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SCIENCE

10 NOVEMBER 1995
VOL. 270 • PAGES 885–1088
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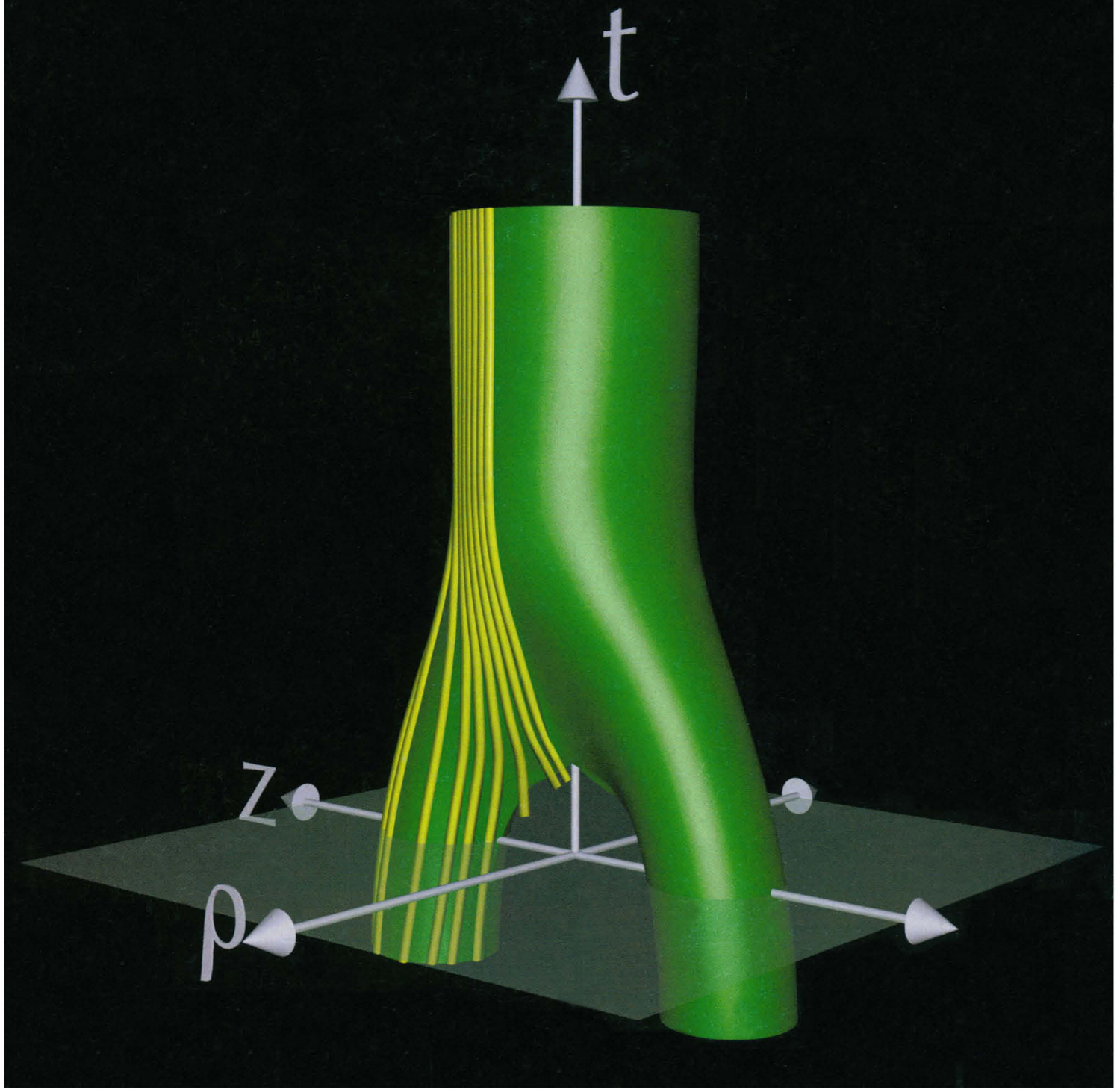

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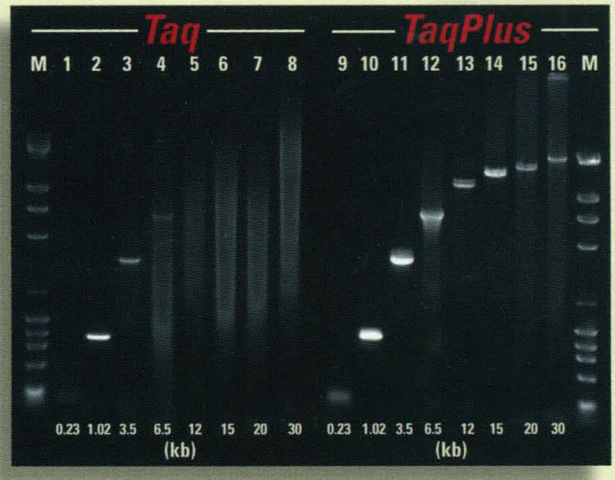

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REFERENCES
1. Nielson, K.B., Scott, B., Bauer, J.C., and Kretz, K. (1994) Strategies 7: 64-65.
2. Nielson, K.B., Schoettler, W., Bauer, J.C., and Mathur, E. (1994) Strategies 7: 27.

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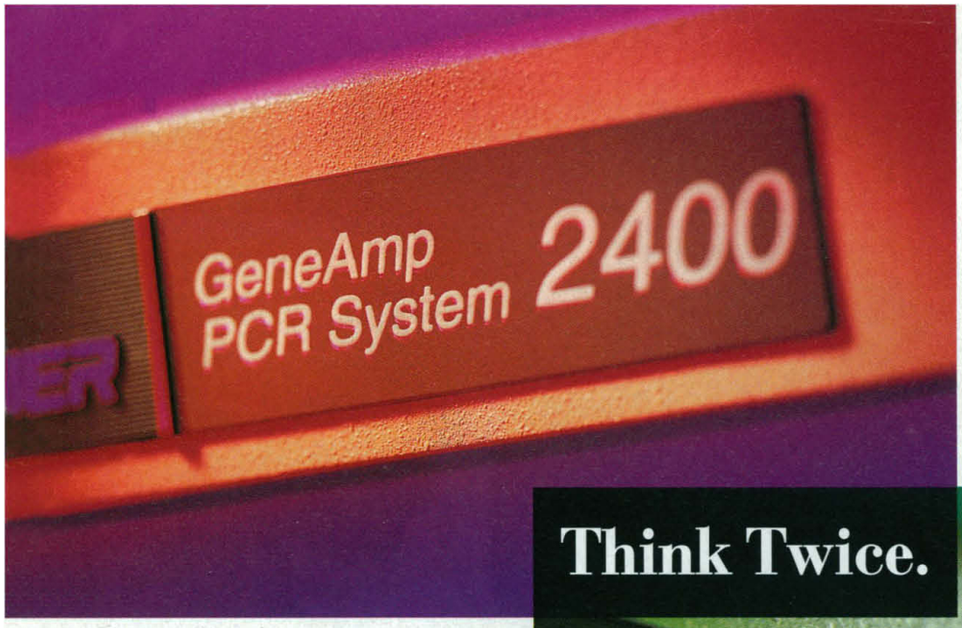

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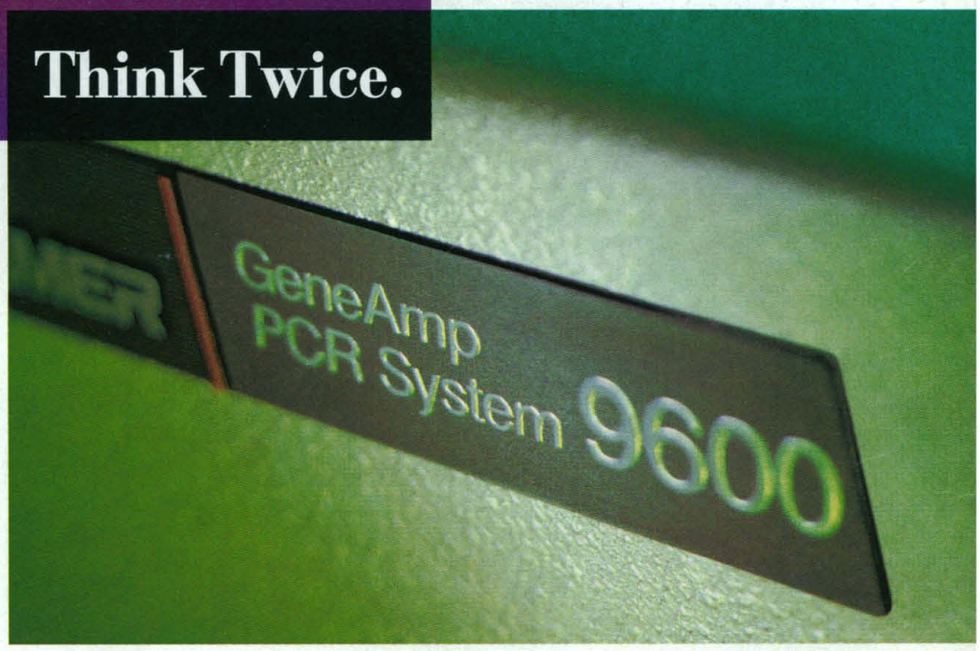

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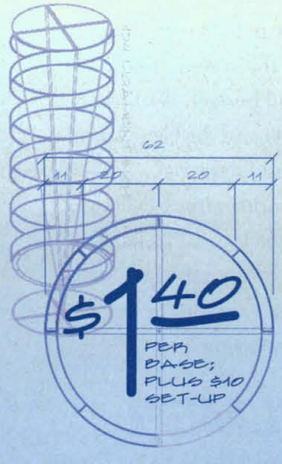

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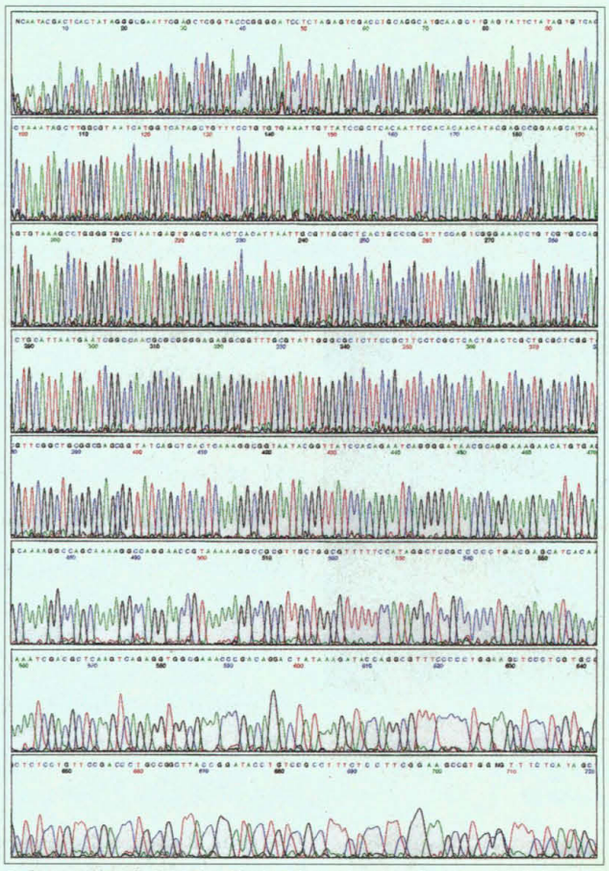
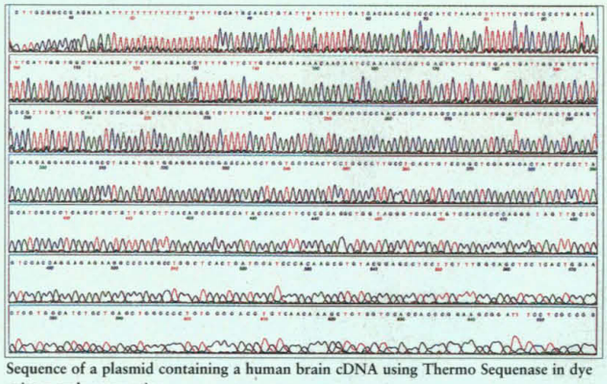


Cycle sequencing of pGEM plasmid using Thermo Sequenase fluorescent labelled primer cycle sequencing kit.
(Data supplied by an independent research laboratory)



Sequence of a plasmid containing a human brain cDNA using Thermo Sequenase in dye primer cycle sequencing.
(Data supplied by Généthon, 1 rue de l'International, 91002, Evry, France)

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1. *Proc. Natl. Acad. Sci.,USA*, **92(14)**, pp.6339-6343, (1995).

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ISSN 0036-8075
10 NOVEMBER 1995
VOLUME 270
NUMBER 5238

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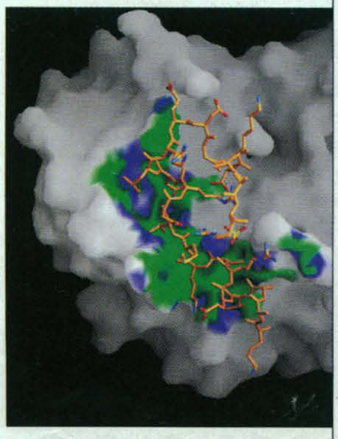
904

Testing time for AIDS vaccines?



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A G_α-protein oligomer interface

NEWS & COMMENT

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COVER

Axisymmetric merger of two black holes to form a single asymptotically spherical black hole. Yellow lines (paths of light rays) are tangential generators of the black hole surfaces. Behavior of these rays and their singularities can be understood in terms of the classical theory of caustics. Time t is plotted on the vertical axis, z is the symmetry axis, and ρ is the other cylindrical coordinate axis. The coordinate angle ϕ is suppressed in the figure. See page 941. [Image: National Center for SuperComputing Applications]

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Oxygen chemistry in the upper atmosphere

◩ Indicates accompanying feature

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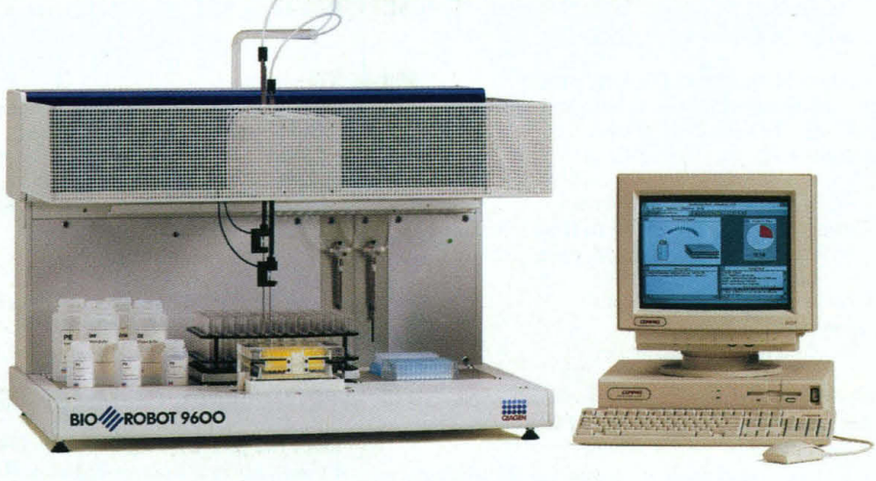

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edited by PHIL SZUROMI

Play at the plates

Reconstruction of plate motions from the details of magnetic anomalies formed at spreading ridges is critical for interpreting the causes of many geologic events and features. A key area for reconstructing the motions of many plates is in the South Pacific Ocean, where spreading has been occurring between the Antarctic and Pacific plates. Cande *et al.* (p. 947) analyze magnetic anomalies in this poorly surveyed region to reconstruct the spreading history of these plates during the past 65 million years. A major change in the relative motion between the Pacific and Antarctic plates occurred about 6 million years ago.

Tune-up and alignment

Organic molecules that show strong second-order nonlinear responses have many potential uses in optics and electronics. However, this response depends not just on molecular properties but requires a specific molecular arrangement in the material. Kauranen *et al.* (p. 966) were able to force organic molecules into the desired arrangement by attaching them to a helical backbone. This supramolecular approach increases the nonlinear response of the material and could be used to optimize the second-order nonlinear response of other compounds.

Plastic oscillator

Polymer transistors and logic circuits are desirable for low-cost mass-produced electronic applications, but their performance needs to be comparable to that of silicon devices to make practical devices. Brown *et al.* (p. 972) have developed polymer field-effect transistors that exhibit voltage amplification—a prerequisite for constructing more complex circuits. Fabrication was made possible by the use of solution processing of conjugated polymers. A five-stage ring oscillator was built to show that the polymeric transistors could drive subsequent gates.

Lymphocyte homeostasis

The immune response relies on selection and massive expansion of a small number of lymphocytes of appropriate antigenic specificity. Subsequent down-modulation of the response prevents the build-up of large numbers of activated lymphocytes. Unlike activation, down-modulation has been refractory to molecular analysis. Now Waterhouse *et al.* (p. 985; see the Perspective by Allison, p. 932) suggest that the T cell surface molecule CTLA-4 plays a critical role in negative regulation. Mice lacking CTLA-4 suffer a severe lymphoproliferative disorder and die within weeks of birth; T cells from these animals proliferate spontaneously. Adding further interest, CTLA-4 shares sequence homology with CD28, a surface receptor known to be involved in the stimulatory phase.

PCB processing

Polychlorinated biphenyls (PCBs), once released into the environment, can be long-lived pollutants. Some microbes can degrade these stable aromatic compounds by adding two hydroxyl groups and cleaving the modified aromatic ring, thus forming more biodegradable products. Han *et al.* (p. 976) present the crystal structure of a metalloenzyme that catalyzes the cleavage reaction, enabling them to define the coordination of the modified PCB by the iron atom and possible flexibility in handling chlorinated substrates.

Quality, not quantity

Precise cell division patterns may play a role in the determination of cell fates during development. Such divisions may be needed for proper distribution of determinants necessary to ensure the correct cell fate. De Nooij and Hariharan (p. 983; see the news story by Roush, p. 916) examined the requirement for the second mitotic wave in the establishment of proper fates in the *Drosophila* eye. After blocking the second mitotic wave with the expression of a human cyclin-dependent kinase inhibitor p21, each cell type was still specified even though the proper number of precursor cells was not present. Thus cell fate can be uncoupled from the normal pattern of cell division in the eye.

Benign HIV-1 strain

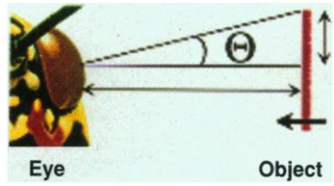
Not all strains of HIV-1 necessarily produce immune deficiency. Deacon *et al.* (p. 988; see the news story by Cohen, p. 917) have sequenced HIV-1 from a blood donor and a group of six recipients who have not shown HIV-disease symptoms despite being infected for 10 to 14 years. Deletions were found in the *nef* gene and the U3 region of the long-terminal repeat. Because the lack of disease progression appears to depend on the virus instead of the host immune system, these results suggest a possible use of such HIV strains in live vaccines.

Shifting origins of replication

In certain viral genomes, the origins of DNA replication are defined by a specific DNA sequence. In higher organisms, however, the nature of a DNA replication origin has resisted definition. Hyrien *et al.* (p. 994), in studying the ribosomal RNA genes of the frog, *Xenopus*, show that initiation of nuclear DNA replication may be modulated by the developmental state of the cell. Early in development, when the embryo is undergoing a period of rapid cell division with little transcriptional activity, DNA replication in the ribosomal RNA gene cluster initiates without regard to a specific DNA sequence. However, after the mid-blastula transition, replication initiation becomes confined to the intergenic ribosomal DNA spacers.

Low-impact insect flight

Animal navigation requires not only the ability to move but also the ability to detect and evade objects and predators. How, for example, does an insect avoid collisions with approaching objects that vary in size and velocity? Hatsopoulos *et al.* (p. 1000) present an analysis of computation performed by a visual neuron of the locust that multiplies angular acceleration by an inverse exponential function of angular size. This function increases with approach but reaches a maximum prior to impact, providing enough time for escape.



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References

1. Fodde, R., and Loosekoot, M., *Human Mutation*, 3, 83, (1994).
2. Fischer, S.G. and Lerman, L.S., *Proc. Natl. Acad. Sci., U.S.A.*, 80, 1579 (1983).
3. Borresen, A. L., *et al., Proc. Natl. Acad. Sci., U.S.A.*, 88, 8405 (1991).

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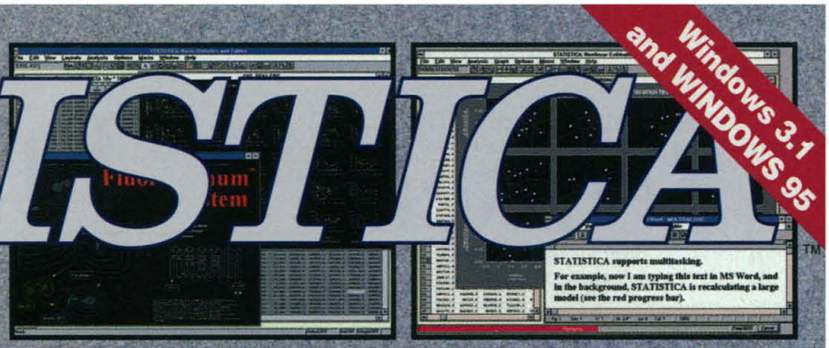

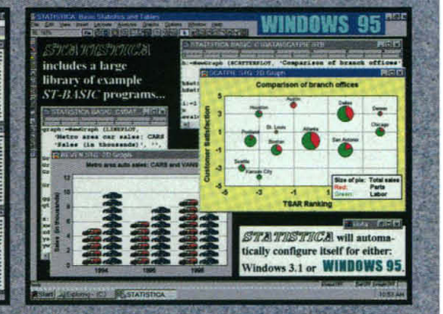

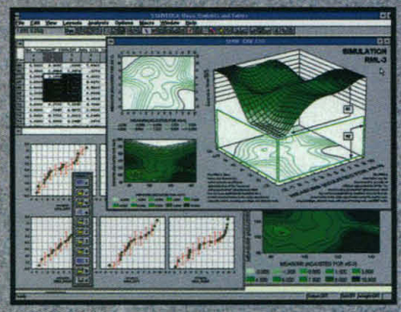

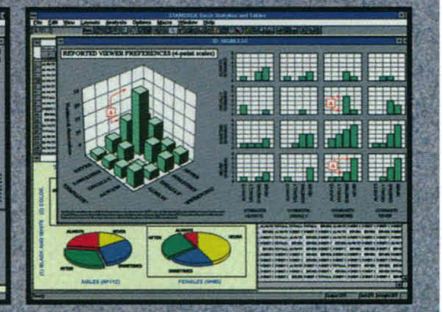

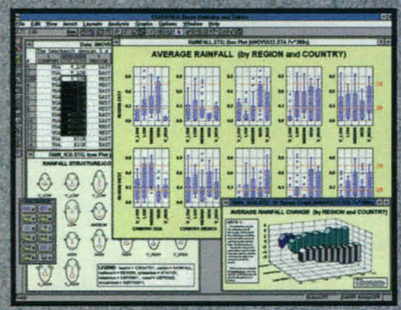

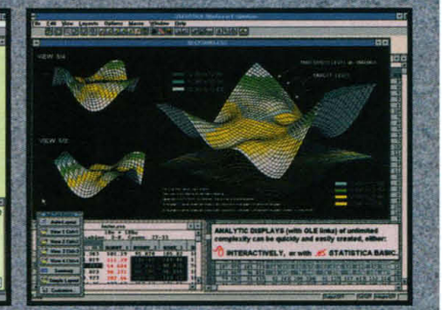

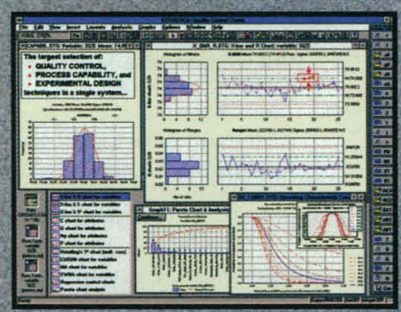

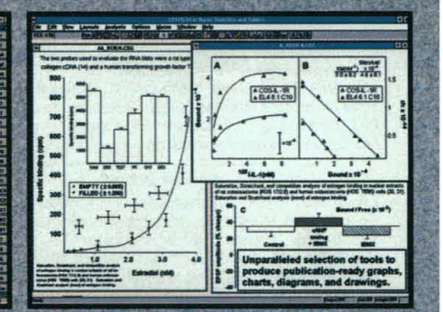

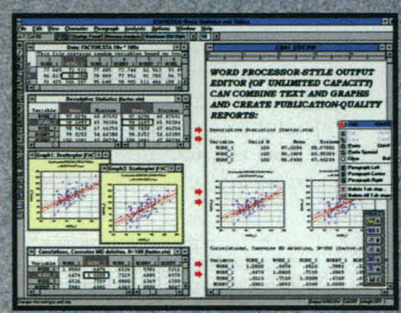

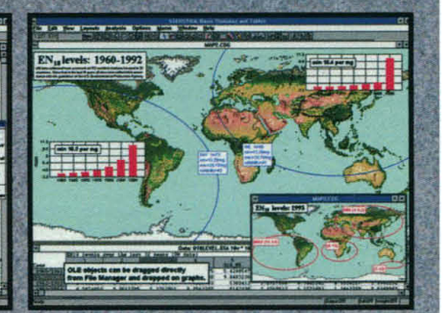

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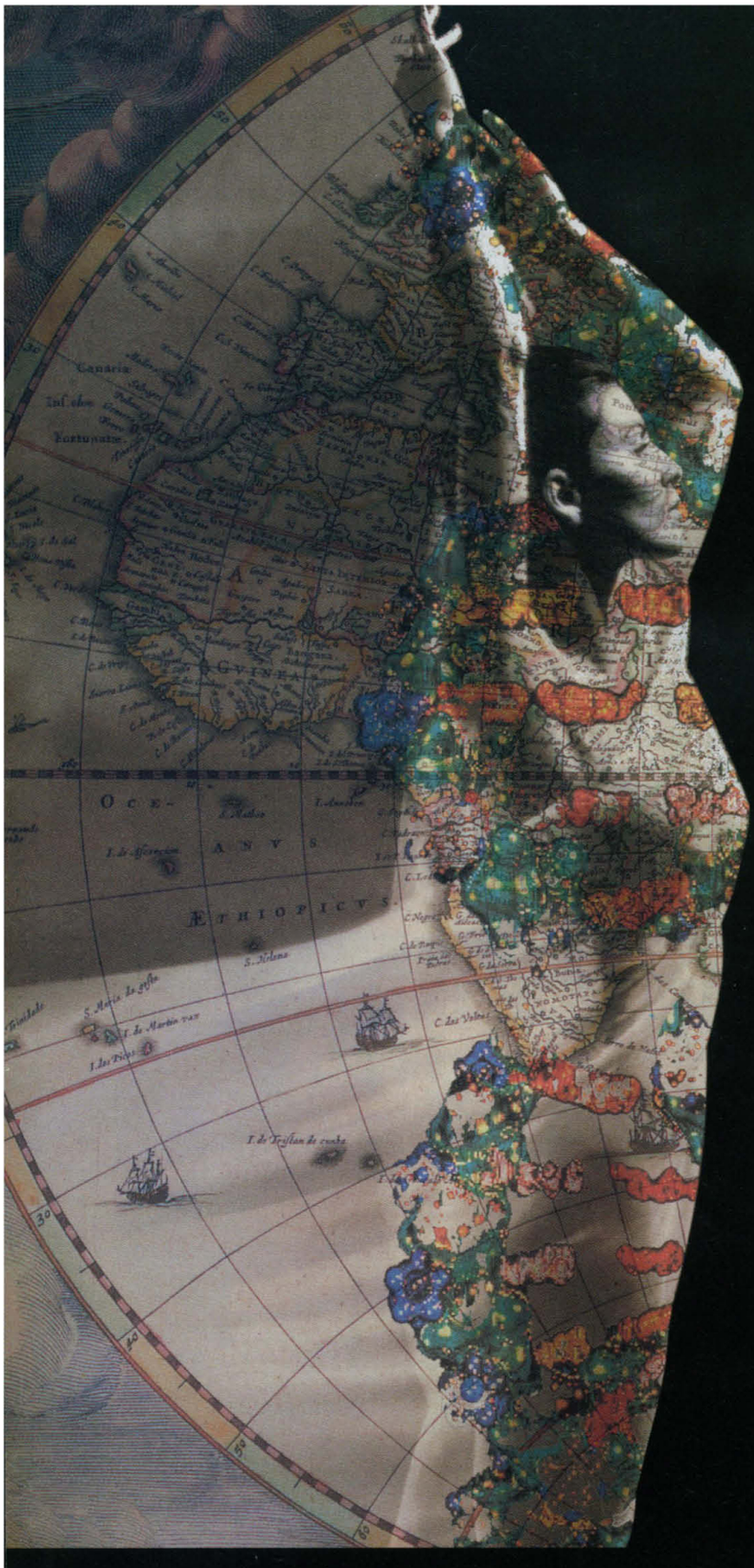

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	3'...CGCCGG▲CG...5'			3'...CCGGN▲NNNNCCGG...5'	

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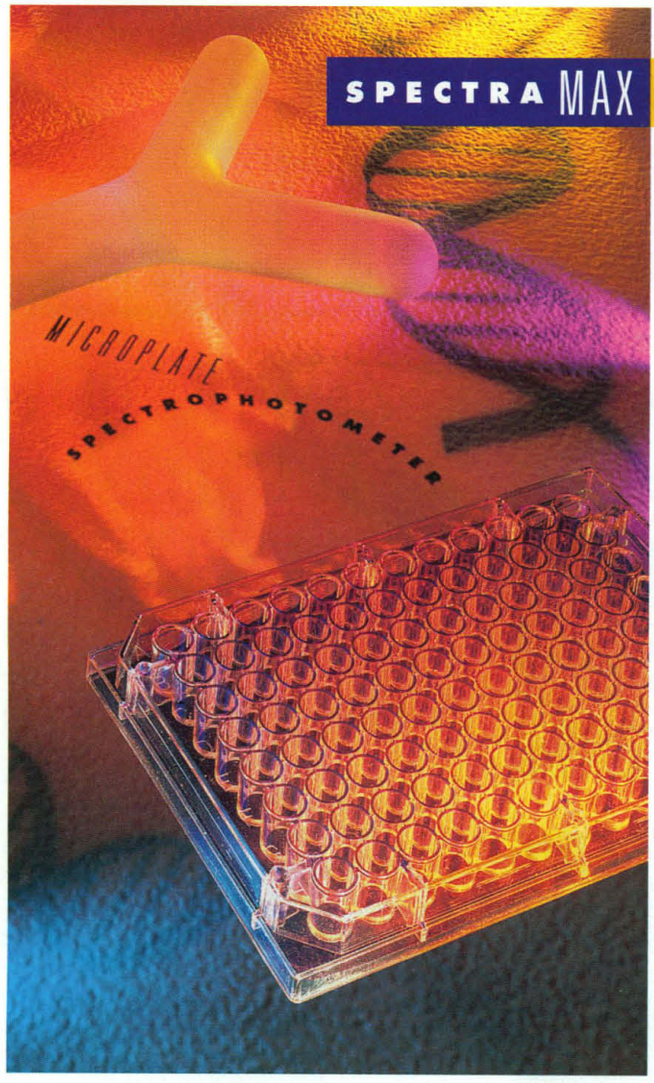

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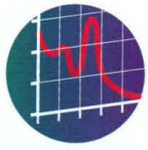
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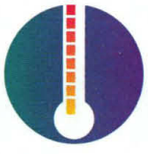
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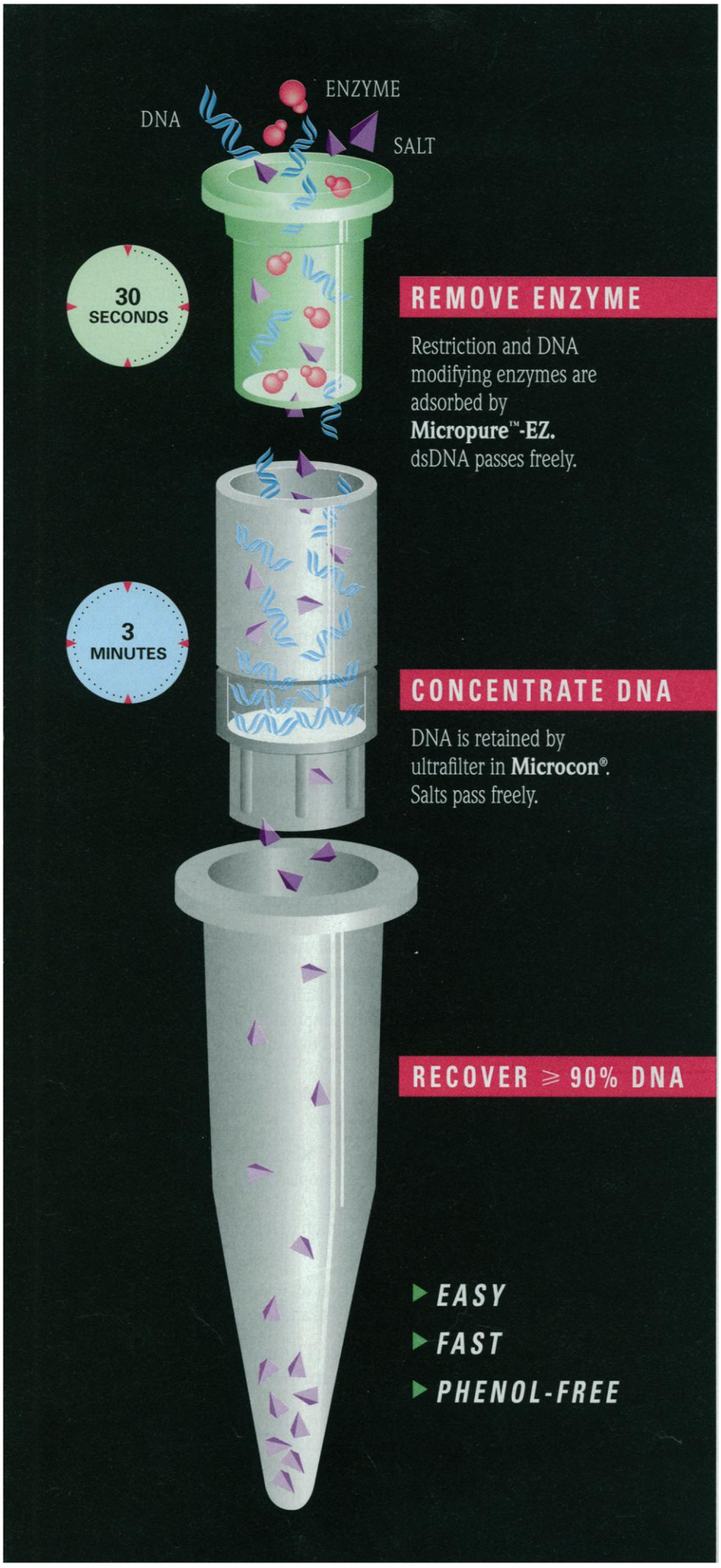

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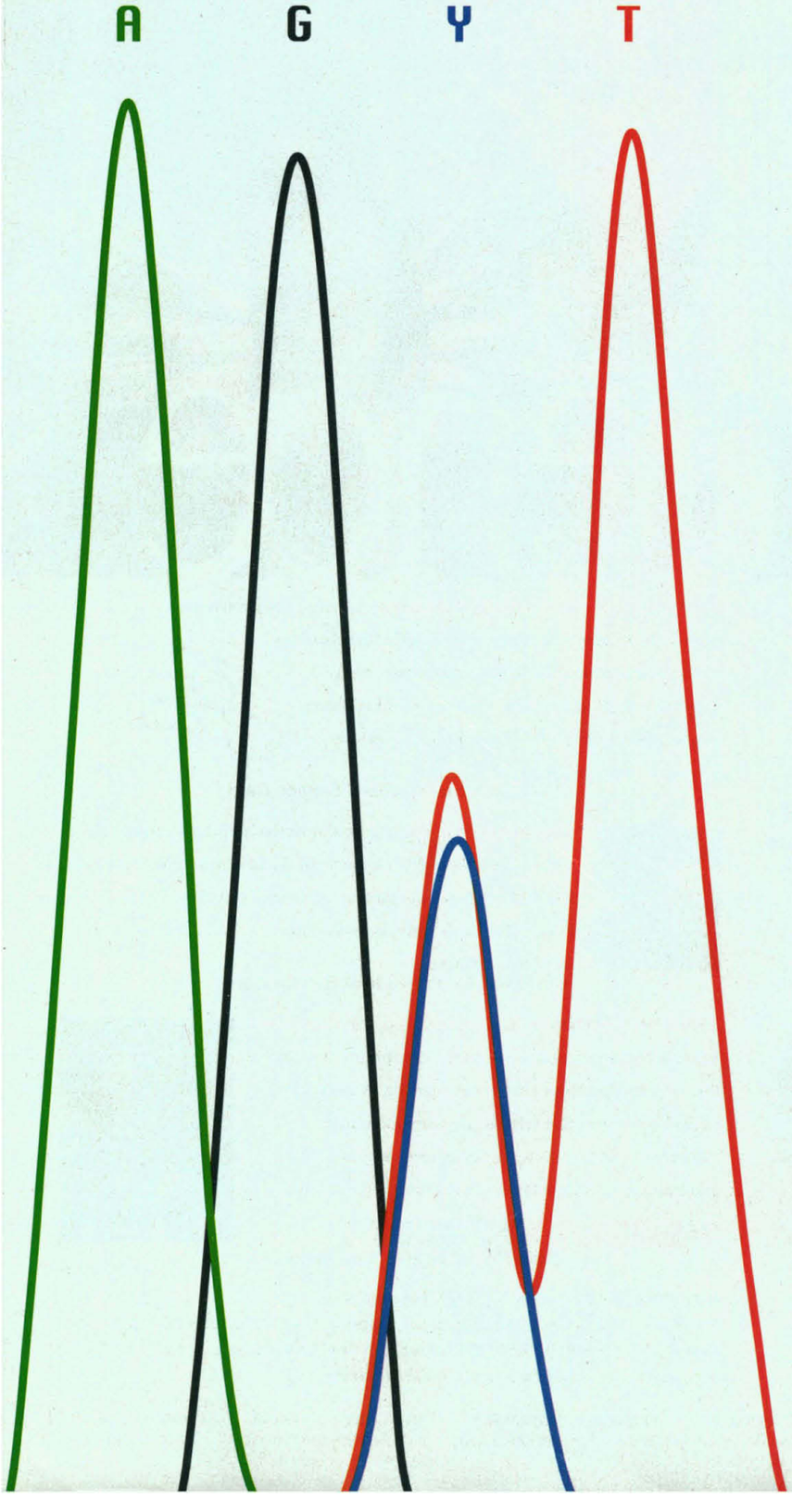
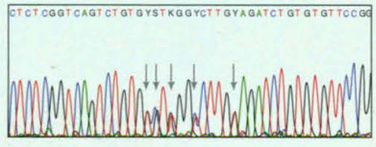


Good news for genetic disease researchers. A breakthrough in enzyme design just took mutation detection to new levels of convenience and performance.



Direct PCR sequencing of the highly polymorphic HLA-B gene using a dye primer kit with the AmpliTaq FS enzyme.

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AmpliTaq FS kits expand the power of ABI PRISM™ multicolor detection technology to sequence-based mutation detection. Together with our reagents and protocols for fluorescent PCR detection, we provide complete DNA analysis solutions for your laboratory.

Find out how PCR-based cycle sequencing with AmpliTaq FS kits makes mutation detection even easier. For more information and a free copy of our technical guide to comparative PCR sequencing, call 1-800-345-5224. Outside the U.S. and Canada, contact your local Perkin-Elmer representative.

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Perkin-Elmer PCR reagents are developed and manufactured by Roche Molecular Systems, Inc., Branchburg, New Jersey, U.S.A.

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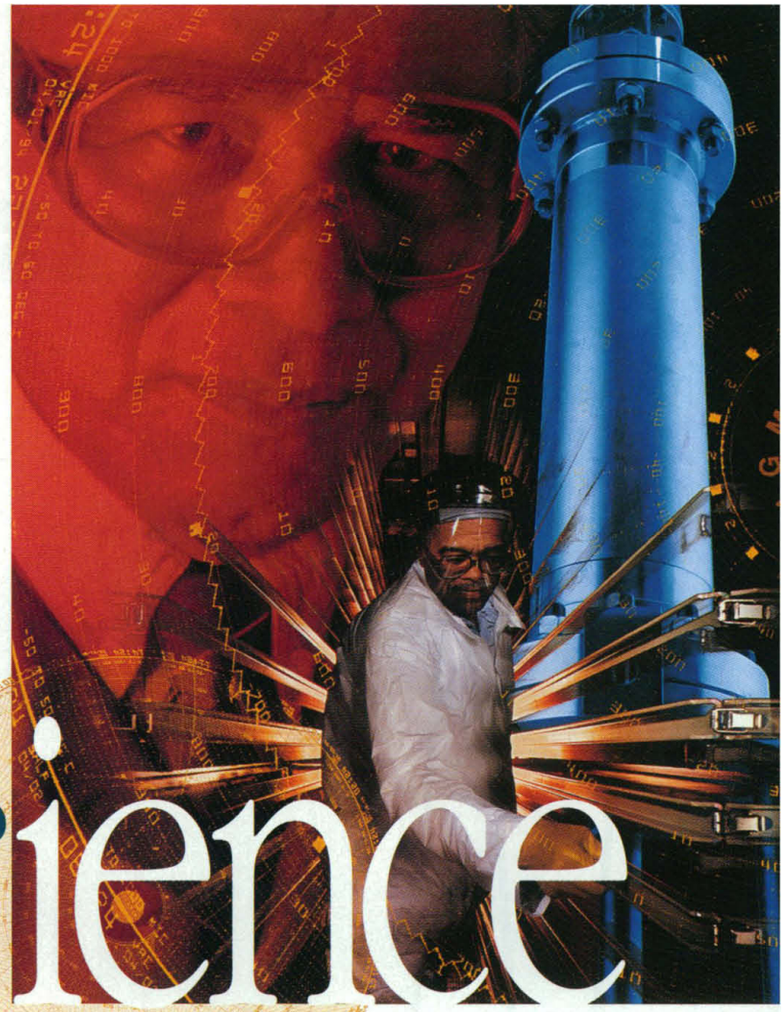

ACE Substrates and Inhibitors A comprehensive review of current research involving the use of ACE substrates in the determination of Angiotensin Converting Enzyme activity is available from Sigma. In addition, pharmacological studies of the antihypertensive properties of ACE inhibitors are reviewed.

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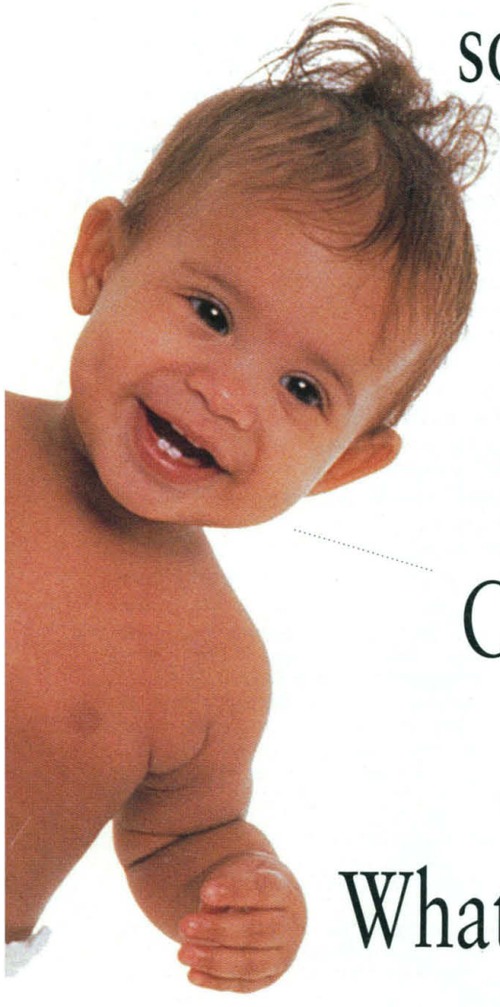
Holmes and Watson solved the mystery of the double helix.



Wasn't that Crick and Watson?

What do you want, a prize?

Pharmacia Biotech & SCIENCE Prize for Young Scientists
IN MOLECULAR BIOLOGY 1996

Perhaps you don't have to be quite this young, but in recognition of the work that is done during preparation for a doctorate, Pharmacia Biotech and *Science* are joining forces to encourage scientists at the start of their careers. This major new world-wide prize will include US$20,000 awarded to the best young scientist of the year, and up to 7 additional prizes of US$5,000 each.

For 116 years *Science* has been one of the world's leading scientific journals, promoting science through print, exhibitions and conferences. Pharmacia Biotech, as one of the pioneers of biotechnology, is committed to serving the changing needs of the international scientific community.

Call for entries

You must be a recent Ph.D. graduate (awarded between 1 January and 31 December 1995) working in molecular biology. Submissions must be in the form of a 1000 word essay, in either English, French, German, Spanish, Japanese or Chinese (Mandarin), on your thesis, highlighting the significance of its contribution and overall implications in the field. The winning essay will be published in *Science*.

Closing date for entries is 31 May 1996.

The prizes will be presented in Stockholm, Sweden, during December 1996.

Full details and the required entry form can be requested from the administrator, at the address below, or via Science's homepage (http://www.aaas.org/science/prize.htm).

The Award Committee
Pharmacia Biotech & SCIENCE Prize for Young Scientists

Enquiries from Europe – Science International, 14 George IV Street, Cambridge, CB2 1HH, UK.
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Grand Prize Winner

Pharmacia and *Science* are pleased to announce the 1995 grand prize winner of the Pharmacia Biotech & *Science* Prize for Young Scientists. The winner of the 1995 grand prize in molecular biology was chosen from among the first- and second-prize winners from three geographical areas—North America, Europe, and the rest of the world. The grand prize has been awarded to the winner of the first prize for North America, **Michael O. Hengartner**, for his essay on programmed cell death in the worm *Caenorhabditis elegans*. This essay, reprinted on the opposite page, describes his doctoral research in the Department of Biology at the Massachusetts Institute of Technology (MIT).

M. O. Hengartner

Dr. Hengartner was born in St.-Gallen, Switzerland, but grew up in Paris, France; Bloomington, Indiana; and more recently Québec City, Canada. After an initial foray into physics, he turned to biochemistry and started his research career in the laboratory of Guy Poirier at Laval University investigating polyADP ribosylation. His Ph.D. was awarded in 1994 by MIT for research performed in the laboratory of Robert Horvitz. He subsequently moved to the Cold Spring Harbor Laboratory as an independent staff member, where he has a laboratory in the space previously occupied by Barbara McClintock. His present research continues his work on the function of *ced-9* in *C. elegans* and its upstream regulators and downstream targets.

First- and Second-Prize Winners

First-Prize Winner in Europe: **Lauri A. Aaltonen**, for his essay "Molecular Genetic Background of Hereditary Nonpolyposis Colorectal Cancer," which is based on work performed in the Department of Medical Genetics, Haartman Institute, University of Helsinki, Finland, for his Ph.D. He received his M.D. from the University of Helsinki and continues his work on colon cancer genetics in the Haartman Institute.

First-Prize Winner Outside of Europe and North America: **Fiona Topfer,** presently investigating autoimmune disease in the Laboratory of Immunology, National Institute of Arthritis and Infectious Diseases, the National Institutes of Health, Bethesda, Maryland, for her essay "Tolerance and Immunity of La and Ro." She obtained her B.S. from the Australian National University and her Ph.D. from the Flinders University of South Australia in the laboratories of James McCluskey and Tom Gordon, where she studied autoimmunity in mice.

Second-Prize Winner in North America: **Arnim Pause**, for his essay "Functional Analysis of the Mammalian Cap-Binding Protein Complex eIF-4F." The essay describes his doctoral research in the Department of Biochemistry at McGill University in the laboratory of Nahum Sonenberg on the mechanisms of translation. Dr. Pause received his B.S. and M.S. degrees from the University of Konstanz, Konstanz, Germany, and is now in the Cell Biology and Metabolism Branch, National Institute of Child Health and Human Development, National Institutes of Health, Bethesda, Maryland, where he studies the von Hippel–Lindau tumor suppressor protein.

The full text of the essays written by the first- and second-prize winners of the Pharmacia Biotech & *Science* Prize can be obtained from the Beyond the Printed Page section of *Science*'s home page at http://www.aaas.org/science.

Pharmacia Biotech & Science Prize for Young Scientists

IN MOLECULAR BIOLOGY 1996

The Pharmacia Biotech & Science *Prize for Young Scientists has been established to provide support to scientists at the beginning of their careers because both organizations believe that such support is critical for continued scientific progress. In 1996 the prize will recognize outstanding graduate students in molecular biology, from all regions of the world. This international prize will be awarded for the most outstanding thesis in the general area of molecular biology as described in a 1000-word essay. The prize will be presented at a ceremony in Stockholm during December 1996, and the winning essay will be published in* Science.

For the purpose of this prize, molecular biology is defined as "that part of biology which attempts to interpret biological events in terms of the physico-chemical properties of molecules in a cell" (*McGraw-Hill Dictionary of Scientific and Technical Terms*, 4th Edition).

Rules of Eligibility

1. Entrants must have been awarded their Ph.D. between 1 January and 31 December 1995. Candidates for M.D./Ph.D. degrees are eligible to compete for the prize in either the year the Ph.D. is awarded or the final degree is awarded.
2. The research described in the entrant's thesis must be in the field of molecular biology as described above.
3. The prize will recognize only work that was performed while the entrant was a graduate student.
4. The prize will be awarded without regard to sex, race, or nationality.
5. Employees of Pharmacia Biotech, *Science* and AAAS, and their relatives are not eligible for the prize.

Procedures for Entry

Materials may be submitted in either English, French, German, Spanish, Japanese or Chinese (Mandarin). The entrant must submit the following items:

1. An essay, written by the entrant, that describes his or her thesis work and places it in perspective with respect to current research in molecular biology. The length of the essay must not exceed 1000 words.
2. The abstract of the thesis (not to exceed four typed, double-spaced pages).
3. A one-page letter from any thesis committee member, or the entrant's advisor, commenting on the applicant and the significance of the work.
4. Typed listings of the following information: a) All published/in-press papers based on the thesis work. List full citation, including title and authors, in order. b) Academic and professional awards and honors the entrant received as a student. c) Relevant professional experience (work, presentations, etc.)
5. A completed entry form, which can be obtained at addresses below.

Deadline for Entries

All entries must be postmarked no later than midnight 31 May 1996.

Awards

The judges may select up to three winners for each of the four geographic regions. The number of prizes awarded to each region is at the discretion of the judging panel and will be based on the relative quality of the submissions. Total prizes will not exceed eight. The judges may choose not to award a prize to one or more of the regions if they determine that such a prize is not warranted. All regional winners will compete for the grand prize of US$20,000. The regional winners who do not receive the grand prize will be awarded US$5,000.

Winners will be announced in *Science* and the prize will be awarded in Sweden in early December. The grand prize essay will be published in *Science*.

Full details and an entry form can be requested at the addresses below or obtained on the internet at **http://www.aaas.org/science/prize.htm**

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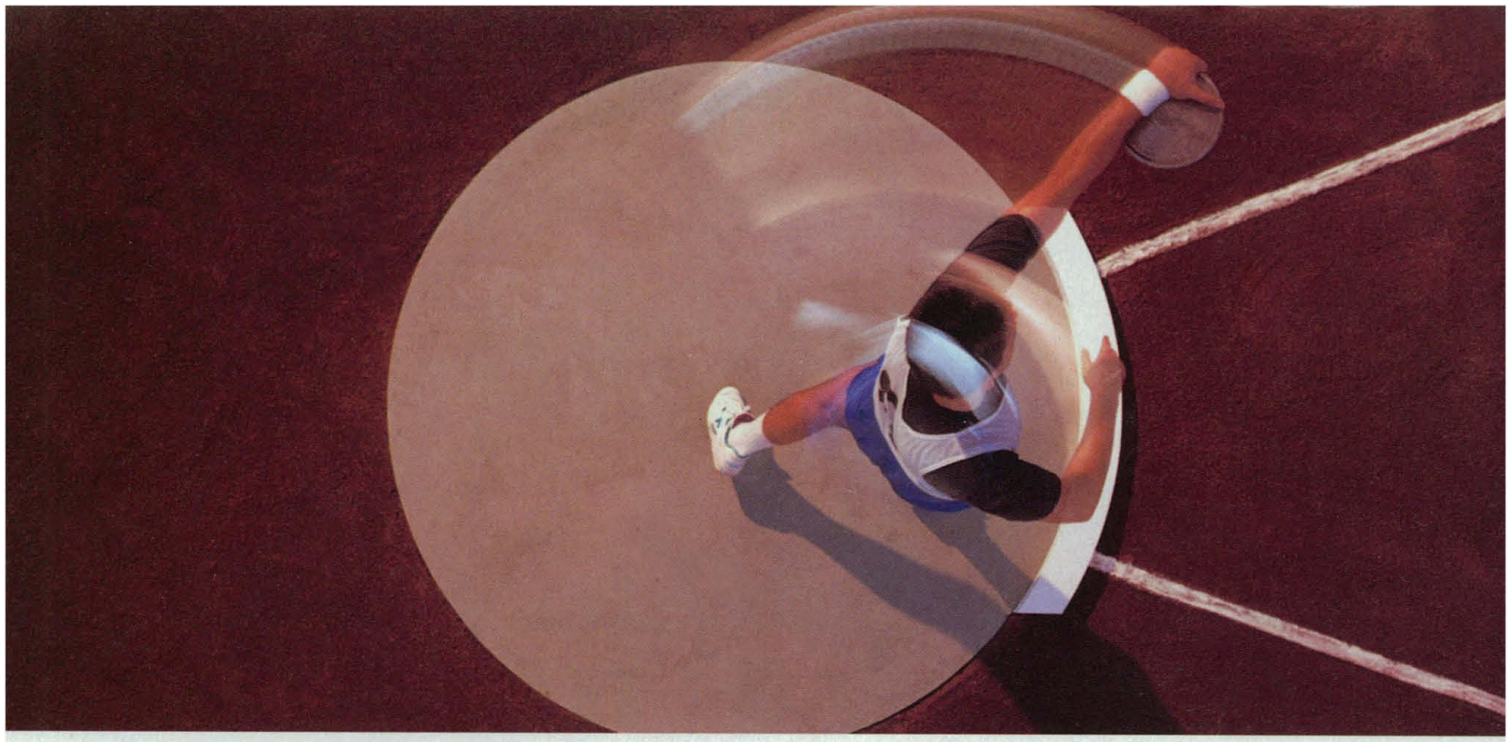

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