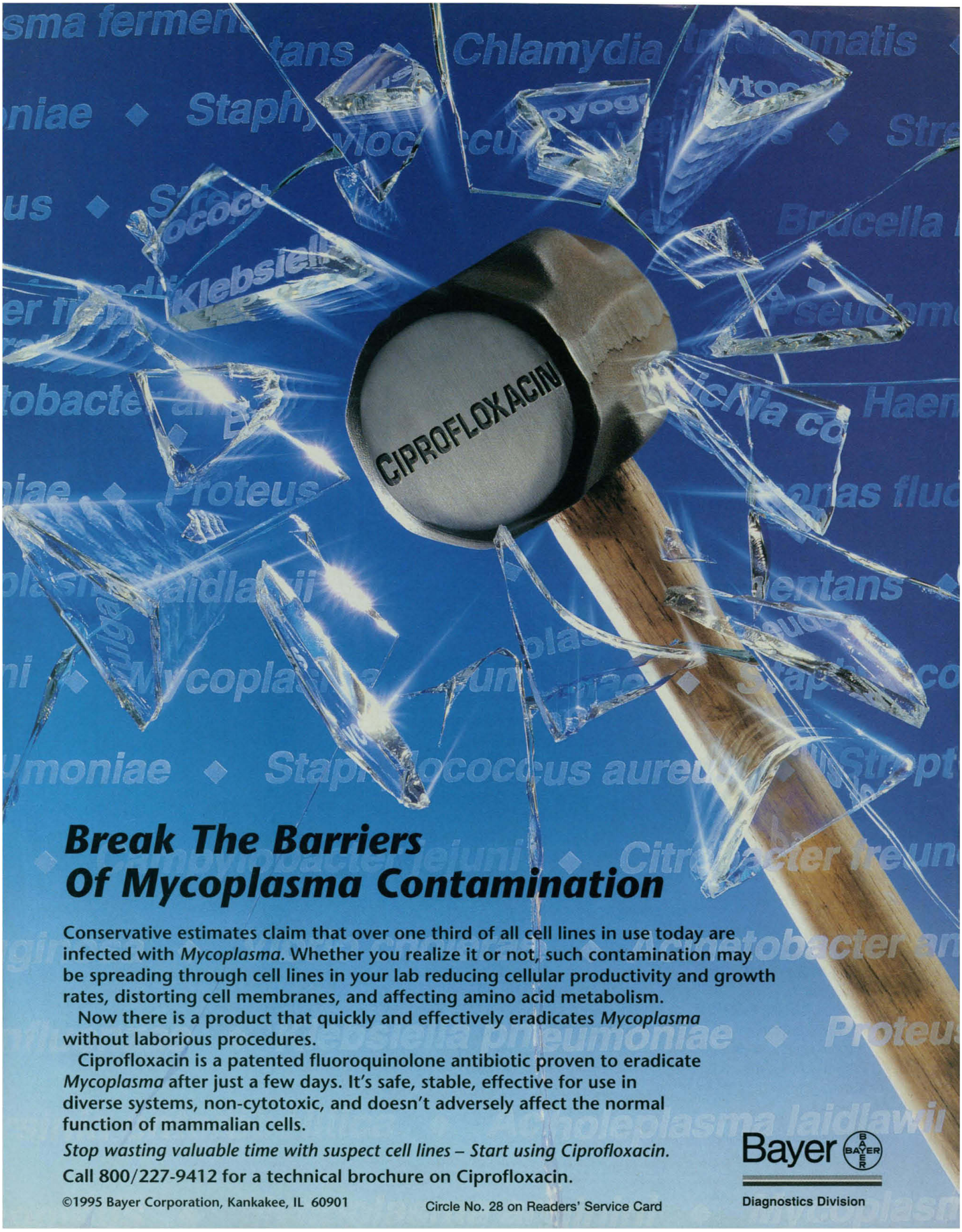

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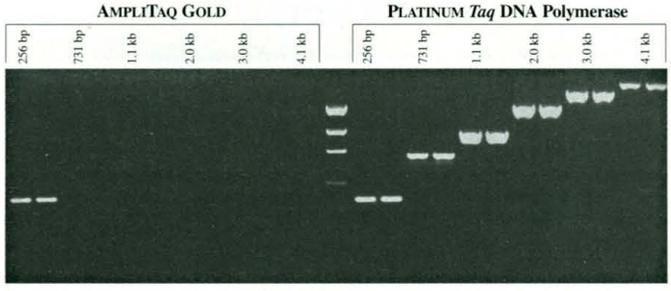

Automatic Hotstart setup at Room Temperature with 100 ng K562 Human DNA. Human betaglobin primers were used in 0.2 µM amounts. **PLATINUM *Taq* DNA Polymerase:** 1.5 mM $MgCl_2$, 0.2 mM dNTPs, 10X PCR buffer with PCR protocol–94°C, 1 min.; 94°C, 30 s; 55°C, 30 s; 72°C, 4 min 30 s. 35 Cycles of PCR performed. **AMPLITAQ GOLD™:** 2.5 mM $MgCl_2$ (as specified by PE), 0.2 mM dNTPs; 10X PCR buffer (PE); 2 units of AMPLITAQ GOLD. PCR protocol–PRE-INCUBATION 10 min @ 94°C prior to cycling; 94°C, 1 min; 94°C, 30 s; 55°C, 30 s; 72°C, 4 min 30 s; 35 Cycles of PCR performed.

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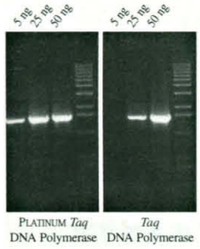

Improved Sensitivity in RT-PCR. Each: 1 unit enzyme; 1,572 bp HeLa cDNA fragment. Cycling: 94°C, 1 min; 35X (94°C, 15 s; 55°C, 30 s; 68°C, 2 min).

Increased Specificity and Yield

- Real-time activation eliminates pre-PCR misprimings.
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- Product design ensures stable storage by completely inhibiting enzyme until used.
- Amplifies templates up to 5 kb.

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- PLATINUM *Taq* DNA Polymerase allows you to use equivalent units with your existing PCR protocols.
- No additional protocol steps such as optimization, incubation, or slow activation of enzyme.

No Contamination Risk

- Your reaction mixture will not be contaminated by wax or any extra reagents.
- Chance of contamination from extra manipulations or additions is eliminated.

Eliminates Safety Hazards

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Product	Cat. No.	Size
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	10966-034	500 units
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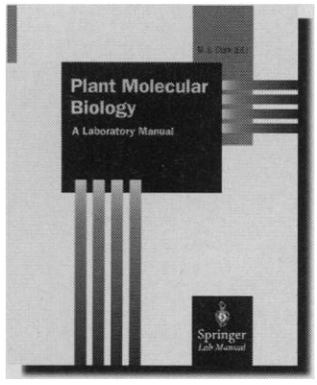

M. Clark (Ed.)

Plant Molecular Biology

A Laboratory Manual

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1997. XXIX, 529 pages. 37 figures, 1 in color. (Springer Lab Manual)
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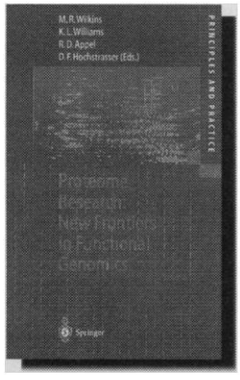
Principles and Practice *new book programme*

Also practice-oriented methods books, but with more extensive background information



M.R. Wilkins, K.L. Williams, R.D. Appel, D. Hochstrasser (Eds.)

Proteome Research: New Frontiers in Functional Geonomics

Recent advances in 2D gel electrophoresis, protein microanalysis and bioinformatics have made possible the systematic analysis of proteins of a tissue or organism. This approach has aquired the name "Proteome" research, indicating that it can be considered as "the other side to the genome project", and the results of proteome analysis have considerable significance for studies of genomes. Proteome research is also attracting considerable interest from pharmaceutical companies, and has extensive potential clinical applications.

1997. Approx. 250 pages. 36 figures, 16 in color.
(Principles and Practice)
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G. Isenberg (Ed.)

Modern Optics, Electronics and High Precision Techniques in Cell Biology

The techniques described in this book provide an alternative method to understanding cellular biological structures and processes. Molecular genetic methods mainly analyse single molecules or very small cellular parts, which does not necessarily enhance our understanding of the fundamental cellular processes. However, using techniques such as atomic force, infrared microscopy, neutron reflection, stopped-flow, laser, or biosensoric-based electronics it is possible to study cells or biological systems in their entirety. Physiological processes of celles, such as movement, development, plasticity, regeneration and communication, can be visualized using the high precision biophysical techniques described here.

1997. Approx. 280 pages. 112 figures, 5 in color, 4 tables.
(Principles and Practice)
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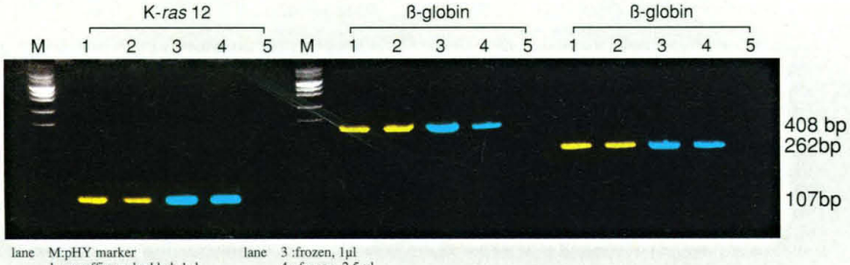
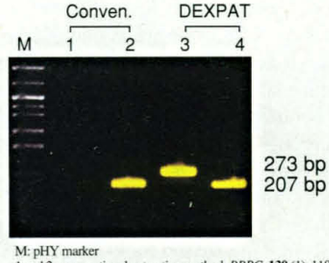
for K-*ras* 12 (107 bp) and ß-globin (408 bp and 262 bp) Amplification from Human Tonsil: 1 µl or 2.5 µl extracts used for 25 µl PCR



lane M:pHY marker
1 : paraffin-embedded, 1µl
2 : paraffin-embedded, 2.5 µl
3 :frozen, 1µl
4 : frozen, 2.5 µl
5 : negative control

Comparison of Extraction Methods
for p53 *exon* 5 (273 bp) and *exon* 6 (207 bp) Amplification from Paraffin-embedded Tissues of Colon Cancer After a 10-year Preservation



lane M: pHY marker
1 and 2 : conventional extraction method: *BBRC* **130** (1), 118-126 (1985)
3 and 4: newly developed TaKaRa DEXPAT™ method

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