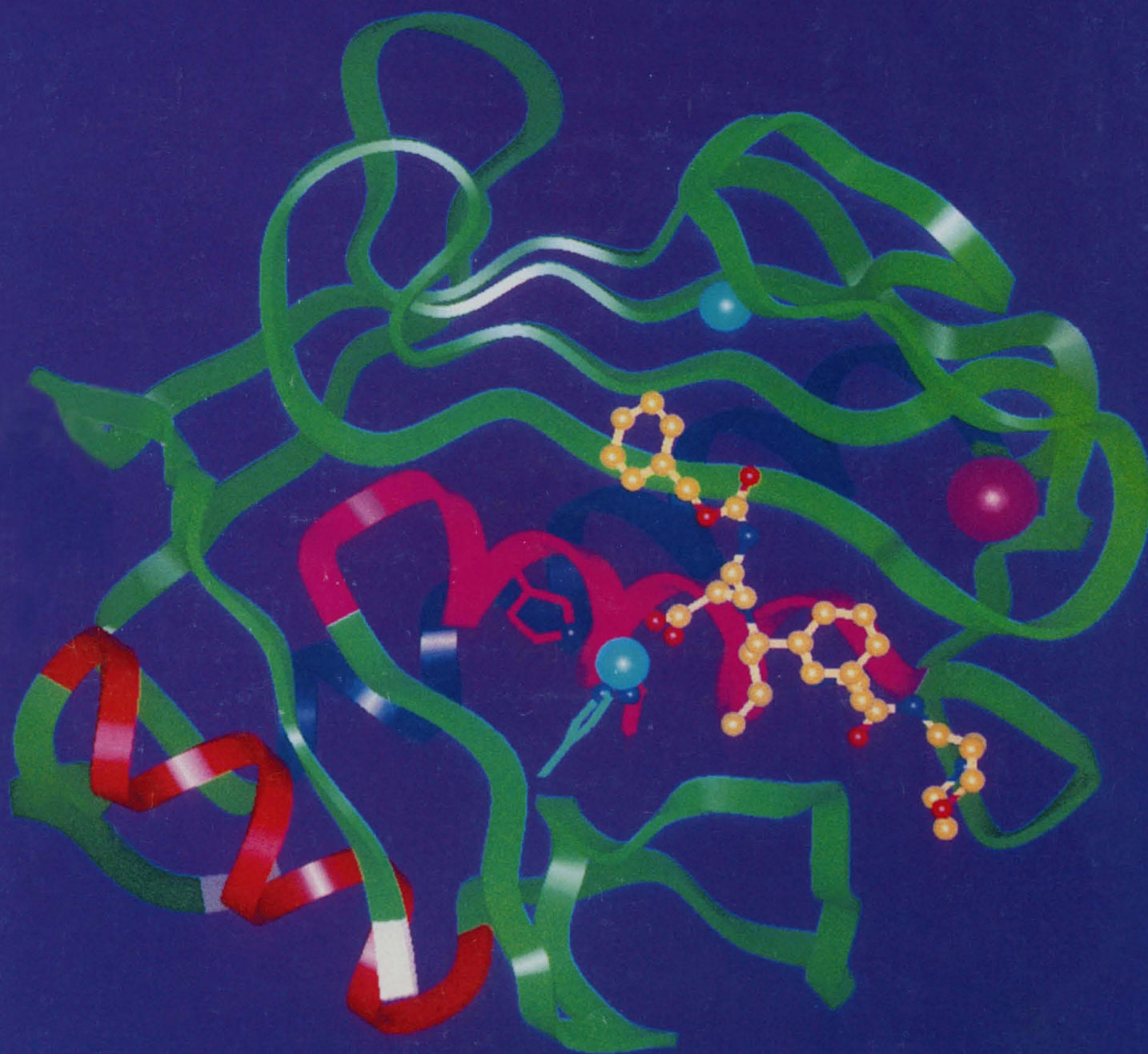


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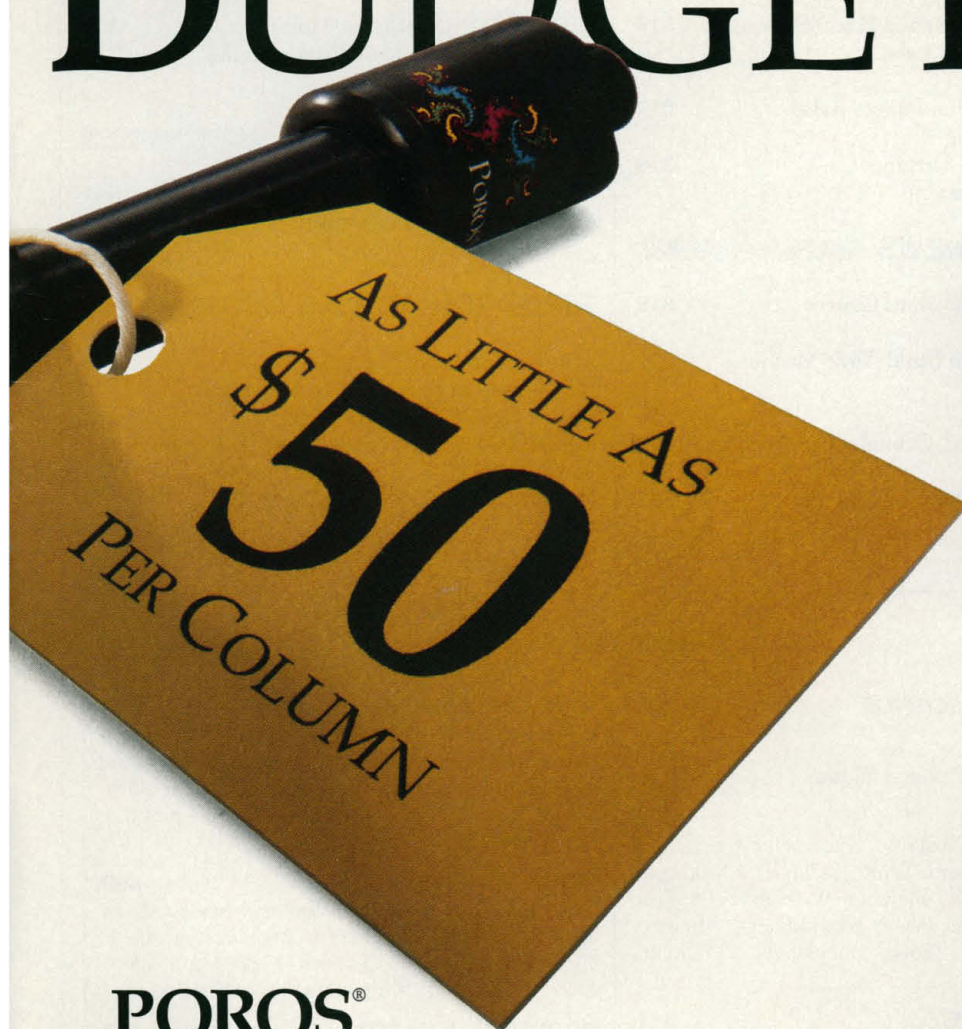
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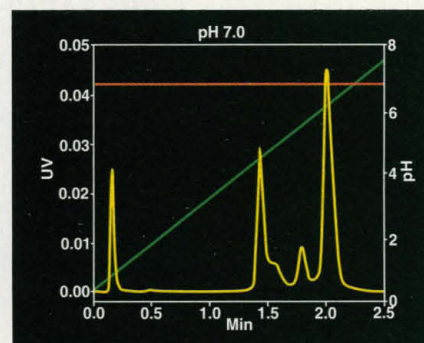
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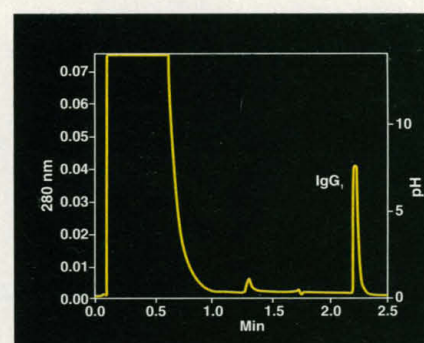


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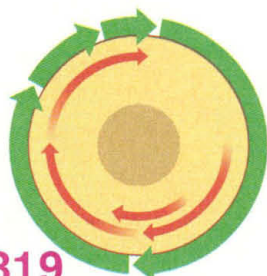
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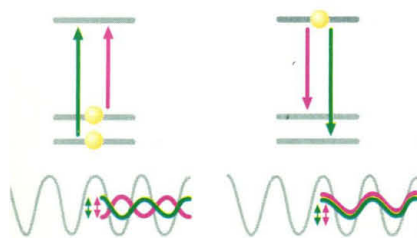
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319

Cell cycle derange-
ments and cancer



337

A new way to lase

NEWS & COMMENT

- Can Carol Browner Reform EPA ?
Strict Ethical Rules Confound
EPA Science 312
- Italy Throws EMBL Into Turmoil 315
- Germany: Environmental R&D Shakeup
Rattles the National Labs 316
- Easy-to-Alter Digital Images Raise
Fears of Tampering
Technology for Turning
Seeing Into Believing 317

RESEARCH NEWS

- How Cells Cycle Toward Cancer 319
- Researchers Try to Build Time Machines
for Microwaves 321
- In Ancient Climate, Orbital Chaos? 323
- New Images Highlight Hubble Fix 323

- Boning Up: Newly Isolated Proteins
Heal Bad Breaks 324

PERSPECTIVES

- Lasers Without Inversion 337
M. O. Scully and M. Fleischhauer
- Polyketide Biosynthesis: Molecular
Recognition or Genetic Programming? 338
D. E. Cane

ARTICLE

- Detecting Climatic Change Signals:
Are There Any "Fingerprints"? 341
S. H. Schneider

RESEARCH ARTICLE

- Hin Recombinase Bound to DNA:
The Origin of Specificity in Major and
Minor Groove Interactions 348
J.-A. Feng, R. C. Johnson, R. E. Dickerson

DEPARTMENTS

- THIS WEEK IN SCIENCE** 301
- EDITORIAL** 303
U.S. Petroleum: Past and Future
- LETTERS** 305
Italy's Role in EMBL: V. Sgaramella • Environ-
mental Management: W. R. Jordan III • Michigan
Support for Faculty Member: W. Harrison • Trot
and Pace: R. Haas; Eds. • Not Huxley's Student:
D. L. Hull • Good Songs: E. C. Scott;
E. F. Hawkins
- SCIENCESCOPE** 311
- RANDOM SAMPLES** 326
Glitch in U.K. Tech Plan • Big Splash On Jupiter •
Mismeasures of Productivity • Birth Control and
High Blood Pressure • Designer Cattle With Ultra-
sound • At the Core of the Chromosome • Hiring
Thaw at FDA
- BOOK REVIEWS** 400
The Clostridia and Biotechnology, reviewed by
E. R. Kashket • *Antarctic Microbiology*, E. F.
DeLong • *Volcanoes*, J. Fink • *Beyond Southern
Skies*, R. D. Davies • Vignettes • Books Received
- PRODUCTS & MATERIALS** 407

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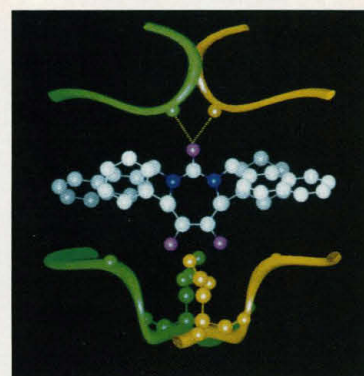
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Model of the catalytic domain of human fibroblast collagenase complexed with an inhibitor. The inhibitor (gold) binds to the catalytic zinc (lower light blue sphere) in the active site cleft of the enzyme. Collagenase activity has been associated with several diseases

including arthritis and metastatic cancer. Knowing the structure of collagenase will facilitate the design of more potent inhibitors. See page 375. [Graphics: Brett Lovejoy, using Insight II software (Biosym)]



380
Designing a protease inhibitor

REPORTS

Crystal Structure of the High-Pressure Phase of Solid CO₂ 356

K. Aoki, H. Yamawaki, M. Sakashita, Y. Gotoh, K. Takemura

Wind Streaks on Venus: Clues to Atmospheric Circulation 358

R. Greeley, G. Schubert, D. Limonadi, K. C. Bender, W. I. Newman, P. E. Thomas, C. M. Weitz, S. D. Wall

500,000-Year Stable Carbon Isotopic Record from Devils Hole, Nevada 361

T. B. Coplen, I. J. Winograd, J. M. Landwehr, A. C. Riggs

Distinguishing the Direct and Indirect Products of a Gas-Surface Reaction 365

C. T. Rettner and D. J. Auerbach

High-Performance Photorefractive Polymers 367

M. Liphardt, A. Goonesekera, B. E. Jones, S. Ducharme, J. M. Takacs, L. Zhang

Built for Jumping: The Design of the Frog Muscular System 370

G. J. Lutz and L. C. Rome



370
Designed for jumping

Benefit to Male Sailfin Mollies of Mating with Heterospecific Females 373

I. Schlupp, C. Marler, M. J. Ryan

Structure of the Catalytic Domain of Fibroblast Collagenase Complexed with an Inhibitor 375

B. Lovejoy, A. Cleasby, A. M. Hassell, K. Longley, M. A. Luther, D. Weigl, G. McGeehan, A. B. McElroy, D. Drewry, M. H. Lambert, S. R. Jordan

Stereospecific Acyl Transfers on the Erythromycin-Producing Polyketide Synthase 378

A. F. A. Marsden, P. Caffrey, J. F. Aparicio, M. S. Loughran, J. Staunton, P. F. Leadlay

Rational Design of Potent, Bioavailable, Nonpeptide Cyclic Ureas as HIV Protease Inhibitors 380

P. Y. S. Lam, P. K. Jadhav, C. J. Eyermann, C. N. Hodge, Y. Ru, L. T. Bacheler, J. L. Meek, M. J. Otto, M. M. Rayner, Y. N. Wong, C.-H. Chang, P. C. Weber, D. A. Jackson, T. R. Sharpe, S. Erickson-Viitanen

Regulation of MHC Class I Transport by the Molecular Chaperone, Calnexin (p88, IP90) 384

M. R. Jackson, M. F. Cohen-Doyle, P. A. Peterson, D. B. Williams

Retention of Unassembled Components of Integral Membrane Proteins by Calnexin 387

S. Rajagopalan, Y. Xu, M. B. Brenner

Cell Membrane Resealing by a Vesicular Mechanism Similar to Neurotransmitter Release 390

R. A. Steinhardt, G. Bi, J. M. Alderton

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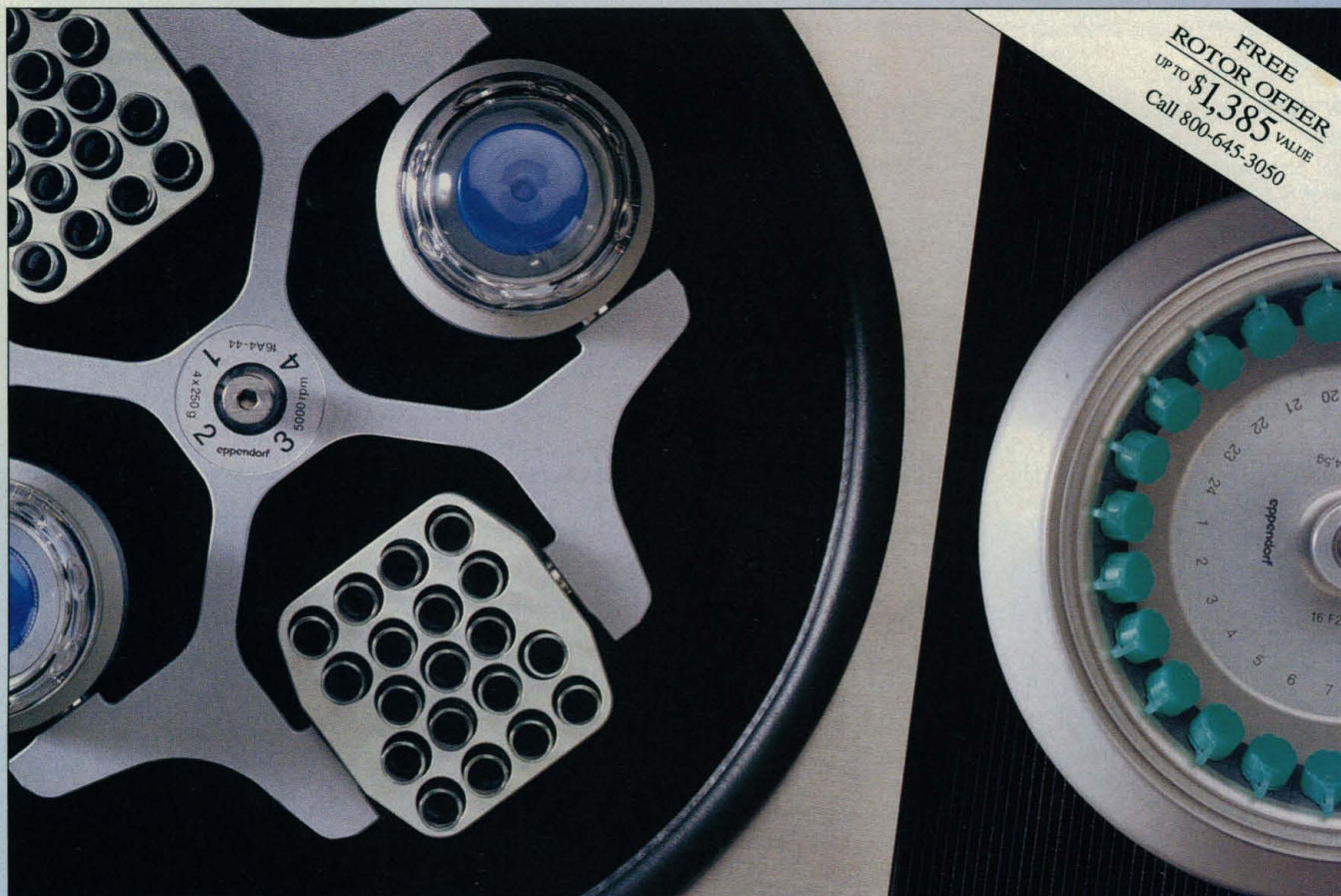
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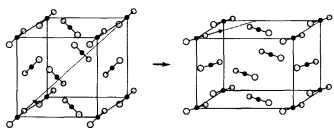
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Beyond dry ice

In solid carbon dioxide (dry ice), quadrupole interactions between the molecules greatly stabilize the cubic lattice structure. Thus, CO₂ undergoes a phase transition only at very high pressures (greater than 10 gigapascals), but the structure of this phase has been difficult to determine. Aoki *et al.* (p. 356) present the crystal structure for this high-pressure orthorhombic phase based on a x-ray powder-pattern analysis of data obtained with a synchrotron source. There is almost no volume change associated with this phase transition. In the cubic phase the molecules are aligned along the body diagonals of the cubic lattice, whereas in the orthorhombic phase the molecules are parallel to one of the base planes.



ations are preserved during the long transit through the carbonate-rock aquifer to Devils Hole.

Damage control

Many experimental manipulations of cells can be done that break the cell membrane because cells are able to rapidly repair such damage and reseal themselves. Cells require the presence of external calcium in order to reseal, which suggests that calcium influx is a signal that participates in repair. Steinhart *et al.* (p. 390) show that this process may involve vesicle delivery and fusion similar to the exocytosis of neurotransmitters. Blocking the activity of two proteins involved in vesicle transport, multifunctional calcium/calmodulin kinase and kinesin, inhibited resealing in sea urchin embryos and 3T3 fibroblasts. Proteins associated with synaptosomes also appear to participate in resealing.

Surface signatures

When a gas-phase molecule reacts with a molecule adsorbed on a surface, does it do so by directly striking the adsorbed

molecule, or does it adsorb on the surface before proceeding to react? This seemingly simple question has in fact been difficult to answer directly. Rettner and Auerbach (p. 365) studied the reaction of hydrogen atom beams with chlorine atoms adsorbed on the gold(111) surface. They find that both mechanisms operate but in different energy regimes. The higher energy HCl products show a highly peaked angular distribution, indicating that they "remembered" the direction of the incoming hydrogen atom. The lower thermal energy products show a broad angular distribution consistent with accommodation of the hydrogen atoms with the surface.

Popularity contest

In some species that reproduce asexually, the females must still mate with males from other species; the sperm of the male stimulates embryogenesis. Why do the males apparently waste their resources on such unproductive matings? Schlupp *et al.* (p. 373) show that, in sailfin mollies, females of the sexually reproducing species prefer male fish that have already consorted with the

asexual females. The male apparently improves his chances for reproductive success by mating with the asexual females.

Left behind

Cells have mechanisms to prevent the transport of incompletely assembled receptors to the cell surface. Two reports present evidence that incomplete components of the class I histocompatibility molecules or the T cell receptor (TCR) are retained in the endoplasmic reticulum (ER) by the molecular chaperone protein known as calnexin. Jackson *et al.* (p. 384) show that in *Drosophila* cells that lack calnexin, expression of calnexin slowed intracellular transport of class I subunits. Rajagopalan *et al.* (p. 387) studied COS cells that expressed mutant forms of calnexin that were exported from the ER. In these cells, the CD3 ϵ subunit of the TCR also left the ER and colocalized with calnexin.

Going west

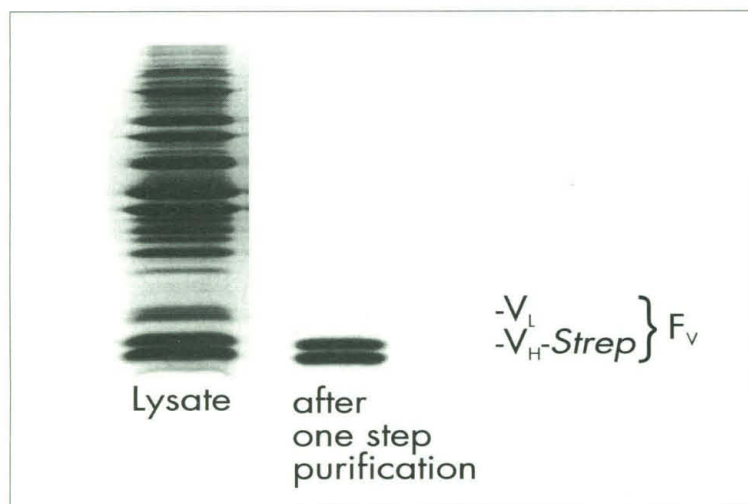
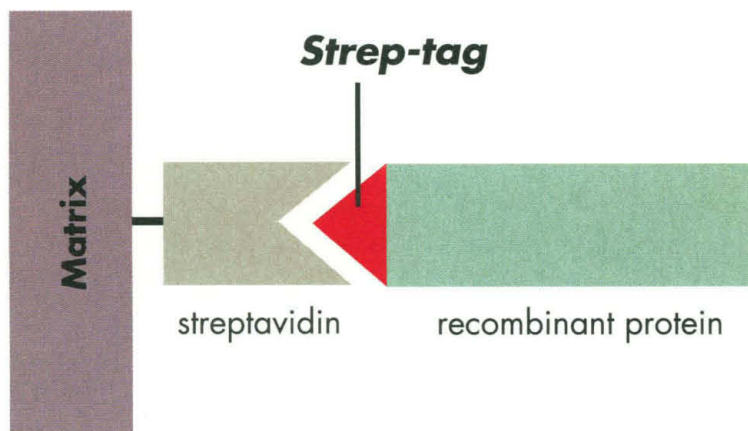
The atmosphere of Venus is dense and fast-moving enough to push around loose dust and sand on the planet's surface. Greeley *et al.* (p. 358) have used radar imaging by the Magellan orbiter to trace windblown streaks of surface material and thereby infer the pattern of Venus' atmospheric circulation. After removing individual wind streaks obviously associated with local topography, the remaining pattern is one of westward and equatorward circulation. This result is consistent with theoretical models in which air travels from the poles to the equator at the surface, and then rises and recirculates back to the poles at higher altitudes.

Adding to the record

Analysis of oxygen isotopes from calcite precipitating from ground water in Devils Hole, Nevada, has yielded a detailed record of climate in the Great Basin extending back 500,000 years that challenges aspects of the Milankovitch theory of climate change. Coplen *et al.* (p. 361) present the carbon isotope record from the same samples; this record also holds some surprises and problems. The ¹³C/¹²C ratios vary inversely with the oxygen isotope record and at times lead it by up to 7000 years. The changes in carbon isotopic composition of the ground water implied by the record may reflect climate-induced changes in the extent and density of vegetation in the Great Basin, but it is not clear how the isotopic varia-

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¹Schmidt & Skerra, Prot. Engineering 6, 109-122 (1993)
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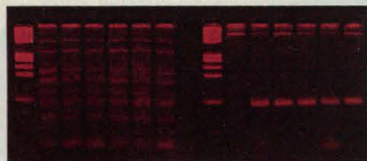
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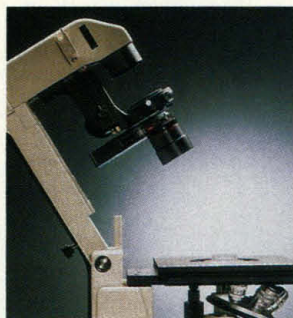
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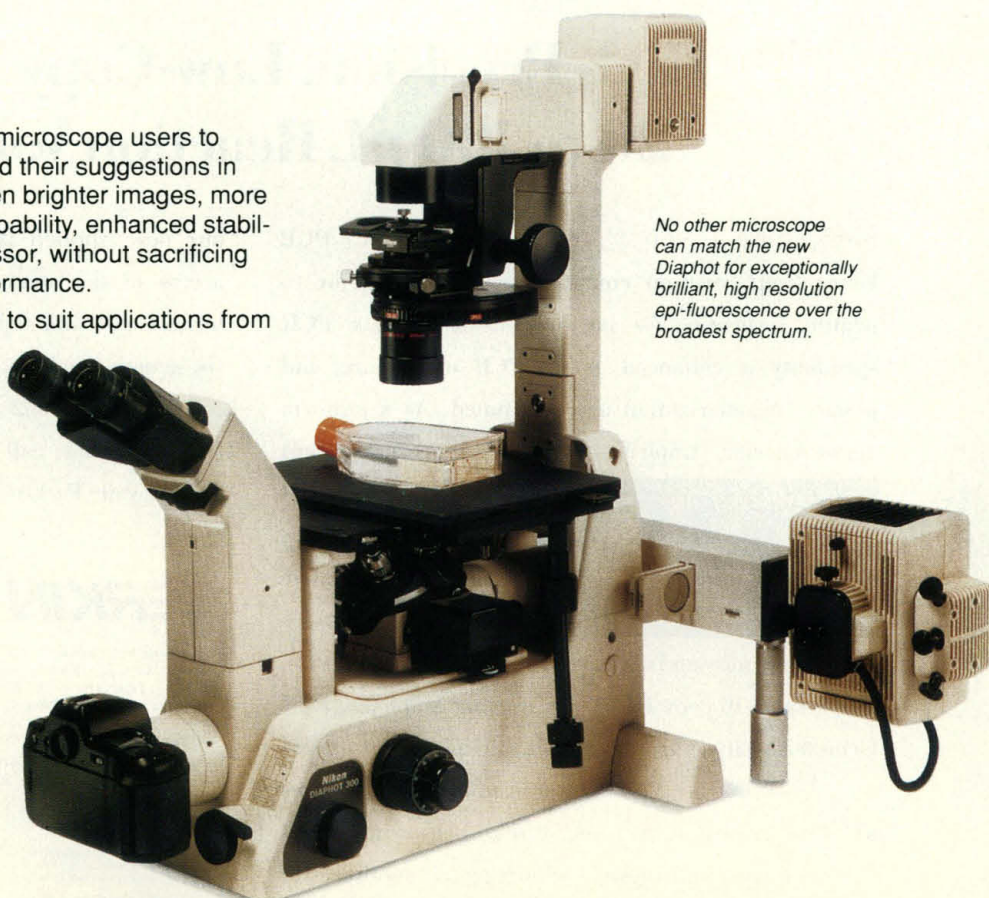
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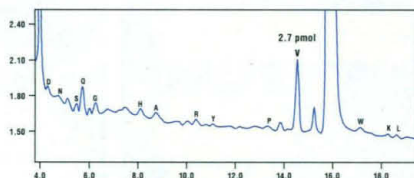
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The recently-released Version 3.0 includes enhancements that further define ORIGIN's uniqueness. The new curve fitting tool bar, for example, offers users a quick and easy way to set fitting constraints and generate confidence

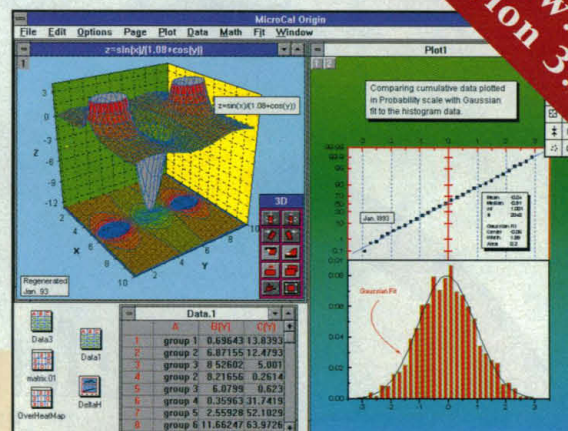
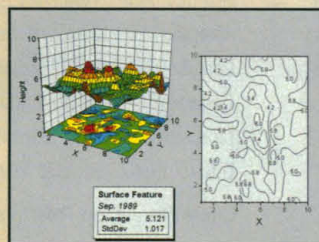
bands for the fit curve. The new Object Edit tool bar allows users to select multiple objects by dragging a "rubber band" and aligning them with a single click.



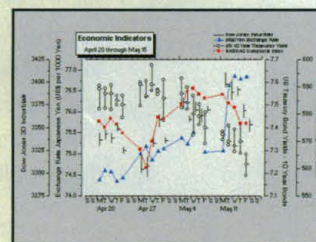
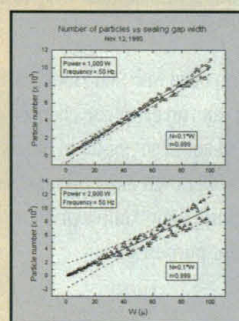
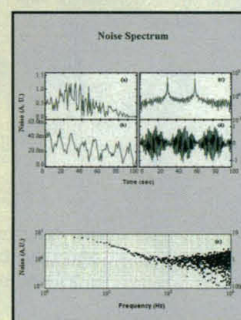
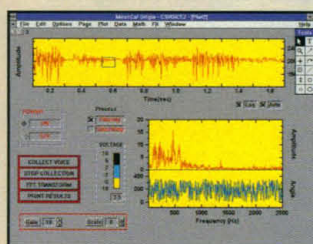
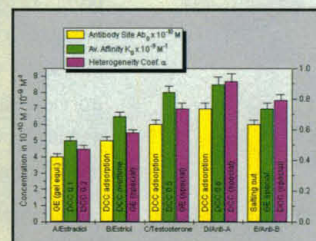
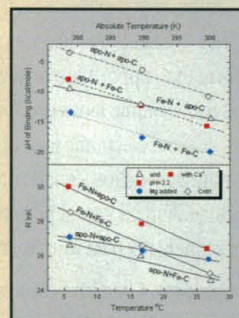
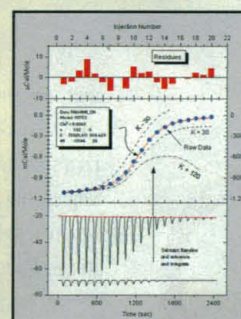
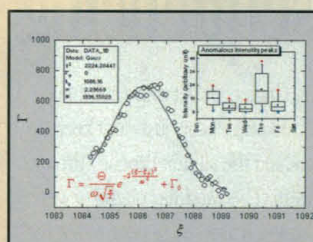
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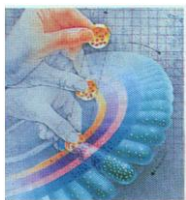


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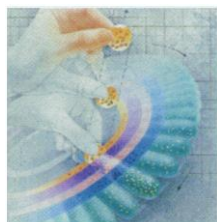
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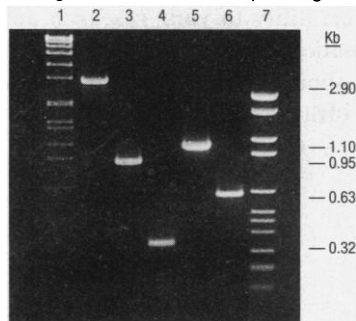
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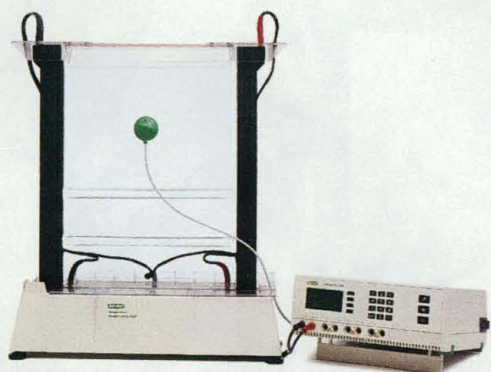
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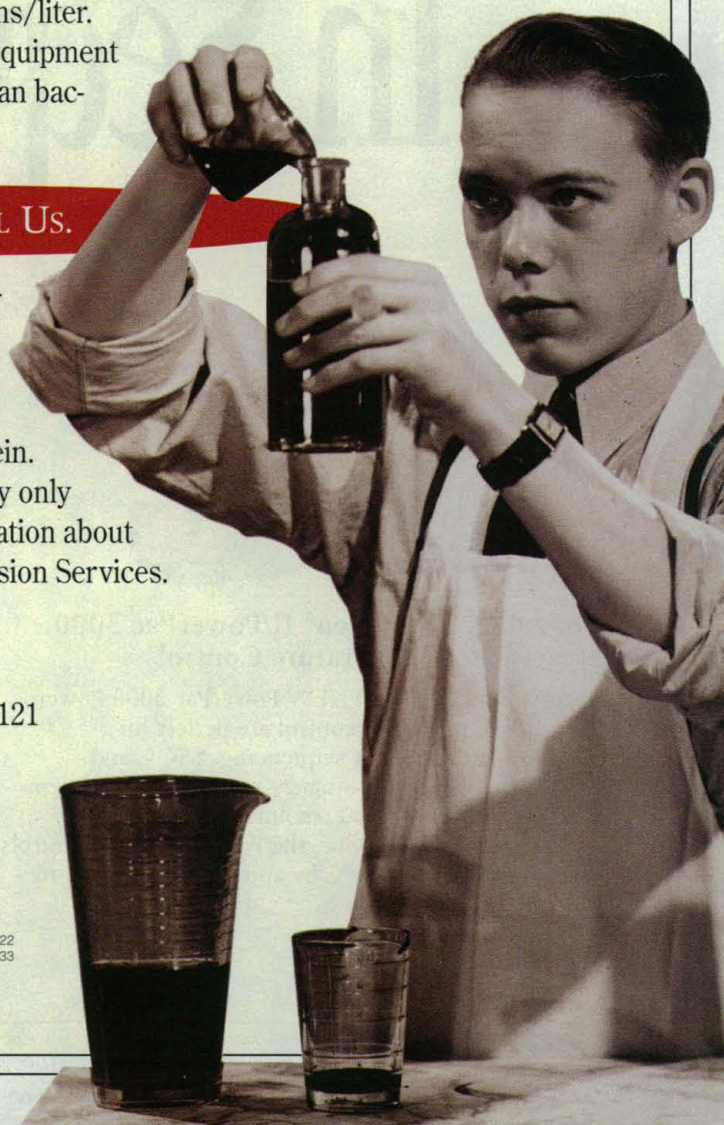


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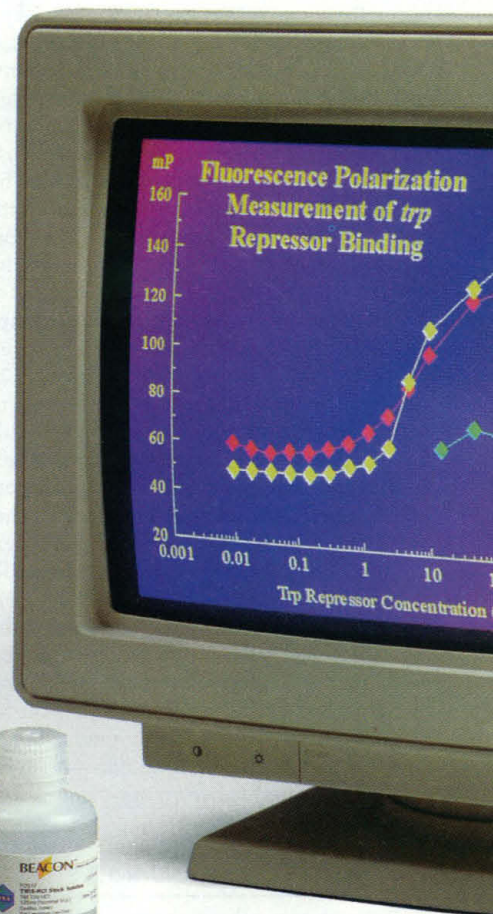
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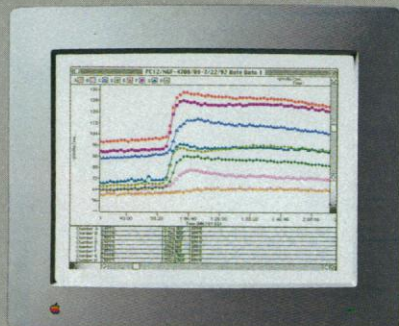
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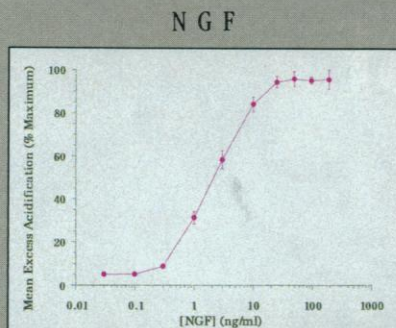
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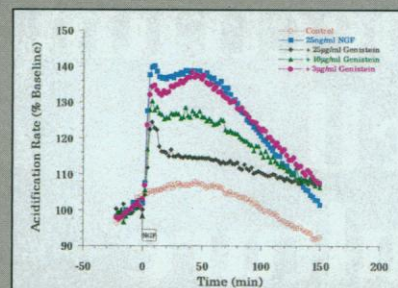
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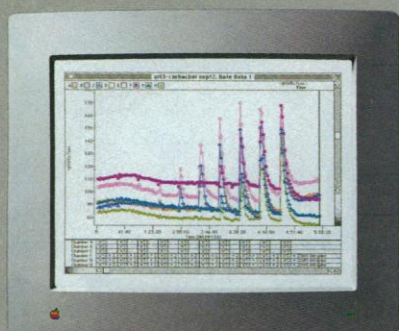
1 Real-time acidification rate data showing the response of PC12 cells to a 12 min. exposure to nerve growth factor (NGF:0.1-200ng/ml).



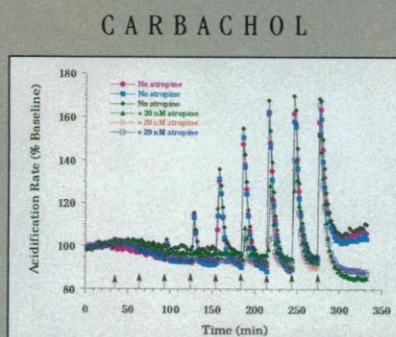
2 Dose response of PC12 cells to NGF. Each point represents data from 7 separate experiments. Calculated EC_{50} value for NGF was 1.9 ± 0.7 ng/ml ($\sim 152 \pm 50$ pM) ($\bar{x} \pm S.E.M.$).



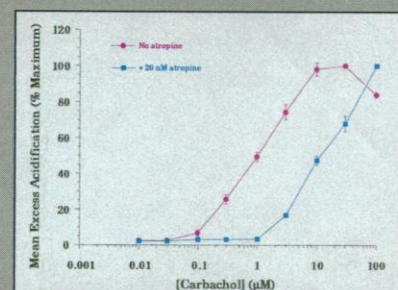
3 Dose dependent inhibition of NGF (25 ng/ml) response by tyrosine kinase inhibitor, genistein (3-25 μ g/ml).



1 Real-time acidification rate data demonstrating stimulation of CHO cells transfected with muscarinic M_1 receptor. Increasing doses of carbachol (10nM-100 μ M) given in presence and absence of 20nM atropine.



2 Data from previous figure expressed as percentages of the basal acidification rates before initial addition of carbachol.



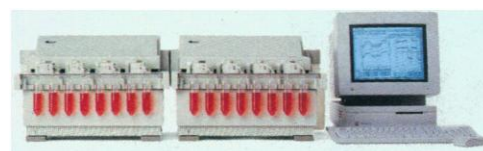
3 The EC_{50} values were calculated as 1.00 ± 0.08 μ M for carbachol alone and 11.50 ± 0.09 μ M for carbachol in the presence of 20nM atropine ($\bar{x} \pm S.E.M.$; $n=3$).

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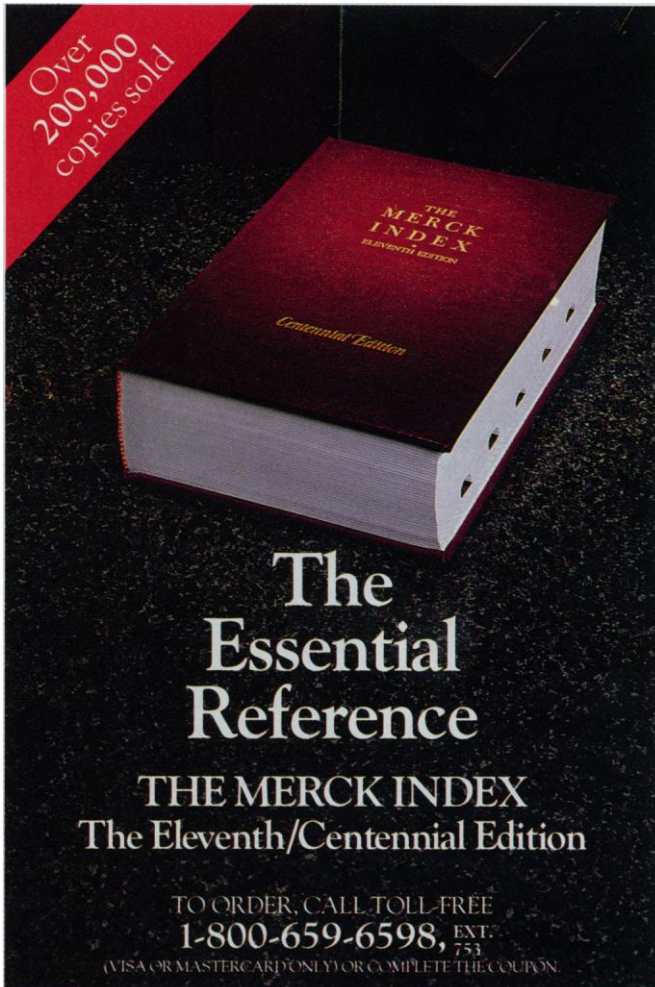
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