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# Stratagene Times

QuikChange Site-Directed Mutagenesis Kit  
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- ▶ Mutation in virtually all transformants

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- ▶ Reduces second-site mutations 150 fold

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Gene in plasmid with target site

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#### 2. Cycle

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#### 3. Digest

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#### 4. Transform

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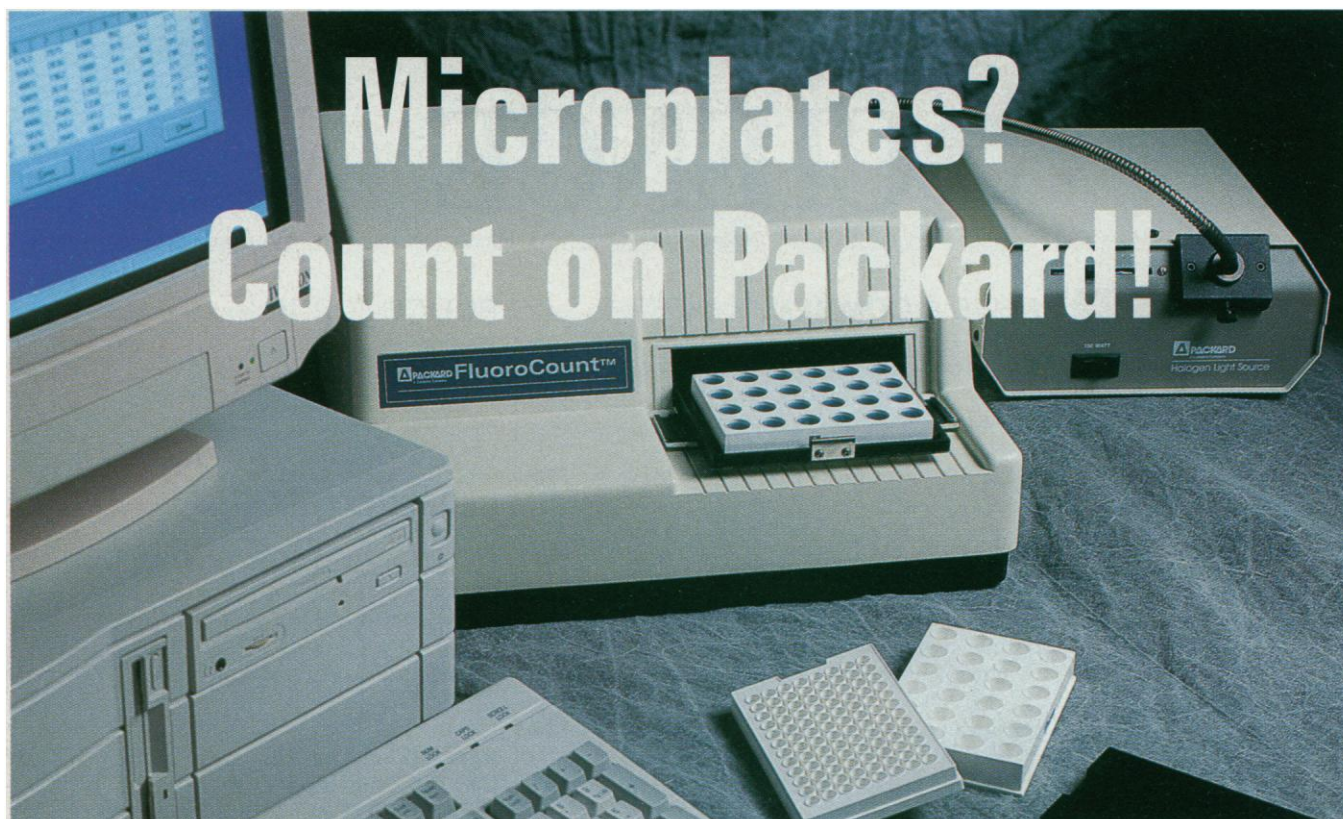


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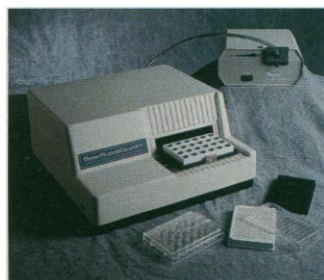
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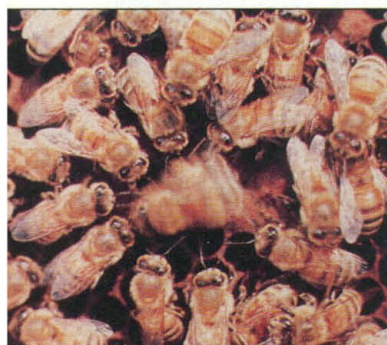


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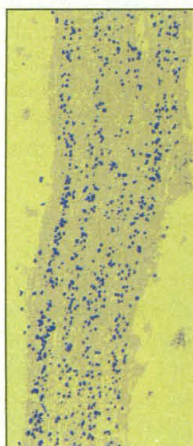
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**739**

Teamwork in evolution



**784**

Neurofila-  
ments in  
motion

## NEWS & COMMENT

- U.S. Neutron Scientists Settle for Less **728**  
Europe and Japan Burst Ahead on **729**  
Neutron Facilities

- Space Station: Construction Costs May **730**  
Bite Into Science

- Despite Anxiety, NIH Begins Merging **731**  
Neuroscience Panels

- Former Soviet Bloc: Hughes Grants **732**  
Brighten Outlook for Elite Researchers

- European Labs Brace for German Cuts **733**

- E-journal: Delayed But Still a Force **734**

## RESEARCH NEWS

- Forging a Path to Cell Death **735**

- Painting Pictures With Atom Waves **737**

- New Experiments Underscore Warnings **738**  
on Maternal Drinking

- Genes vs. Teams: Weighing **739**  
Group Tactics in Evolution


## POLICY FORUM

- The Public Health Risk of Animal **746**  
Organ and Tissue Transplantation  
into Humans  
F. A. Murphy

## PERSPECTIVES

- Is the New Variant of Creutzfeldt-Jakob **748**  
Disease from Mad Cows?  
P. G. Smith and S. N. Cousens

- Why Stress Is Bad for Your Brain **749**  
R. M. Sapolsky

- STATs Find That Hanging Together **750**   
Can Be Stimulating  
S. Leung, X. Li, G. R. Stark

- Calculated Clusters **751**  
D. Voss

## ARTICLE

- The Argentine Precordillera: A **752**  
Traveler from the Ouachita Embayment  
of North American Laurentia  
W. A. Thomas and R. A. Astini

## DEPARTMENTS

- THIS WEEK IN SCIENCE **715**

- EDITORIAL **719**  
Pharmaceuticals Based on Biotechnology

- LETTERS **721**  
Promoting Teaching: S. Metzenberg; H. M. Lenhoff  
• Fears About Illness: L. Carter-Long • German  
Society and German Science: T. R. Garbe • Fetal  
Immune Response: M. Sarfati and G. Delespesse •  
Peopling the Americas: F. E. Leon-S., A. Ariza-  
Deleon, M. E. Leon-S., A. Ariza-C.; P. Parham

- SCIENCESCOPE **727**

- RANDOM SAMPLES **741**  
Multiple Sclerosis: A Multigene Disease • Rainmak-  
ing • Troubled Italian Space Agency Gets New  
Chief • Grassroots Search for Primes ... • ... Or for  
E.T. • Nanotube Pipe Cleaners • U.S. Medalists Pre-  
scribe Tech Strategies

- BOOK REVIEWS **744**  
*The Cigarette Papers*, *Smokescreen*, and *Ashes to Ashes*,  
reviewed by S. D. Sugarman • *The Way Life Works*,  
P. Szurumi • Vignettes

- PRODUCTS & MATERIALS **817**

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## COVER

Chondrule (850  $\mu\text{m}$  in diameter) from the unmetamorphosed Chainpur meteorite, containing excess  $^{26}\text{Mg}$  from decay of  $^{26}\text{Al}$  4.6 billion years ago. Initial abundance of  $^{26}\text{Al}$  is one-fifth of that in Ca-Al inclusions, the oldest solids formed in the solar system, implying that chondrules

formed—and the solar nebula lasted—for more than 2 million years. The chondrule includes glass (dark magenta), brightly colored olivine and dendritic pyroxene, and blocky spinel (light magenta). See page 757. [Transmitted polarized light (plus gypsum plate) photo: G. J. MacPherson]



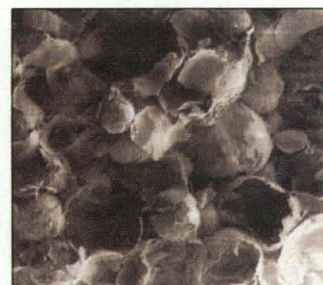
## RESEARCH ARTICLE

- Evidence for Widespread  $^{26}\text{Al}$  in the Solar Nebula and Constraints for Nebula Time Scales** 757  
S. S. Russell, G. Srinivasan, G. R. Huss, G. J. Wasserburg, G. J. MacPherson

## REPORTS

- "Single-Electron Parametron": Reversible Computation in a Discrete-State System** 763  
K. K. Likharev and A. N. Korotkov
- "Tubules-Within-a-Tubule" Hierarchical Order of Mesoporous Molecular Sieves in MCM-41** 765  
H.-P. Lin and C.-Y. Mou
- Oil-Water Interface Templating of Mesoporous Macroscale Structures** 768  
S. Schacht, Q. Huo, I. G. Voight-Martin, G. D. Stucky, F. Schüth
- Mongolian Tree Rings and 20th-Century Warming** 771  
G. C. Jacoby, R. D. D'Arrigo, T. Davaajamts
- Photopolymerization and Mass-Independent Sulfur Isotope Fractionations in Carbon Disulfide** 774  
J. J. Colman, X. Xu, M. H. Thiemens, W. C. Trogler
- A Statistical Model of the Fluctuations in the Geomagnetic Field from Paleosecular Variation to Reversal** 776  
P. Camps and M. Prévot
- Absorption of Solar Energy in the Atmosphere: Discrepancy Between Model and Observations** 779  
A. Arking
- Subnanometer-Diameter Wires Isolated in a Polymer Matrix by Fast Polymerization** 782  
J. H. Golden, F. J. DiSalvo, J. M. J. Fréchet, J. Silcox, M. Thomas, J. Elman

- Visualization of Slow Axonal Transport in Vivo** 784  
S. Terada, T. Nakata, A. C. Peterson, N. Hirokawa
- Immunodeficiency in Protein Kinase C $\beta$ -Deficient Mice** 788  
M. Leitges, C. Schmedt, R. Guinamard, J. Davoust, S. Schaal, S. Stabel, A. Tarakhovsky
- Activation of Pyk2 by Stress Signals and Coupling with JNK Signaling Pathway** 792  
G. Tokiwa, I. Dikic, S. Lev, J. Schlessinger
- Cooperative DNA Binding and Sequence-Selective Recognition Conferred by the STAT Amino-Terminal Domain** 794  
X. Xu, Y.-L. Sun, T. Hoey
- Diffusional Mobility of Golgi Proteins in Membranes of Living Cells** 797  
N. B. Cole, C. L. Smith, N. Sciaky, M. Terasaki, M. Edidin, J. Lippincott-Schwartz
- Central Hypotensive Effects of the  $\alpha_{2a}$ -Adrenergic Receptor Subtype** 801  
L. B. MacMillan, L. Hein, M. S. Smith, M. T. Piascik, L. E. Limbird
- Cardiovascular Regulation in Mice Lacking  $\alpha_2$ -Adrenergic Receptor Subtypes b and c** 803  
R. E. Link, K. Desai, L. Hein, M. E. Stevens, A. Chruscinski, D. Bernstein, G. S. Barsh, B. K. Kobilka
- Functional Uncoupling of Linked Neurotransmitter Effects by Combinatorial Convergence** 806  
V. Brezina, I. V. Orekhova, K. R. Weiss
- Organization of Diphtheria Toxin T Domain in Bilayers: A Site-Directed Spin Labeling Study** 810  
K. J. Oh, H. Zhan, C. Cui, K. Hideg, R. J. Collier, W. L. Hubell
- Genome Sequence of a Human Tumorigenic Poxvirus: Prediction of Specific Host Response-Evasion Genes** 813  
T. G. Senkevich, J. J. Bugert, J. R. Sisler, E. V. Koonin, G. Darai, B. Moss



768

Controlling shapes of mesoporous films

## ■ Indicates accompanying feature

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## Breaking News: Possible Life on Mars?

A special electronic preprint of the McKay *et al.* paper is available at <http://www.sciencemag.org/>



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# THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

## Nanopores in tubes and through films

Mesoporous materials can contain porous networks of parallel nanoscale cylinders. Two reports show how such materials can be assembled into hollow structures on the micrometer scale. Lin and Mou (p. 765) tailored the mesoporous aluminosilicate MCM-41 into micrometer-diameter tubules in which its cylindrical pores are coaxial with the tube. Schacht *et al.* (p. 768) assembled mesoporous films at oil-water interfaces to create hollow micrometer-scale fibers and spheres as well as thin sheets. The pores generally align perpendicular to the film.

## American origins

The eastern margin of North America was first defined in the Precambrian, when rifting created the Iapetus Ocean. Closure of this ocean formed the Appalachian-Ouachita mountains; subsequent reopening formed the Atlantic Ocean. As a result of this history, original fragments of North America are now attached to other continents. Thomas and Astini (p. 752) synthesize recent geologic data to show that one such fragment, originally from the region of the Ouachitas, is now part of western South America. Tracing this connection allows a better understanding of the timing of the formation of the Iapetus Ocean and the past geography of continents.

## Solar system origins

A key for reconstructing events in the early solar system is the recognition of daughter isotopes of short-lived radioiso-

## Drugs, receptors, and hypertension

Stimulation of  $\alpha_2$ -adrenergic receptors ( $\alpha_2$ ARs) causes a decrease in blood pressure, and drugs that activate these receptors are widely used to treat hypertension. However, the role of the three  $\alpha_2$ AR subtypes ( $\alpha_{2a}$ ,  $\alpha_{2b}$ , and  $\alpha_{2c}$ ) and possibly other receptors in the physiological effects of  $\alpha_2$ AR agonists has been unclear. Link *et al.* (p. 803) and MacMillan *et al.* (p. 801) describe the specific roles of the  $\alpha_2$ AR subtypes revealed by studies of genetically engineered mice deficient in one of the  $\alpha_2$ AR subtypes. The  $\alpha_{2a}$  subtype is mainly responsible for the antihypertensive action of  $\alpha_2$ AR agonists, whereas the  $\alpha_{2b}$  subtype mediates an undesirable opposite, or hypersensitive, effect. Drugs designed to be selective for the  $\alpha_{2a}$  receptor may be more effective in treating hypertension.

topes in meteorites. One such important isotope is  $^{26}\text{Al}$ , which decays to  $^{26}\text{Mg}$  with a half-life of 0.73 million years. Russell *et al.* (p. 757) searched for the original presence of  $^{26}\text{Al}$  in chondrules and calcium-aluminum-rich inclusions (CAIs), two particles that formed early in the solar nebula and are contained in ordinary chondrites, a primitive class of meteorites. The CAIs had the highest amounts of  $^{26}\text{Mg}$ , some chondrules had lesser amounts, and some had no evidence of original  $^{26}\text{Al}$ . Chondrule formation likely lasted more than 5 million years in the solar nebula.

## Delivery systems

Most neuronal proteins are synthesized in the cell body. Proteins that are required at the synapse must be transported along the axon—many by a process known as slow axonal transport. Terada *et al.* (p. 784) examined the transport of neurofilament proteins along the axons of living neurons. Their findings suggest that neurofilament subunits can be transported along axonal microtubules, rather than requiring a preexisting neurofilament track for their own transport.

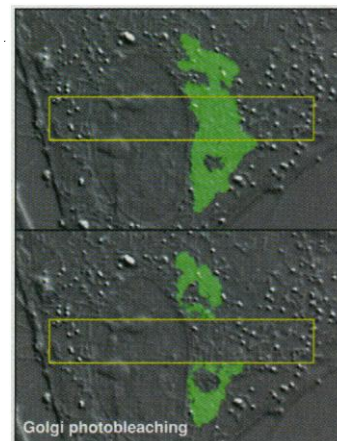
## Sending a message

With so many neurotransmitters activating so many receptors that are coupled to so many second messengers, how do signals overcome the intracellular bureaucracy to produce an effect? Brezina *et al.* (p. 806) describe a model of combinatorial control of a muscle in the buccal mass of *Aplysia*. In this system, a relatively small number of identified neurons make it possible to interpret neuromuscular events in terms of behavioral circumstances. The authors were able to predict and confirm experimentally the cellular changes caused by the release of several neurotransmitters, which allows them to explain why, for instance, unpalatable food triggers only a gentle biting, and voracious feeding enforces an increase in muscle relaxation rate.

## Free to move about the membrane

The Golgi complex is comprised of a set of flattened cisternae. Many theories have been put forward to explain how the Golgi morphology and the distinctive membrane composition of each cisterna is established and maintained in the

face of rapid membrane traffic. Cole *et al.* (p. 797) examined the lateral mobility of engineered fluorescently labeled Golgi membrane protein in a living cell. Surprisingly, all of the proteins studied showed



very rapid movement, which suggests that lateral restriction of diffusion of membrane components is unlikely to explain the distribution of specific Golgi membrane proteins in specific Golgi cisternae.

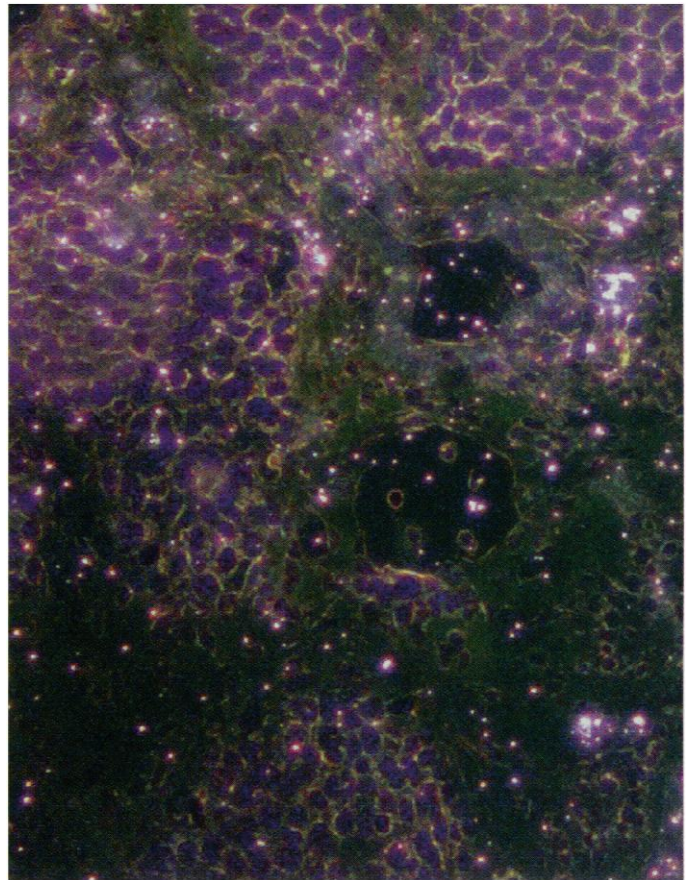
## Pox strategies

Only two pox viruses have been known to infect humans—variola virus, which was responsible for smallpox, and molluscum contagiosum virus (MCV), which normally causes asymptomatic skin papules but leads to opportunistic infection when it infects persons with AIDS. Senkevich *et al.* (p. 813) have sequenced the MCV genome and have found important differences in the genes involved in host infection, nucleotide biosynthesis, and cell proliferation. This study not only provides a genetic basis for understanding the very different strategies by which these viruses evade the host immune system but may also provide clues for drug therapies.

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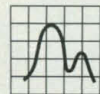
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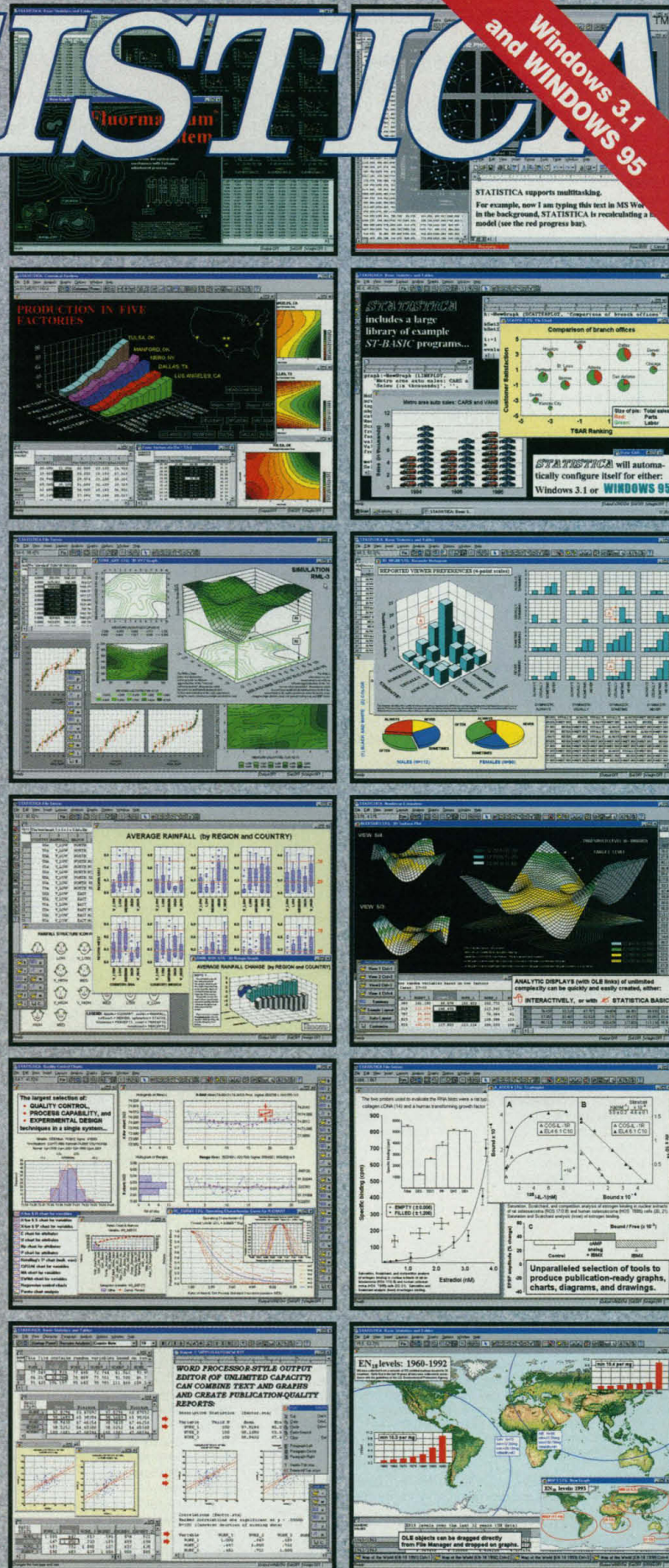


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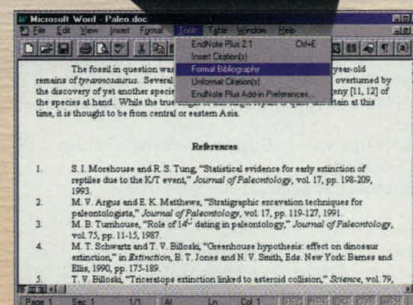
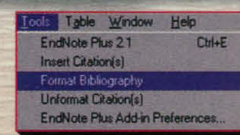
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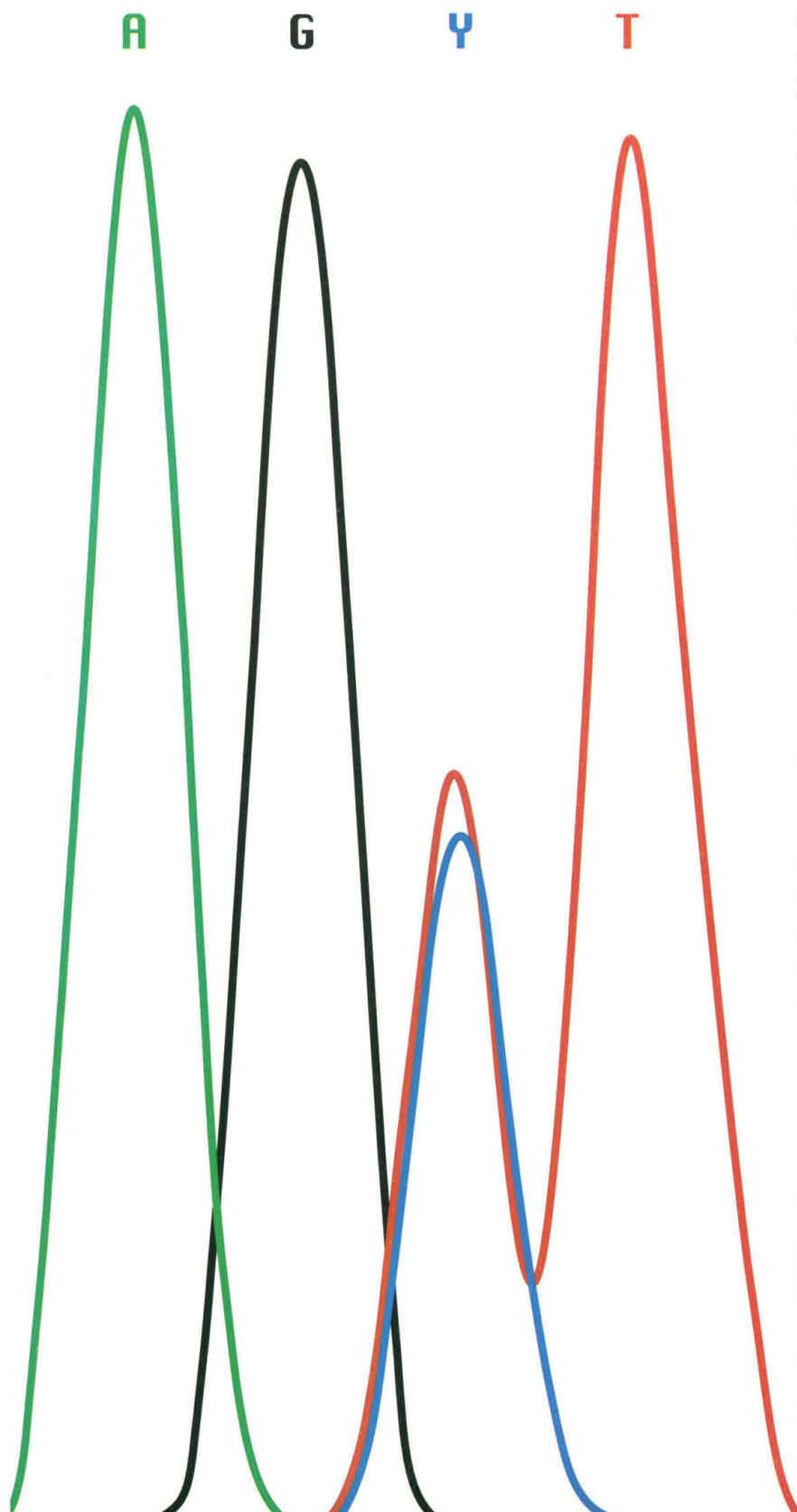
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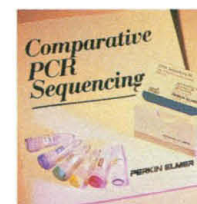
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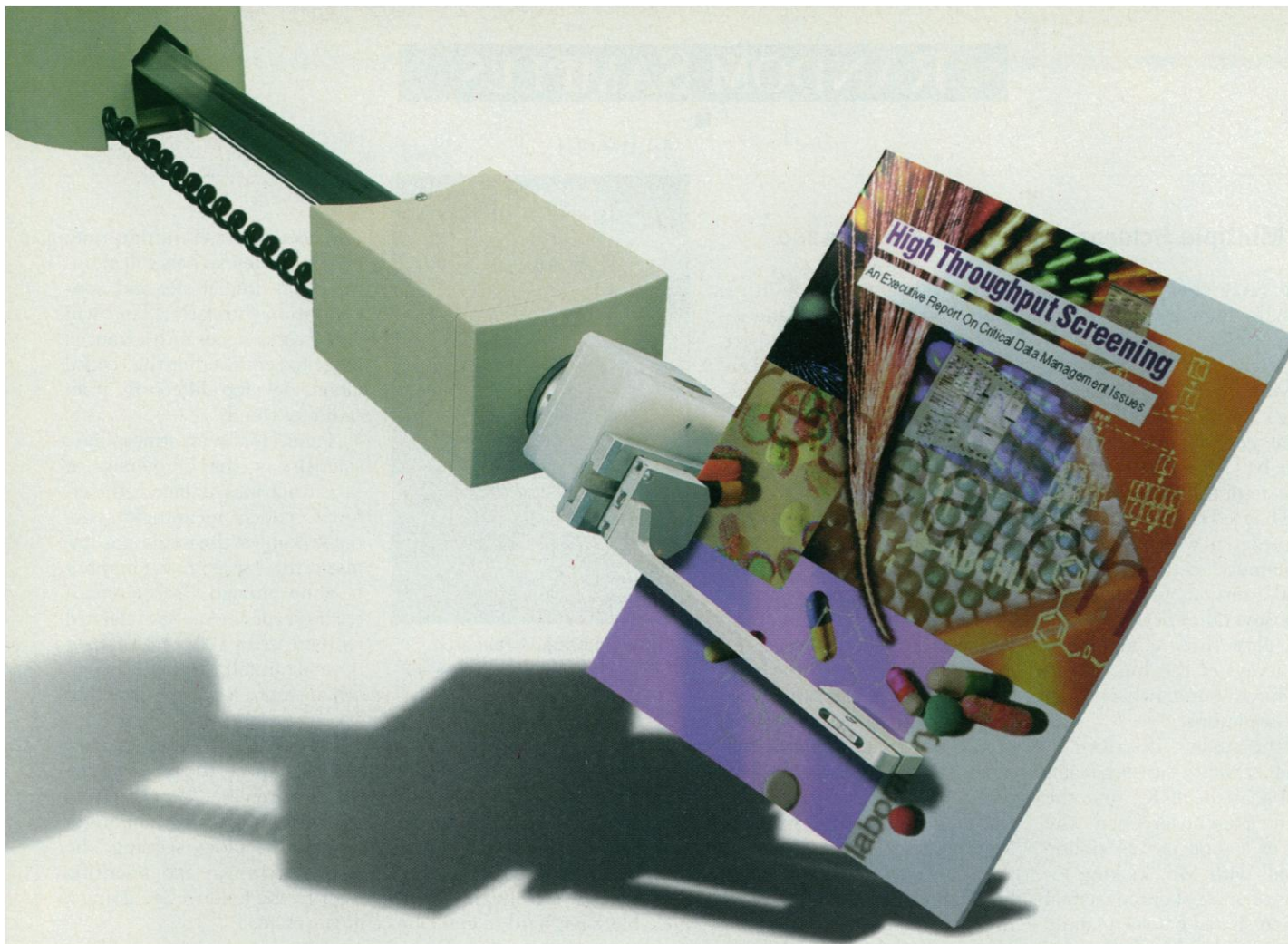
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