



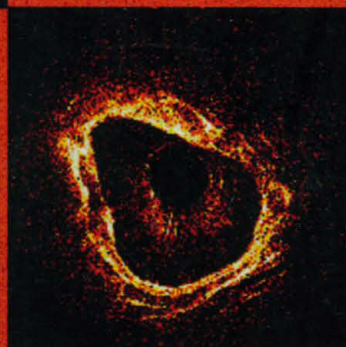
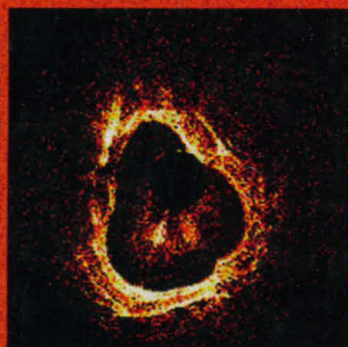
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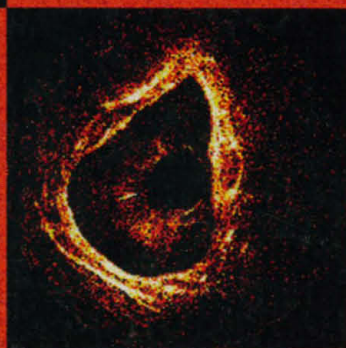
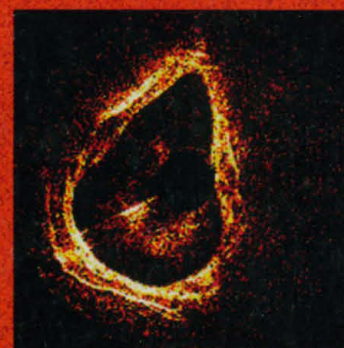
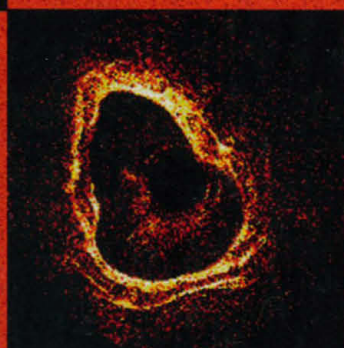
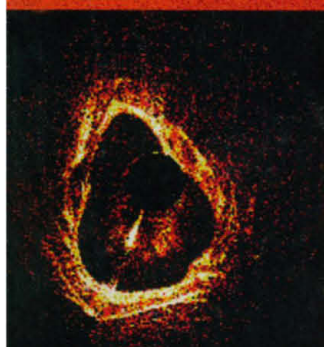
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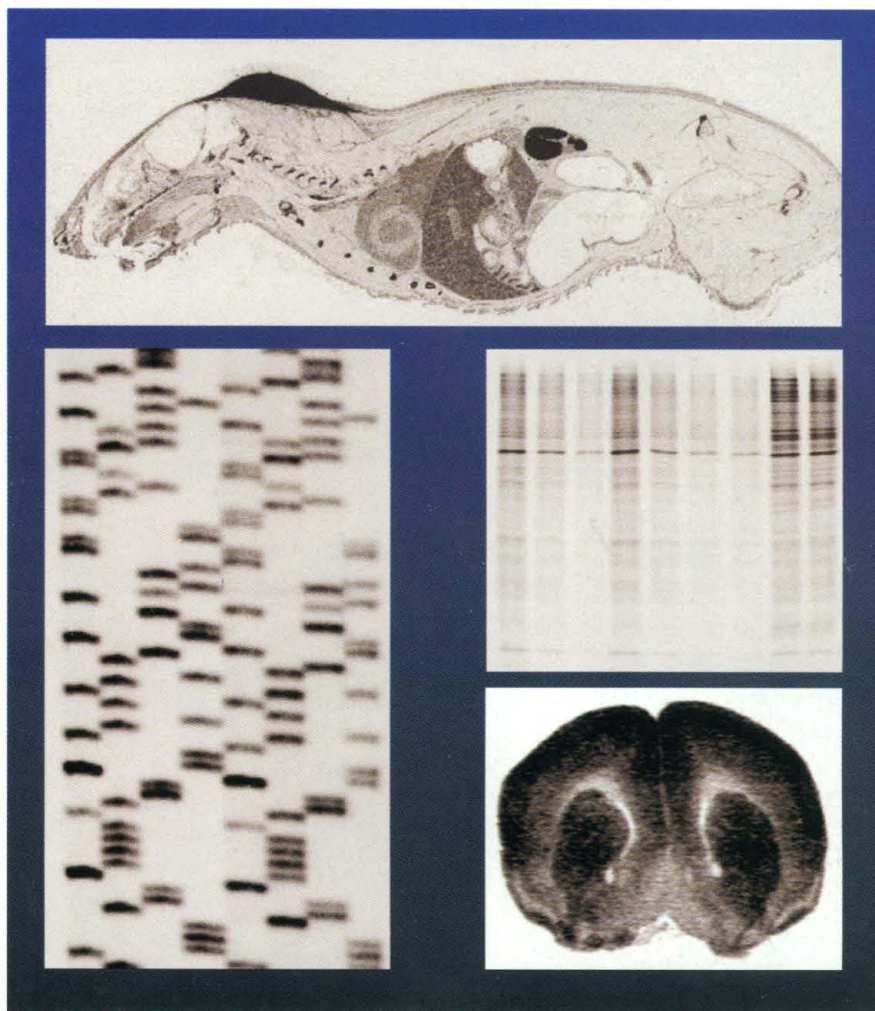


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IL-1 β	RANTES
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IL-2	TGF- β 1
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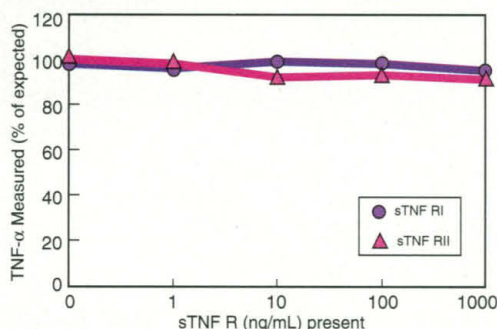
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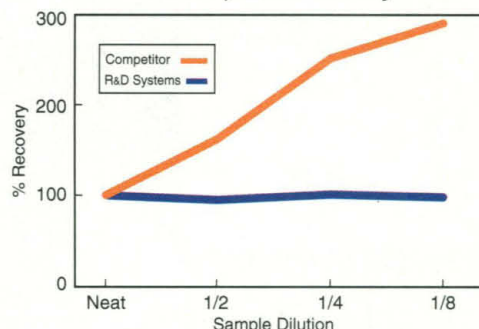
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A spiked serum sample was serially diluted and run in the Quantikine mouse IL-2 ELISA and a competitor's mouse IL-2 ELISA. Results are based on the percent recovery of the diluted sample.

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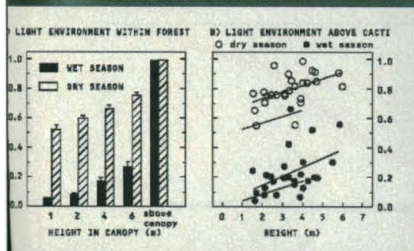
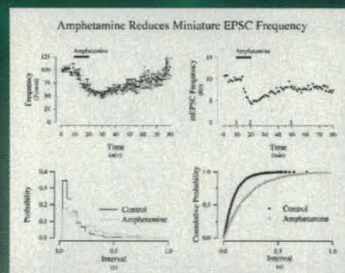
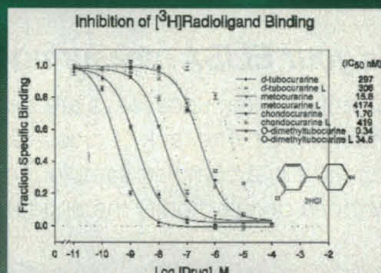
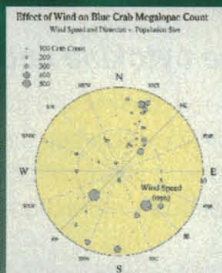
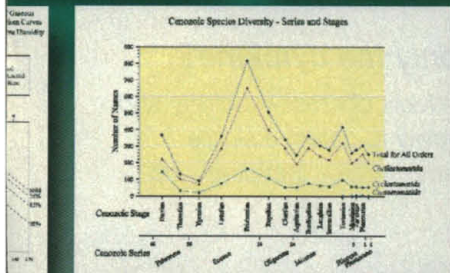
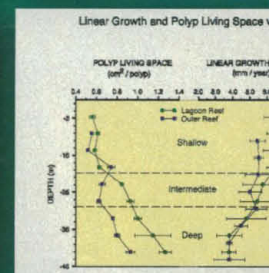
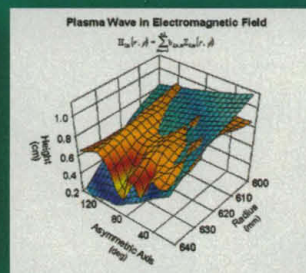
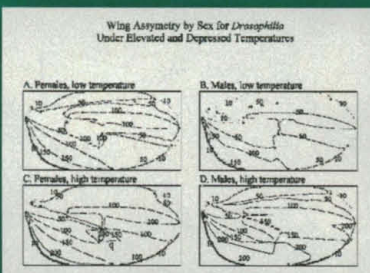
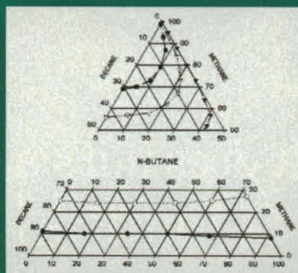
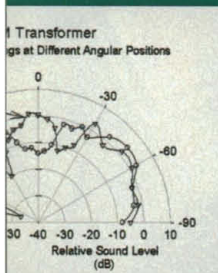
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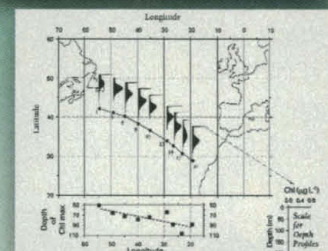
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Review of eleven competitive products
Desktop Engineering Magazine,
September 1996



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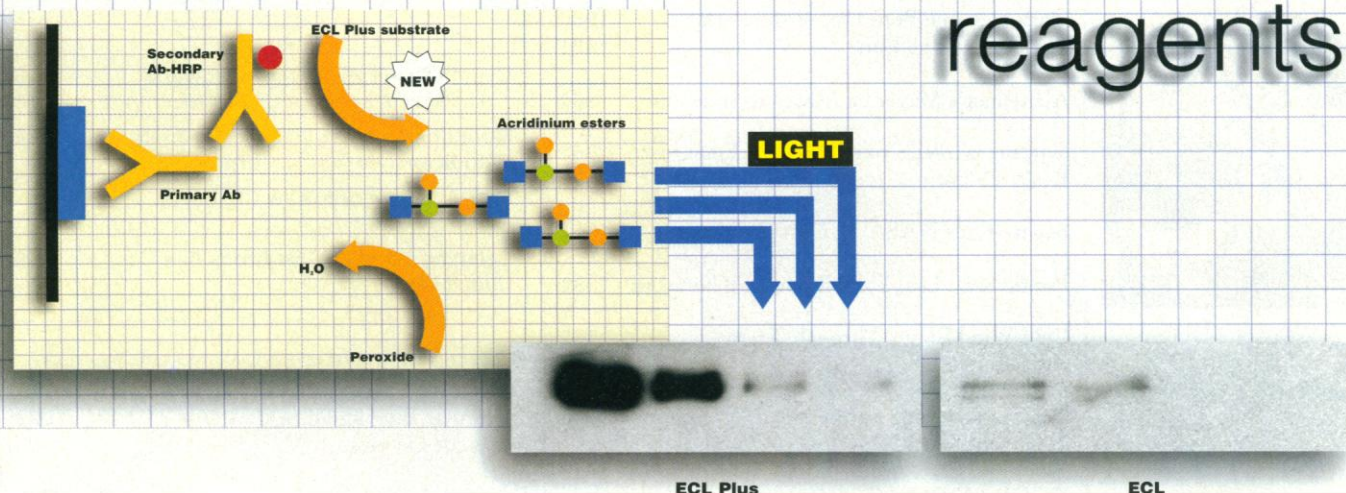
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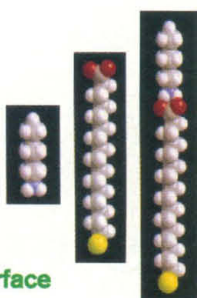
1960

Going with the grain



1973 & 2045

First Parkinson's gene identified



2021

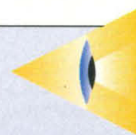
Seeing surface stress

NEWS & COMMENT

- | | |
|---|------|
| Corn Genome Pops Out of the Pack | 1960 |
| Please Pass the Data | 1961 |
| Alzheimer's Maverick Moves to Industry | 1962 |
| Varmus Grilled Over Breach of Embryo Research Ban | 1963 |
| Senate Raps NASA on Cost Overruns | 1964 |
| Pacific Rim: Labs Form Biomedical Network | 1964 |
| Cold Wind Blows Through Arctic Climate Project | 1965 |
| Centers Fear Self-Sufficiency Is Prelude to Government Cuts | 1966 |

RESEARCH NEWS

- | | |
|--|------|
| Marijuana: Harder Than Thought? | 1967 |
| Climate-Evolution Link Weakens | 1968 |
| Strings Unknot Problems in Particle Theory, Black Holes | 1969 |
| Tripping the Light at Fantastic Speeds | 1970 |
| Are Pushy Axons a Key to Spinal Cord Repair? | 1971 |
| Longer Tusks Are Healthy Signs | 1972 |
| Ivory Trade Seen as Threat | 1972 |
| Gene Discovery Offers Tentative Clues to Parkinson's | 1973 |
| New Imaging Methods Provide a Better View Into the Brain | 1974 |



IMAGING

NEWS

- | | |
|--|------|
| Candid Cameras for the Nanoworld | 1982 |
| The Man Who Almost Saw Atoms | 1984 |
| Monitoring a Killer Volcano Through Clouds and Ice | 1985 |
| Fast-Action Flicks Draw Chemists' | 1986 |
| Rave Reviews | |
| Catching Speeding Electrons in a Circuit City | 1987 |

PERSPECTIVES

- | | |
|--|------|
| Molecular Individualism | 1999 |
| P. G. de Gennes | |
| Selection for Survival? | 2000 |
| C. Benoist and D. Mathis | |
| Learning Mechanisms: The Case for CaM-KII | 2001 |
| J. Lisman, R. C. Malenka, R. A. Nicoll, R. Malinow | |
| Tissue Optics | 2002 |
| D. A. Benaron, W.-F. Cheong, D. K. Stevenson | |

REPORTS

- | | |
|--|------|
| Nondestructive Imaging of Dielectric-Constant Profiles and Ferroelectric Domains with a Scanning-Tip Microwave Near-Field Microscope | 2004 |
| Y. Lu, T. Wei, F. Duewer, Y. Lu, N.-B. Ming, P. G. Schultz, X.-D. Xiang | |
| Observation of Magnetic Domain Behavior in Colossal Magnetoresistive | 2006 |

DEPARTMENTS

- | | | | |
|-----------------------------|------|------------------------|------------|
| THIS WEEK IN SCIENCE | 1945 | RANDOM SAMPLES | 1977 |
| EDITORIAL | 1951 | BOOK REVIEWS | 1996 |
| Science in the 21st Century | | AAAS NEWS & NOTES | 2063 |
| President Bill Clinton | | TECH.SIGHT: PRODUCTS | 2067 |
| LETTERS | 1953 | QUARTERLY AUTHOR INDEX | On the Web |
| SCIENCESCOPE | 1959 | | |

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COVER

Ultrahigh-resolution images of a rabbit trachea (~6 mm diameter) obtained in vivo by catheter-endoscope-based optical coherence tomography. The technique probes the tissue with light from a fiber optic source by collecting photons reflected from features in the wall. It is one of the

imaging technologies transforming fields including medical diagnosis, cell biology, and materials science. See page 2037, the special News section (page 1981), and related items marked with the "eye" icon. [Image: C. Pitris, G. Tearney, B. Bouma, S. Boppart, J. Fujimoto, M. Brezinski]



Biologists Get Up Close and Personal With Live Cells	1988
Jellyfish Proteins Light Up Cells	1989
Spectral Technique Paints Cells in Vivid New Colors	1990
Play of Light Opens a New Window Into the Body	1991
Firefly Gene Lights Up Lab Animals From Inside Out	1993
Rethinking the Telescope for a Sharper View of the Stars	1994

Materials with a Magnetic Force Microscope

Q. Lu, C.-C. Chen, A. de Lozanne

Three-Color, Tunable, Organic Light-Emitting Devices

Z. Shen, P. E. Burrows, V. Bulović, S. R. Forrest, M. E. Thompson

Scanning Confocal Optical Microscopy and Magnetic Resonance on Single Defect Centers

A. Gruber, A. Dräbenstedt, C. Tietz, L. Fleury, J. Wrachtrup, C. von Borczyskowski

Creep Response of the Hayward Fault to Stress Changes Caused by the Loma Prieta Earthquake

J. J. Lienkaemper, J. S. Galehouse, R. W. Simpson

Single Polymer Dynamics in an Elongational Flow

T. T. Perkins, D. E. Smith, S. Chu

Surface Stress in the Self-Assembly of Alkanethiols on Gold

R. Berger, E. Delamarche, H. P. Lang, Ch. Gerber, J. K. Gimzewski, E. Meyer, H.-J. Güntherodt

The Role of Antibody Concentration and Avidity in Antiviral Protection

M. F. Bachmann, U. Kalinke, A. Althage, G. Freer, C. Burkhardt, H.-P. Roost, M. Aguet, H. Hengartner, R. M. Zinkernagel

Bacterial Interference Caused by Autoinducing Peptide Variants

G. Ji, R. Beavis, R. P. Novick

An Animal Model for Acute and Persistent Epstein-Barr Virus Infection

A. Moghaddam, M. Rosenzweig, D. Lee-Parritz, B. Annis, R. P. Johnson, F. Wang

Blood Flow Regulation by S-Nitrosohemoglobin in the Physiological Oxygen Gradient

J. S. Stamler, L. Jia, J. P. Eu, T. J. McMahon, I. T. Demchenko, J. Bonaventura, K. Gernert, C. A. Piantadosi

In Vivo Endoscopic Optical Biopsy with Optical Coherence Tomography

G. J. Tearney, M. E. Brezinski, B. E. Bouma, S. A. Boppart, C. Pitris, J. F. Southern, J. G. Fujimoto

Exchange of Protein Molecules Through Connections Between Higher Plant Plastids

R. H. Köhler, J. Cao, W. R. Zipfel, W. W. Webb, M. R. Hanson

Regulatory Phosphorylation of AMPA-Type Glutamate Receptors by CaM-KII During Long-Term Potentiation

A. Barria, D. Muller, V. Derkach, L. C. Griffith, T. R. Soderling

Mutation in the α -Synuclein Gene Identified in Families with Parkinson's Disease

M. Polymeropoulos *et al.*

Cannabinoid and Heroin Activation of Mesolimbic Dopamine Transmission by a Common μ_1 Opioid Receptor Mechanism

G. Tanda, F. E. Pontieri, G. Di Chiara

Activation of Corticotropin-Releasing Factor in the Limbic System During Cannabinoid Withdrawal

F. Rodríguez de Fonseca, M. R. A. Carrera, M. Navarro, G. F. Koob, F. Weiss

Receptor-Mediated Activation of a MAP Kinase in Pathogen Defense of Plants

W. Ligterink, T. Kroj, U. zur Nieden, H. Hirt, D. Scheel

Differential Requirements for Survival and Proliferation of CD8 Naïve or Memory T Cells

C. Tanchot, F. A. Lemonnier, B. Péronau, A. A. Freitas, B. Rocha

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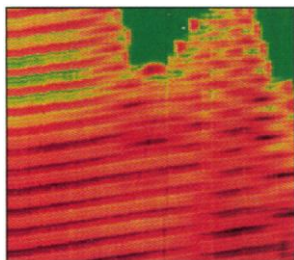
1. "The I.M.A.G.E. Consortium: An Integrated Molecular Analysis of Genomes and their Expression", Lennon, G.G., Auffray, C., Polymeropoulos, M., and Soares, M. B. [1995] Genomics.

THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Scanning materials

Two reports focus on scanning probe methods for characterizing the structures of technologically important materials. Magnetoresistive materials change their conductivity in the presence of magnetic fields and have potential applications in magnetic recording. Q. Lu *et al.* (p. 2006) used a low-temperature magnetic force microscope to image magnetic domains of calcium-doped LaMnO_3 films. As the films were warmed to the temperature range where the films transform from ferromagnetic to paramagnetic (around 245 kelvin), the domains became less stable and merged and split as they decreased in extent. Ferroelectric materials with domains of different polarizations have attracted interest for applications in nonlinear optics and acoustics, but mapping the domain structures has usually required etching and optical imaging. Y. Lu *et al.* (p.



2004) have developed a near-field microwave microscope that uses a scanning tip in a noncontact mode. Changes in the dielectric constant and ferroelectric domain boundaries were mapped out with sub-micrometer resolution on an yttrium-doped LiNbO_3 sample.

Stacking colors

Organic light-emitting devices (OLEDs) have potential uses in flat panel displays. Shen *et al.* (p. 2009) have taken advantage

Seeing single defects in diamonds

Single-molecule, single-exciton, and single-nanocrystal spectroscopy have led to important insights into the behavior of individual components underlying ensemble averages. Gruber *et al.* (p. 2012) now present results for single defect centers in diamond. By combining confocal microscopy and magnetic resonance measurements, they show that nitrogen vacancy centers in diamond are highly photostable. Strain leads to defects with different symmetries that could be distinguished by their magnetic response. These defects have potential uses as nanoscopic light sources.

of transparent electrode materials to create a multilayer device that stacks red, green, and blue OLEDs vertically, an arrangement that simplifies patterning across the display. The intensity of each color can be varied independently.

Assembly under stress

When molecules adsorb in layers on a surface, the forces between the molecules can induce stresses in the underlying substrate. Thus stress measurements can give insights into the growth mechanism of a molecular layer and the interactions between the molecules and the surface. Berger *et al.* (p. 2021) developed a sensor for measuring surface stresses and illustrate their approach for the self-assembly of alkanethiols on gold. Self-assembly led to compressive surface stress, and stress was greater for longer alkyl chains.

Armed and ready

Although susceptible plants may respond to a certain pathogen with the symptoms of disease, that same pathogen may be unable to produce disease in other plant species. Such plants, nonetheless, recognize the presence of the microbe with a system of non-host defense re-

sponses. Ligterink *et al.* (p. 2054) have identified one of the key elements of the non-host defense response. The elicitor-responsive mitogen-activated protein (MAP) kinase is activated after the initial response by ion channels. After activation, it translocates into the cell nucleus where it may affect interactions of transcription factors with the genes that encode other elements of the plant defense armamentarium.

Quantity, not quality?

What parameters best define the ability of antibodies to protect a host from infection? Bachmann *et al.* (p. 2024) used a collection of monoclonal antibodies against a common viral antigen (the glycoprotein of vesicular stomatitis virus) to compare neutralization of the virus in vitro and protection against infection in vivo. Surprisingly, as long as antibodies were above a minimum avidity threshold and a minimum concentration threshold, they provided protection against infection in the whole animal. Parameters that correlated closely with neutralization in vitro, such as avidity, neutralization rate constant, and in vitro neutralizing activity, failed to correlate with protection in vivo.

These results may prove useful in designing antibody therapies to fight viral infection.

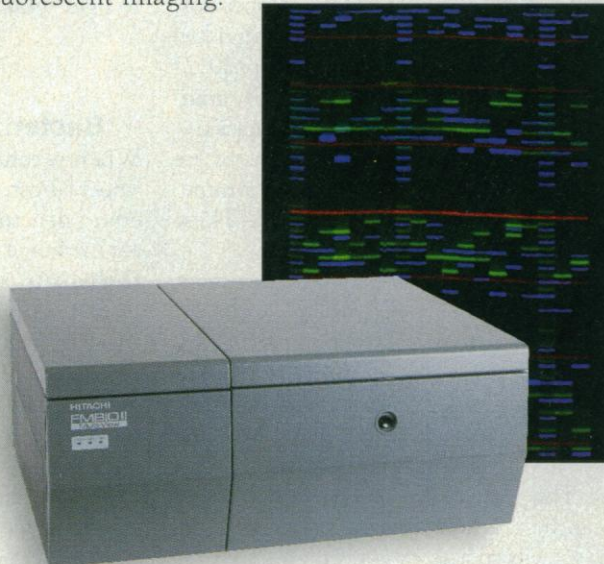
Bacterial blocking

When several bacterial strains infect a host, they do not cooperate but actually interfere with each other. This effect has been thought to arise from growth inhibition, but Ji *et al.* (p. 2027) show that in *Staphylococcus aureus* the virulence factors and other extracellular proteins associated with the *agr* locus from one strain inhibited *agr* expression in another strain and appeared to limit its infectivity. The peptide and receptor sequences can vary markedly, which indicates that some mechanism generates hyper-variability.

LTP origins

Long-term potentiation (LTP) is a well-studied model of neural plasticity, but the molecular mechanisms have been elusive. Barria *et al.* (p. 2042; see the Perspective by Lisman *et al.*, p. 2001) now show that the long-lasting increase in the postsynaptic response in the CA1 area of the hippocampus is due to persistent phosphorylation of Thr²⁸⁶ on the AMPA-type glutamate receptor, catalyzed by calmodulin-dependent protein kinase II (CaM-KII). This result completes the pathway for LTP in these cells: The neurotransmitter, glutamate, binds to the *N*-methyl-D-aspartate receptor, which, when the postsynaptic cell is depolarized, allows calcium to flow in and activate CaM-KII. CaM-KII can then phosphorylate the AMPA receptor and the cell exhibits a greater response.

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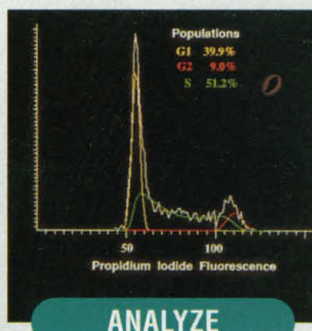
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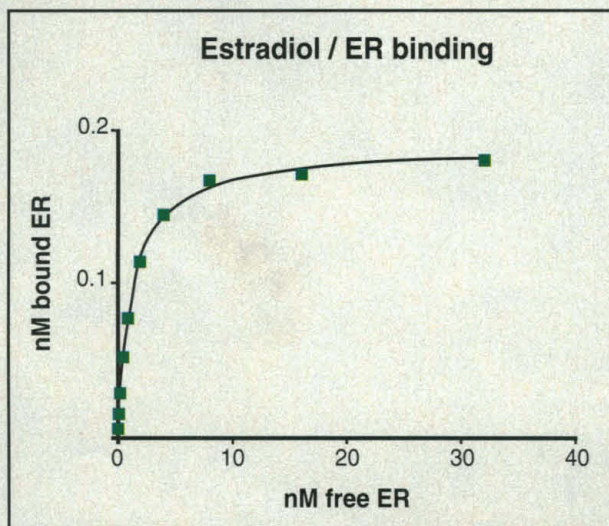
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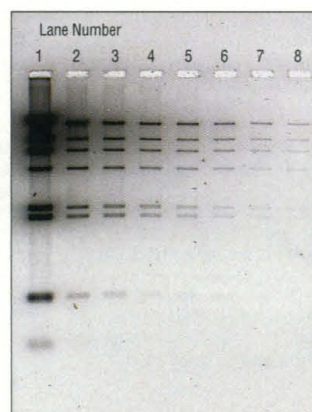
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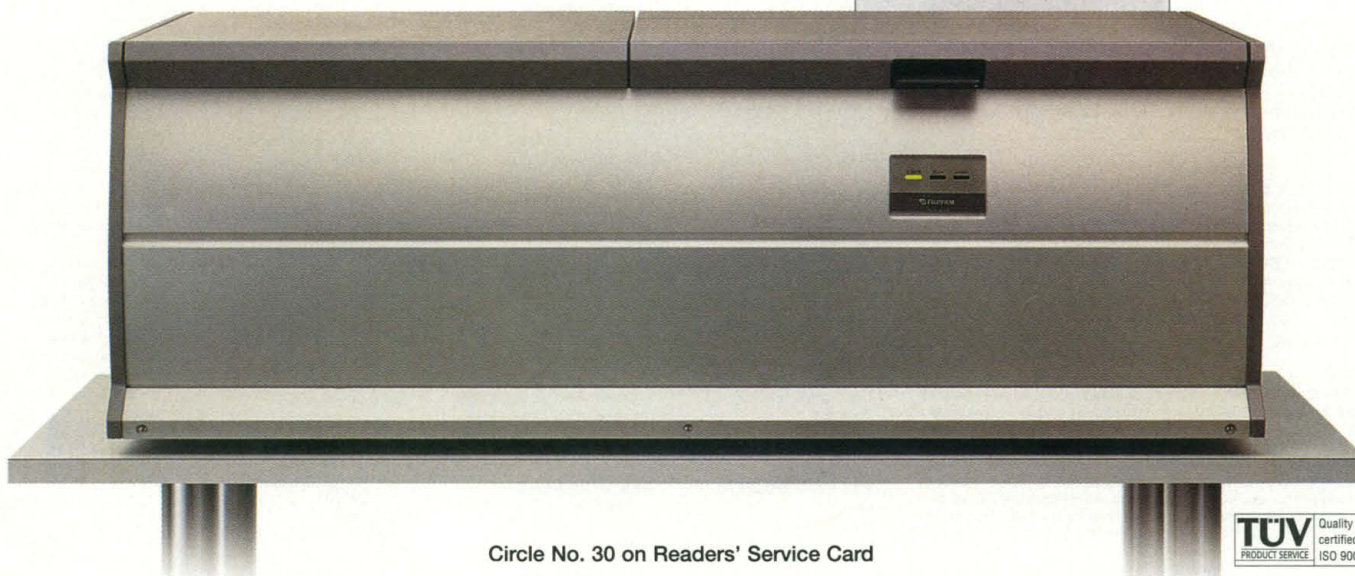
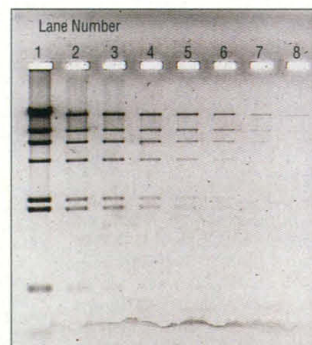
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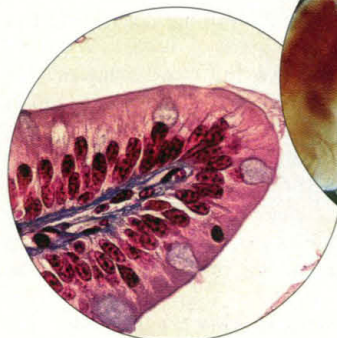


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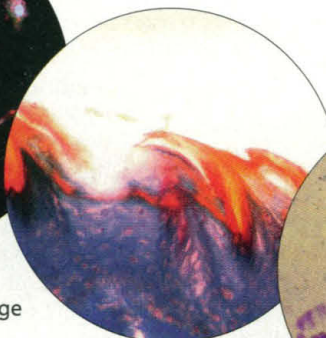
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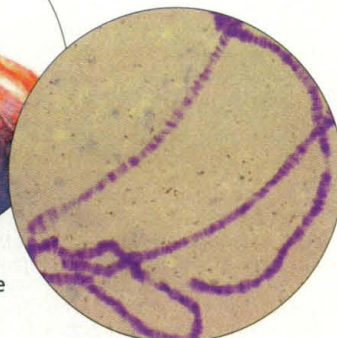
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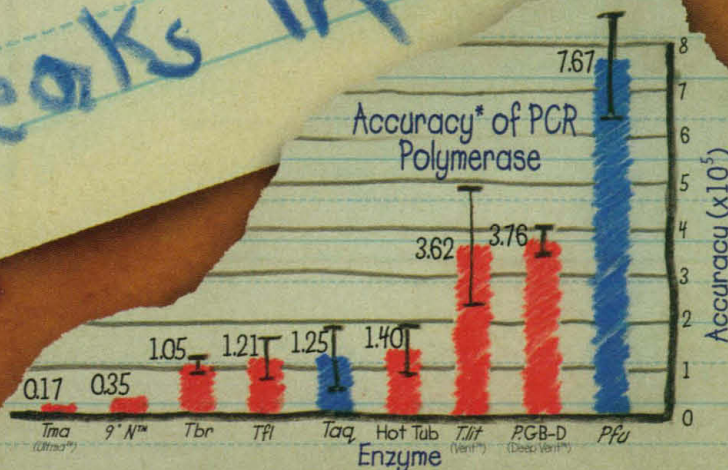
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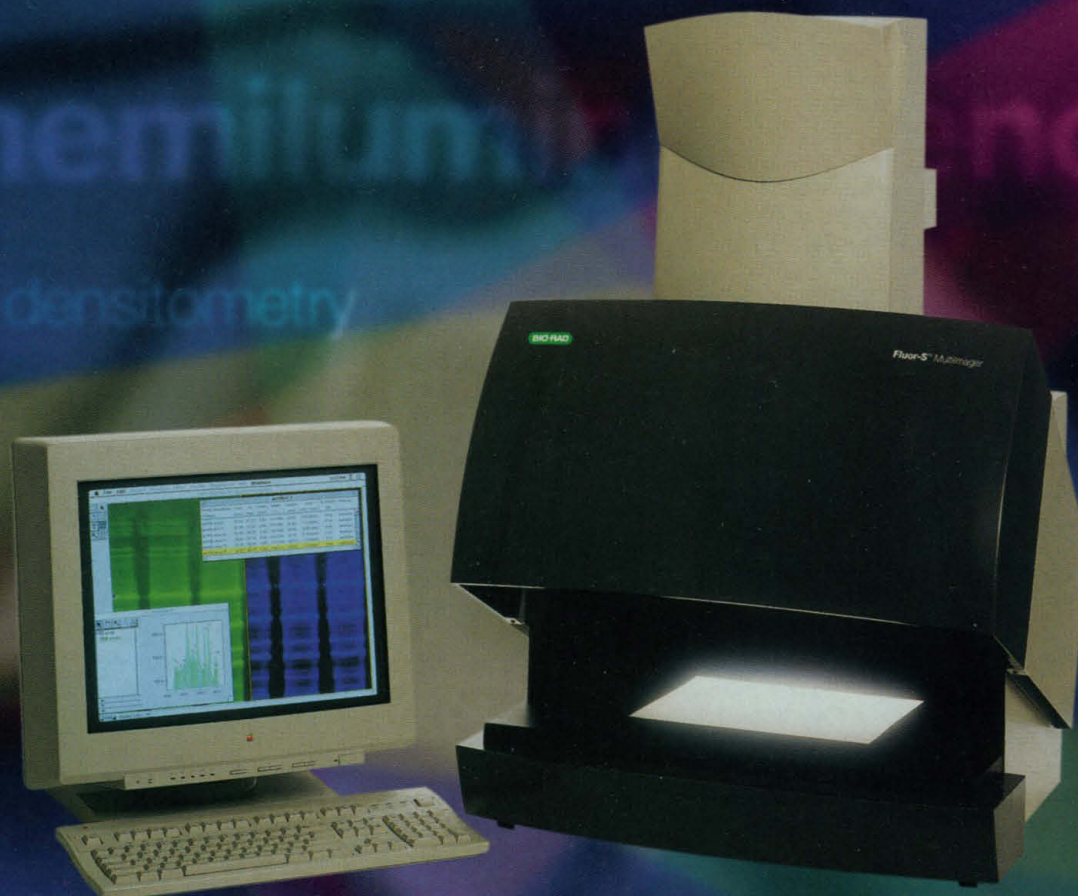
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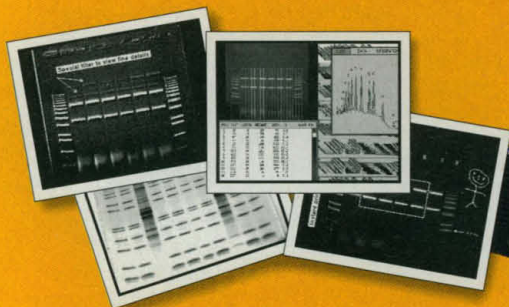
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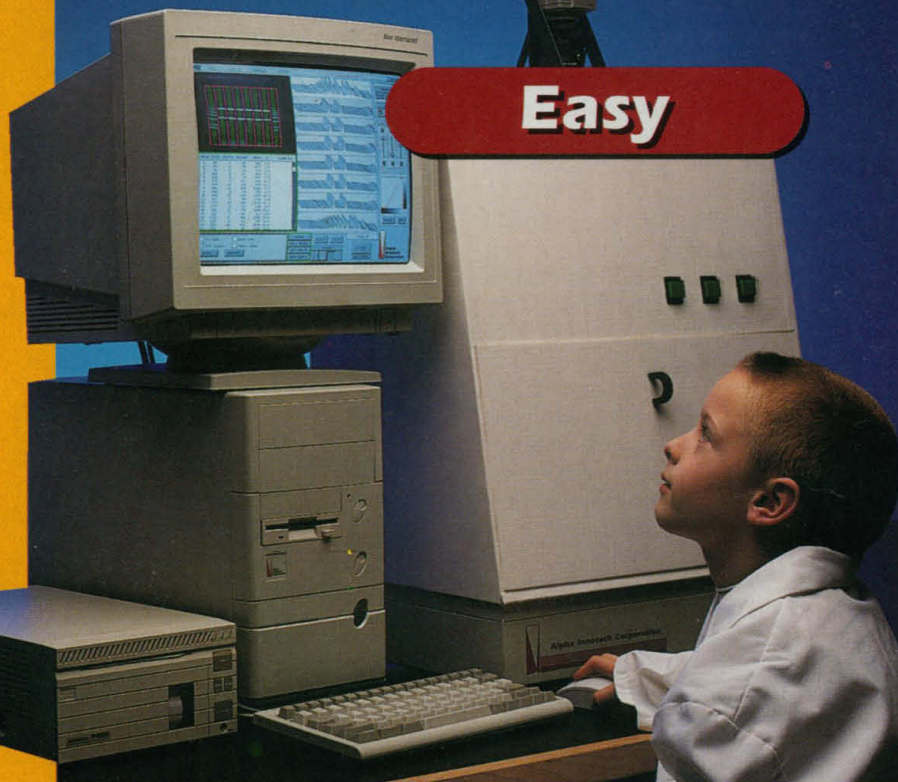
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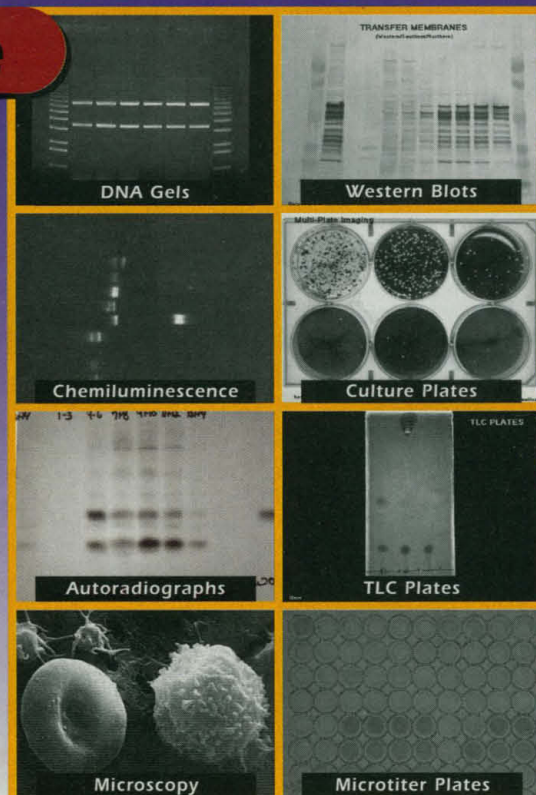
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