American Association for the Advancement of Science

SCIENCE

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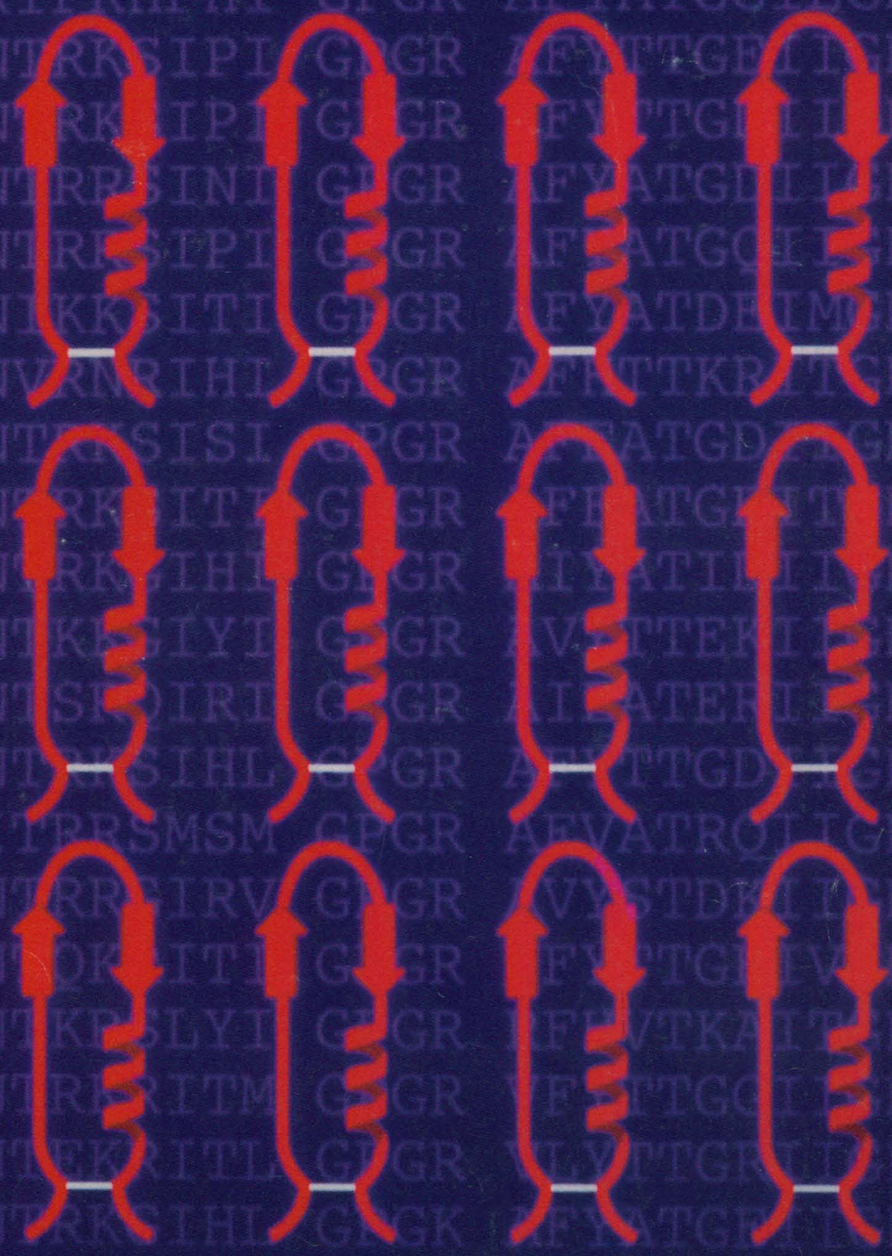
Vol. 249 ■ Pages 829–960



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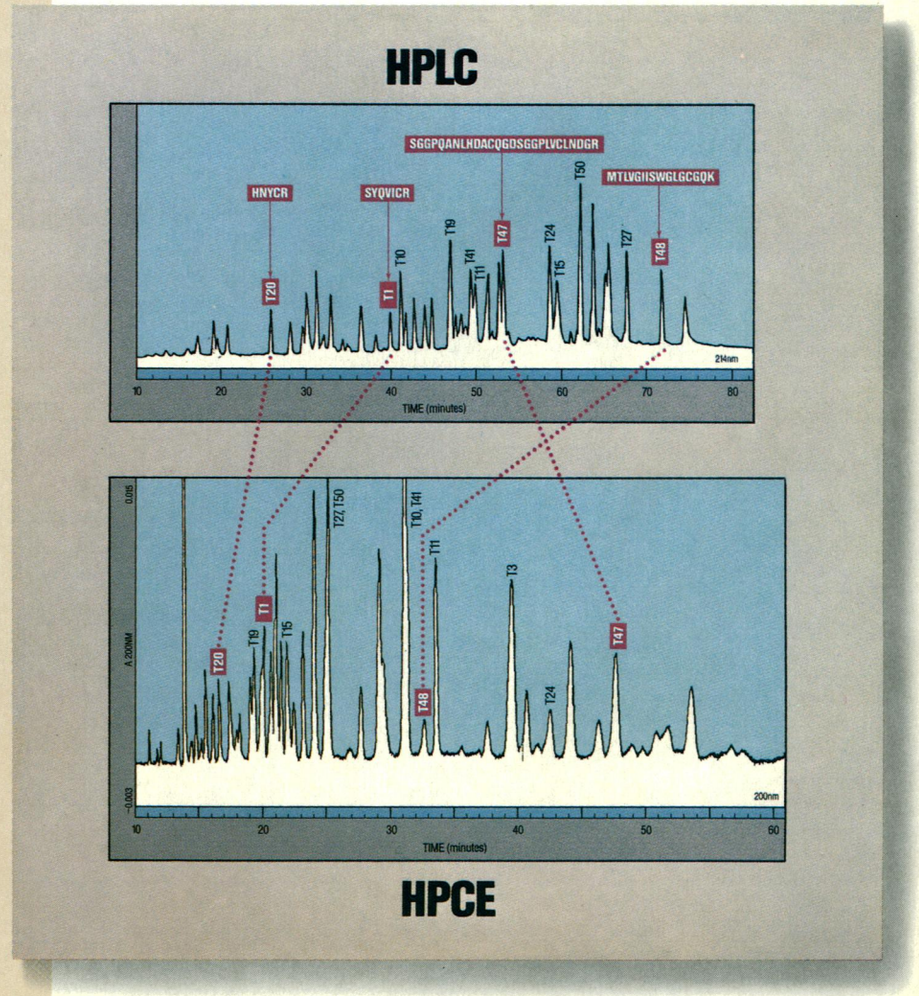
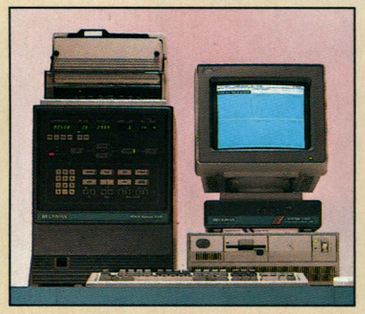


Chromatogram of a tryptic digest of recombinant tissue plasminogen activator by reversed-phase HPLC in phosphate-acetonitrile buffer.

Electropherogram of the same tryptic digest (35 nl; 250 μg/mL) in 100 mM phosphate with pH 2.5.



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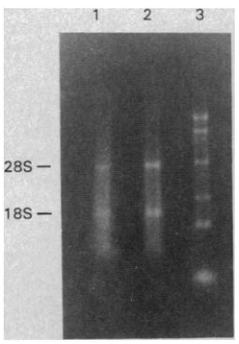

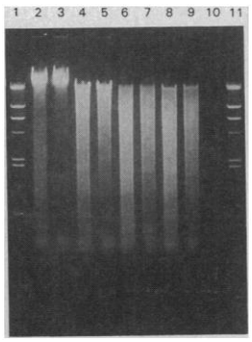

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Lanes 2, 3	Uncut DNA
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SCIENCE

ISSN 0036-8075
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COVER Artistic representation of the secondary structure prediction from a neural network analysis of the principal neutralization determinant of HIV-1. The β sheets are shown by arrows and α helices by spirals. See page 932. [Illustration by Elizabeth Bothwell, Gregory LaRosa, and Scott Putney; neural network analysis by L. Howard Holley and Martin Karplus]

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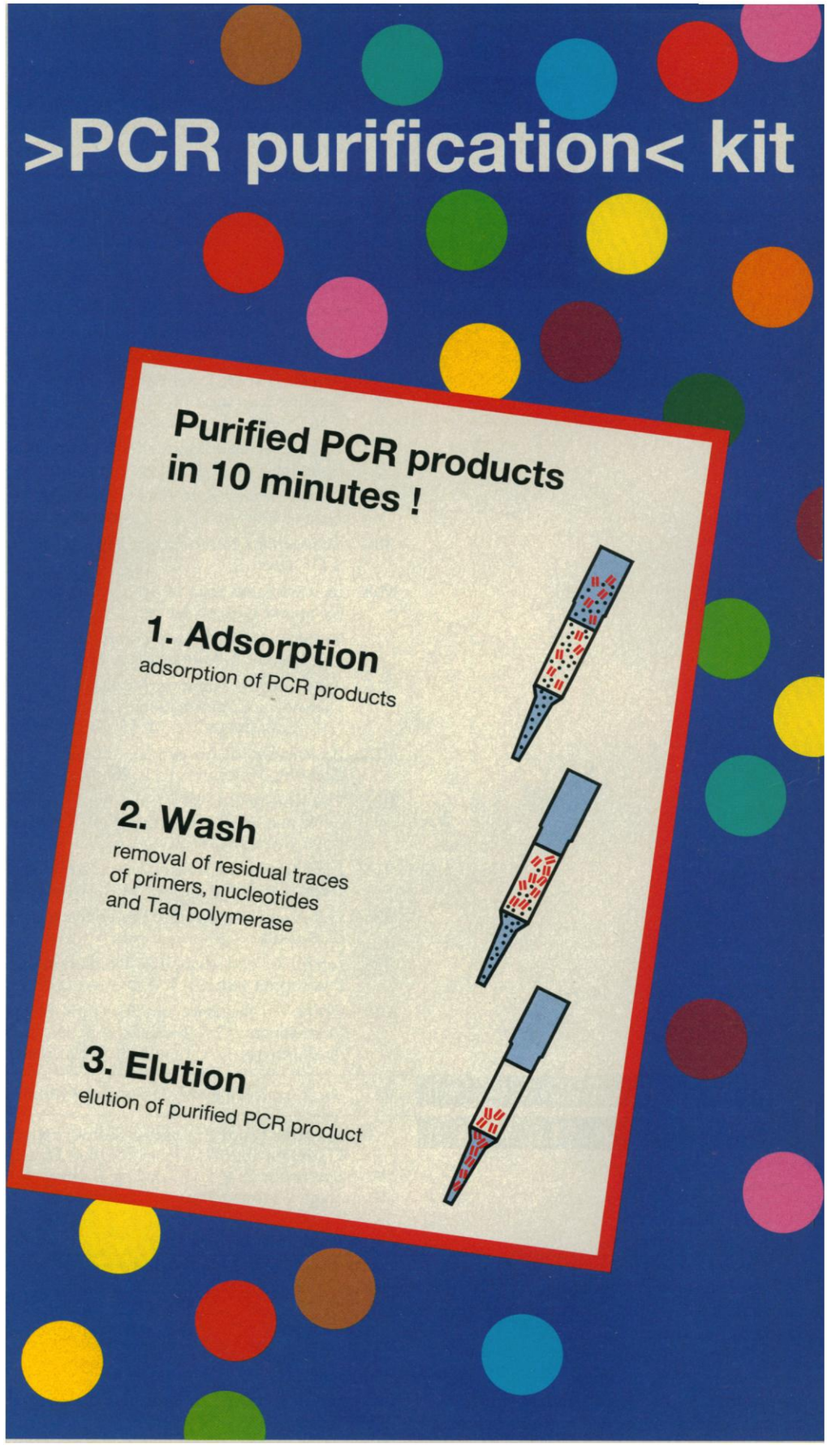

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Deepwater paleoceanography

INCREASINGLY the geochemical clues present in fossils that are buried in sediments in the world's oceans are providing insights into the earth's past temperatures and climates, the thermal structure of the oceans, the changes that have occurred in the composition of the atmosphere, the circulation patterns in the seas and how quickly they have shifted to new patterns, and the forcing role that has been played by variations in the earth's orbit (page 863). Advances in deepwater paleoceanography have been substantial in the past decade and have led to a growing understanding of past events and processes; still, many questions and problems remain. Boyle notes that high on the "wish lists" of most paleoceanographers would be accurate tracers of paleosalinity and deepwater carbonate saturation and a direct method for estimating dissolved oxygen at depth.

Growth hormone safety

THE Center for Veterinary Medicine at the Food and Drug Administration has concluded that bovine growth hormone, which is given to cattle to increase the yield of milk, does not present a health risk to milk consumers. The procedures used by the agency in making its decision and some of the previously unpublished data obtained by pharmaceutical companies that are producing a recombinant form of bovine growth hormone are reviewed by Juskevich and Guyer (page 875). Bovine growth hormone has both direct effects on tissues and indirect ones that are mediated by insulin-like growth factors. Therefore, consideration was given to whether these two proteins might appear intact in cow's milk and if so how active, safe, or toxic each would be if it were ingested by a person. Protein absorption and digestion, protein effects on the nutritional value of milk, and protein denaturation during pasteurization and processing for infant formulas were also evaluated. The increasing use of bovine growth hormone to improve productivity in cattle has come about as a result of advances in recombinant DNA technology; before that, only small amounts of the naturally occurring form of this protein were available. Gibbons and Cherfas explain in two News & Comment articles why this recombinant product has received the green light in the United States but not in Europe (page 852).

Carbon clusters

RINGS, chains, and other configurations of pure carbon clusters are produced by carbon-rich environments such as carbon stars, sooty flames, electric discharges, propellants, and interstellar dust grains. Recently it has become possible to test experimentally some of the hypotheses that have been put forth regarding the structures and characteristics of clusters of specific size. Carbon clusters can be generated by laser vaporization of graphite; after the gases are cooled by supersonic expansion, the resulting clusters are profiled with infrared laser spectroscopy. In a pair of reports, characteristics of carbon clusters with three and seven carbon atoms are described (pages 895 and 897). These first spectral observations of C_7 by Heath *et al.* confirm that C_7 is a symmetric linear molecule with a closed electronic shell. The characterization of C_7 and the expanded profile for C_3 presented by Schmuttenmaer *et al.* suggest fine structure details that should help in searches for these carbon species in astrophysical sources.

Herbicide for leishmaniasis

LEISHMANIASIS is a parasitic disease that is common in the developing world; in South and Central America *Leishmania mexicana* is the agent of a cutaneous form of the disease. The parasite spends part of its life in the gut of a sand fly and part in a human host; biting sand flies pick up parasites that are living in blood cells of infected hosts and later pass them on to other hosts. Chan and Fong show that, in vitro, the herbicide trifluralin inhibits the proliferation of the promastigote stage of the parasite, the proliferation of amistigotes, and the differentiation in culture of the amistigotes to promastigotes (page 924). Trifluralin does not interfere with the proliferation of mammalian cells. The choice of an herbicide as an anti-parasitic agent was based on the prior observation that tubulin (a structural protein) of these parasites is quite similar in sequence to tubulin of plants, to which trifluralin binds. Labeled trifluralin was found to bind to tubulin of the parasites but not of the hosts; the herbicide then probably interfered with tubulin polymerization. The specificity of trifluralin for parasite tubulin suggests that this could be an effective inhibitor of the parasite without being toxic for host cells.

Fruiting body induction

IN *Myxococcus xanthus* bacteria, fruiting body formation is induced by starvation. When cells are starving, motile cells "regroup" by gliding toward one another to form an orderly mound of about 105 cells. Some six hours after starvation has occurred, if conditions are right, a small protein called C-factor is made that switches on spore formation. Out of the mound of cells, a fruiting body filled with spores takes form. C-factor passes between cells but works only at short range. Cells that are not organized in an orderly fashion do not make appropriate cell-to-cell contacts to produce fruiting bodies; nor do nonmotile cells. The connection between motility and signal transmission was ill-defined, but Kim and Kaiser now show that if nonmotile cells are arranged in the proper geometry—side by side or end to end—spore formation and developmental gene expression can be induced (page 926). Proper alignment of cells allows signal transmission and is therefore the glue that binds morphogenesis to motility.

■ RUTH LEVY GUYER

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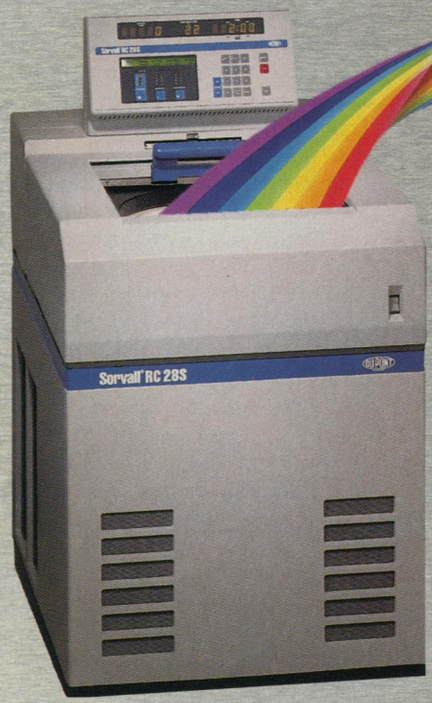

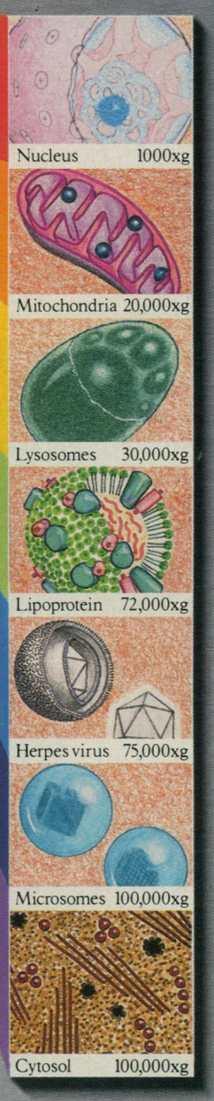

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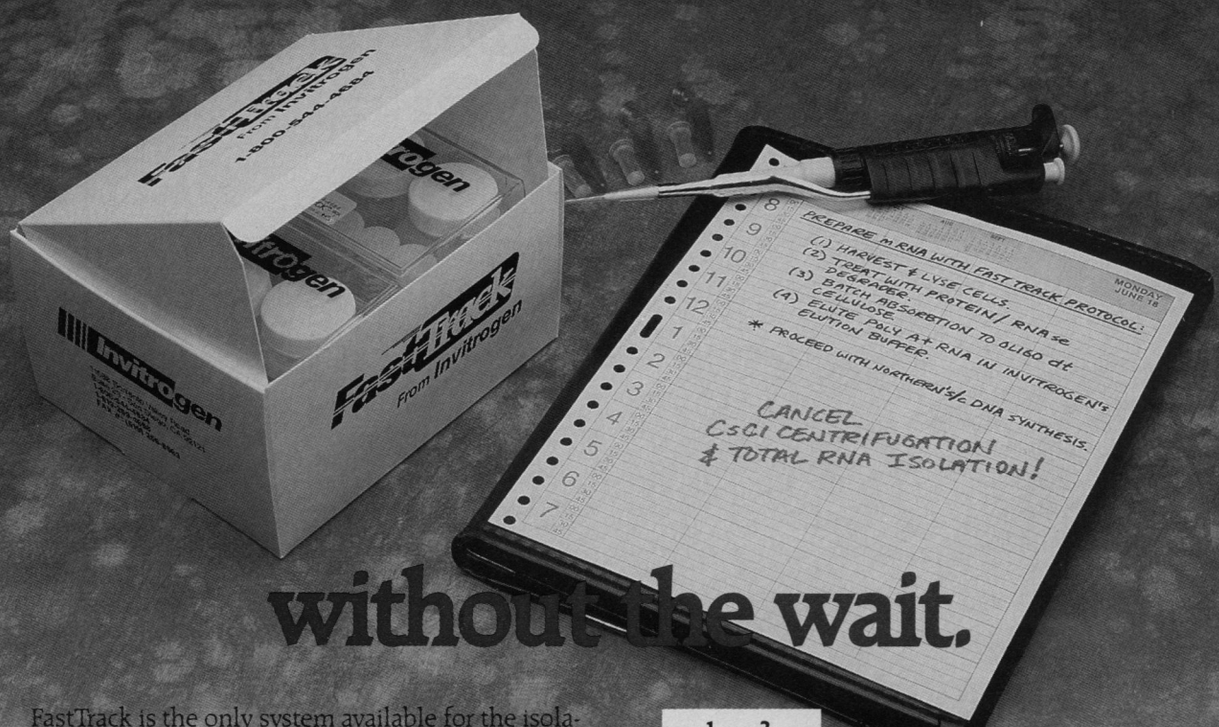

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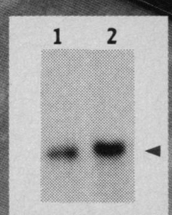

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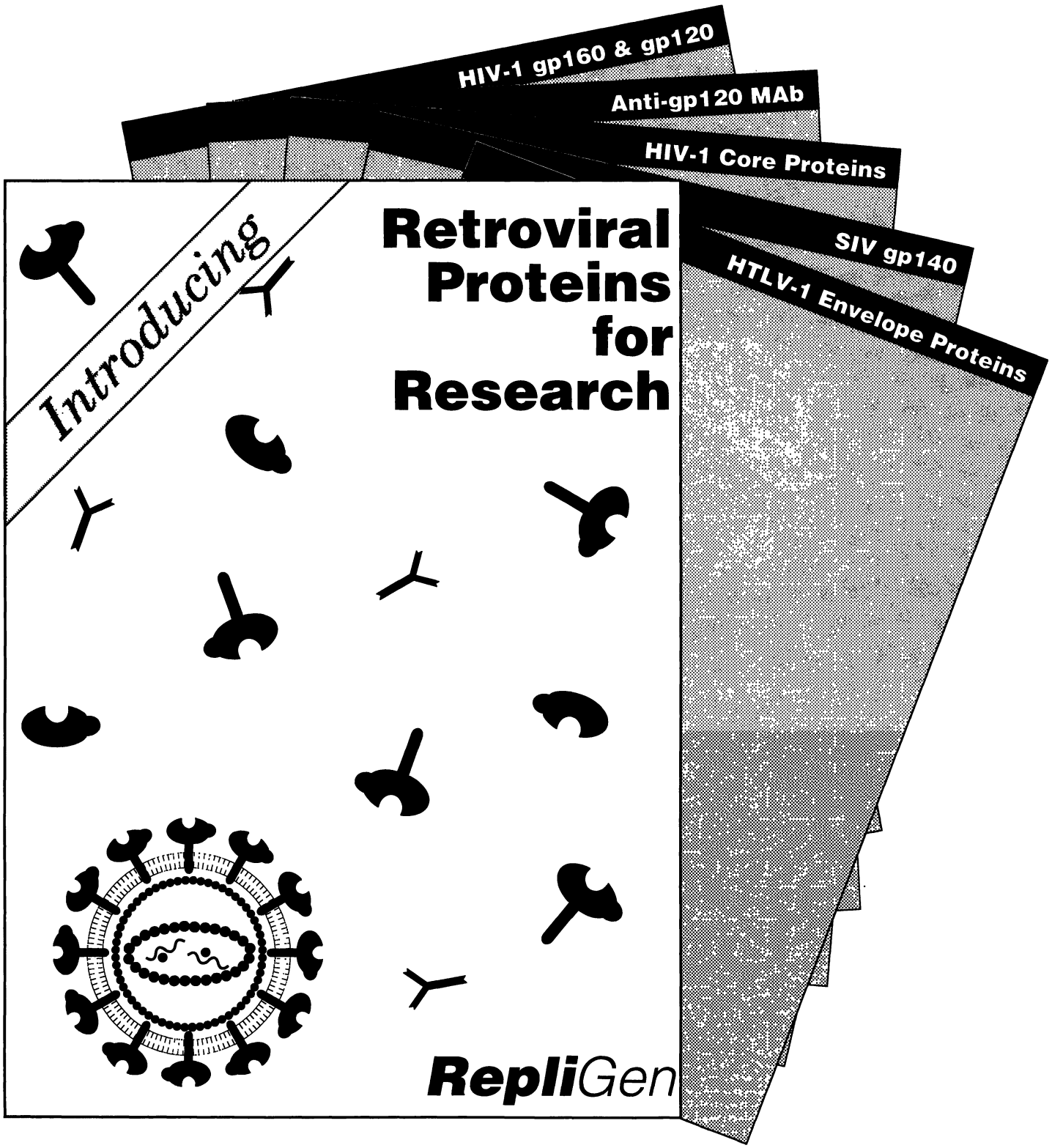

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SCIENTIFIC PROGRAM

MONDAY OCTOBER 22, 1990
9:00am-12:00pm SESSION I – HGP OVERVIEW AND CENTRAL ISSUES
CHARLES CANTOR: Lawrence Berkeley Laboratory – The DOE Prospective.
JAMES WATSON: Cold Spring Harbor Laboratory – The NIH Prospective.
NANCY WEXLER: Columbia University – Ethical, Social, and Legal Issues Concerning the Human Genome Project.
CHARLES DeLISI: Boston University – Structural Biology and the Human Genome Project.
MICHAEL WATERMAN: University of Southern California – Specialized Computer Hardware for Genomic Sequence Analysis.

1:00pm-4:00pm VIEWING OF EXHIBITS AND POSTERS

4:00pm-7:00pm SESSION II – MODEL SYSTEMS
DAN HARTL: Washington University School of Medicine – Progress in the Physical Mapping of the Dorsophila Genome.
FRANK RUDDLE: Yale University – Genomic Analysis of Mammalian Homebox Clusters.
ALAN COULSON: Medical Research Council Laboratory, Cambridge, England – The Genome of Caenorhabditis.
DAVID BOTSTEIN: Stanford University School of Medicine – Why We Should Sequence the Yeast Genome.
ERIC LANDER: Whitehead Institute for Biomedical Research – Physical and Genetic Mapping of the Mouse by YAC Fingerprintings and CA Repeats.

7:00pm-9:00pm WINE AND CHEESE RECEPTION

TUESDAY OCTOBER 23, 1990
9:00am-12:00pm SESSION III – NEW METHODS
ALEXANDER GLAZER: University of California, Berkeley – Intercolation Dye-DNA Complexes and High Sensitivity Laser-Excited DNA Fluorescence Detection.
RODOJE DRMANAC/RADOMIR CRKVENJAKOV: IMGGI, Belgrad, Yugoslavia – Sequencing by Hybridization; Applications and Prospects.
RICHARD MEYERS: University of California, San Francisco – Methods for Identifying Transcripts in Cloned Genomic DNA.
DANIEL COHEN: CEPH, Paris, France – Physical Mapping Based on YAC Technology.
NIKOLAY LISITSYN: Institute of Molecular Genetics, Moscow, USSR – DNA Differences Between Humans and Chimpanzees.
ANDREI MIRZABEKOV: Shemyatkin Institute, Moscow, USSR – DNA Sequencing by Hybridization.

1:00pm-4:00pm VIEWING OF EXHIBITS AND POSTERS

4:00pm-7:00pm SESSION IV – HUMAN DIVERSITY AND ITS IMPLICATIONS
CHARLES COUTELLE: Zentralinstitut fur Molekularbiologie Adw des DDR – Applications of Knowledge Obtained by Human Genome Analysis in National Health Service.
WALTER BODMER: Imperial Cancer Research Fund, London, England.
HENRY ERLICH: Cetus Corporation – The Analysis of Genetic Variation using PCR.
YOSHIYUKI SAKAKI: University of Tokyo, Japan – L1 (LINE-1) repetitive DNA as a novel polymorphic marker for genome analysis.
MALCOLM FERGUSON-SMITH: University of Cambridge, Cambridge, England – Contributions of Cytogenetics to Human Genome Analysis.

7:00pm-9:00pm INDUSTRY SPONSORED WORKSHOPS

WEDNESDAY OCTOBER 24, 1990
9:00am-12:00pm SESSION V – INTERESTING GENE REGIONS
FRANCIS COLLINS: University of Michigan – Identifying Human Disease Genes by Positional Cloning; CF and NF.
THOMAS CASKEY: Baylor College of Medicine – Human X Chromosome Structure/Disease Loci Dysfunction.
KAY DAVIES: John Radcliffe Hospital, Oxford, England – Mapping Around the Fragile X Region of the Human X Chromosome.
DAVID HOUSEMAN: Massachusetts Institute of Technology – Genetics of Wilms Tumor.
ARGIRIS EFSTRATIADIS: Columbia University – Chromosome Specific cDNA/STSs.

1:00pm-4:00pm VIEWING OF POSTERS AND EXHIBITS

4:00pm-7:00pm SESSION VI – LARGE SCALE DNA SEQUENCING
CRAIG VENTER: National Institutes of Health – Automated DNA Sequence Analysis of the Human Chromosome Regions.
WALTER GILBERT: Harvard University – Multiplex Genomic Walking as an Approach to the Sequencing of Megabase-Sized Organisms.
LEROY HOOD: California Institute of Technology – Mapping and Sequencing the T-cell Receptor Loci of Mouse and Man.
WILHELM ANSORGE: European Molecular Biology Laboratory, Heidelberg Germany – Sequencing and Mapping at EMBL.
MATHIAS UHLEN: The Royal Institute of Technology, Stockholm, Sweden – Strategies for Automated Solid Phase DNA Sequencing.

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Edited by Sharon M. Friedman, Sharon Dunwoody, and Carol L. Rogers

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1986; 334 pp.

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