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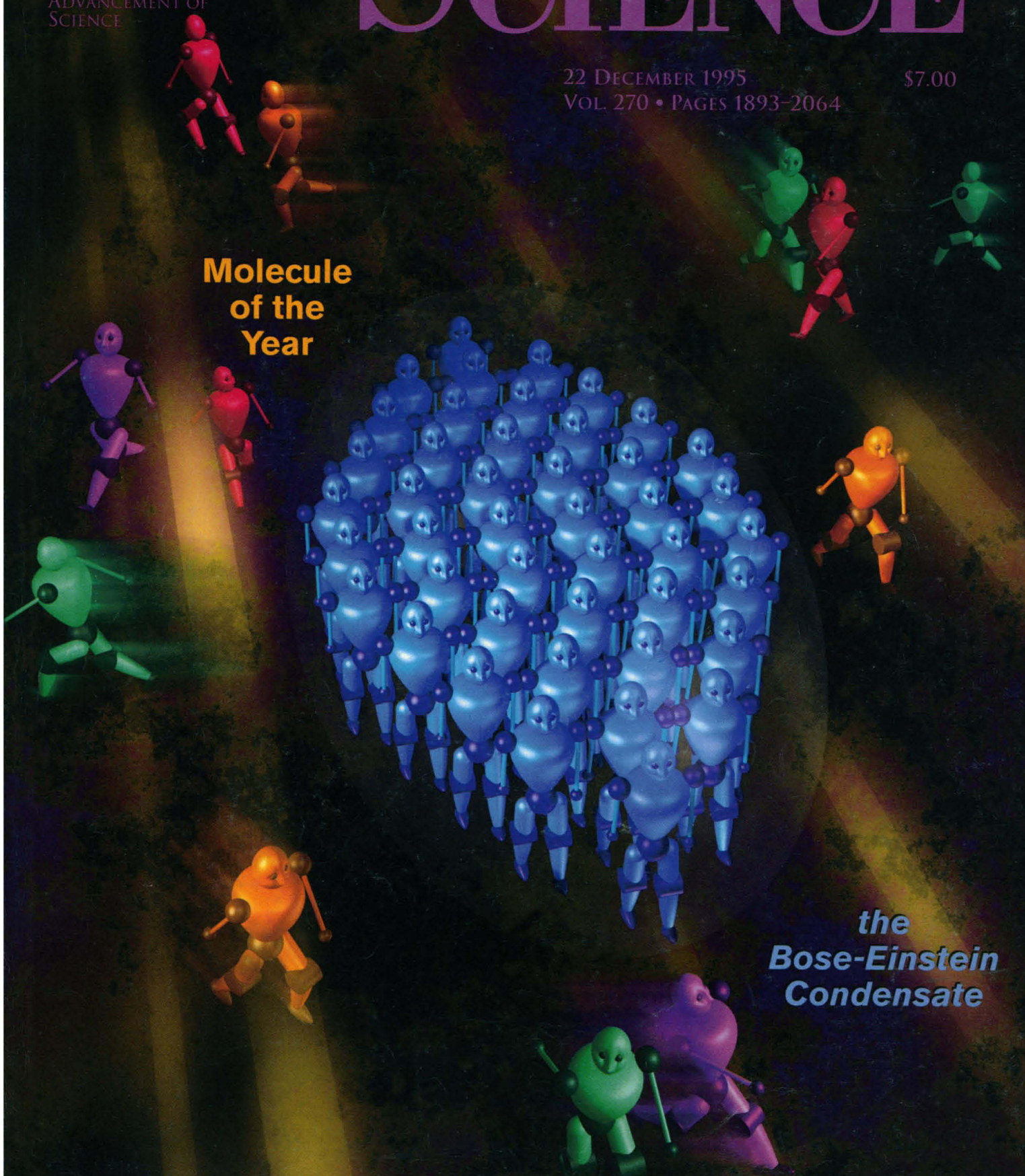
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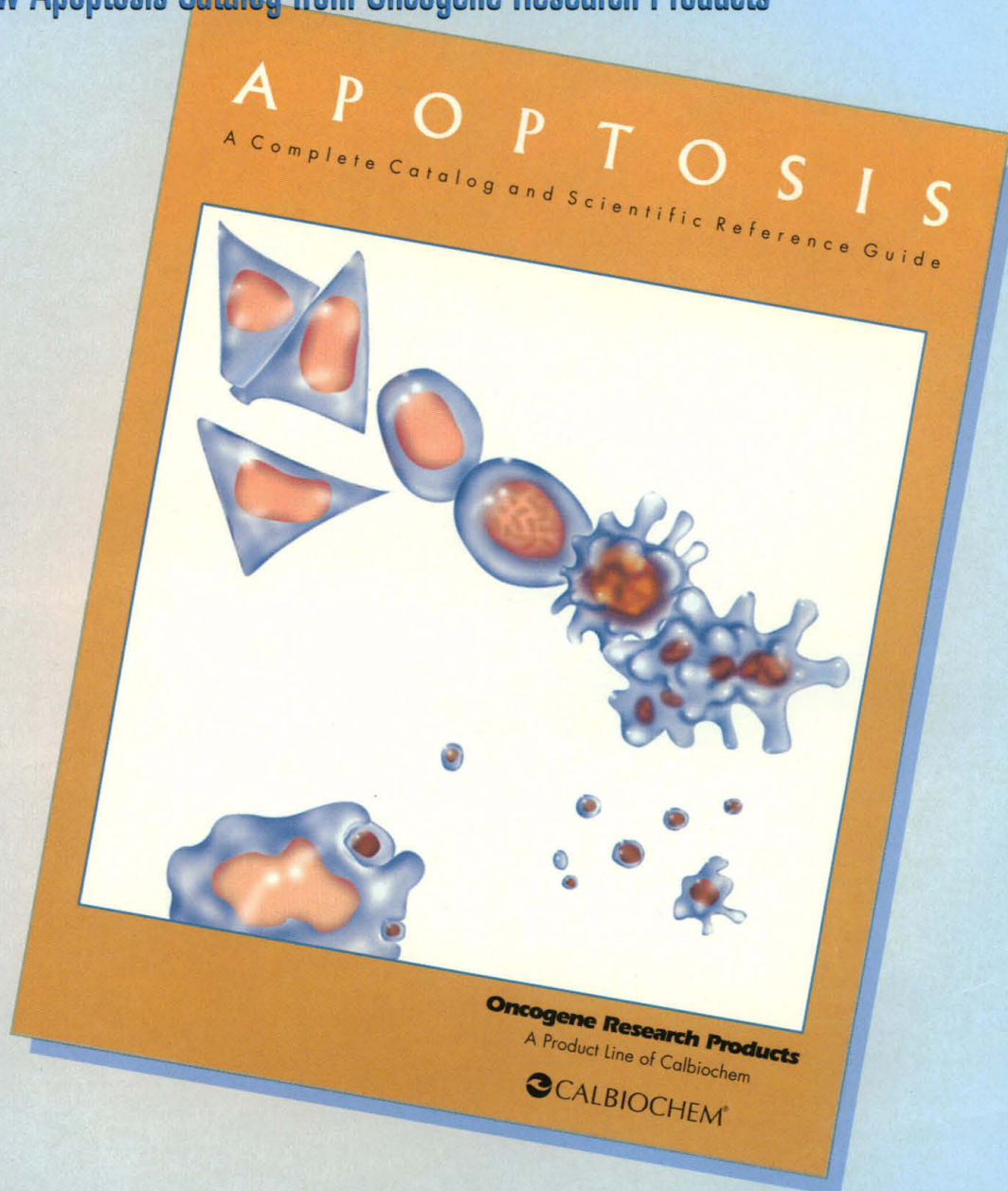
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Cosmic energy gap



1941, 2002 & 2005

Medfly transformed

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- Peer Review: Written and Unwritten Rules 1913
- NAE: Governing Body Clamps Down 1915
- On Its New Chief Executive
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- Korea Plans New Tokamak Machine 1918
- Panel to Feds: Hands Off Radioisotopes 1918

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- of the Universe
- S. van den Bergh

- Plasmodesmata: Plant Channels for 1943
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ARTICLE

- An STS-Based Map of the 1945
- Human Genome
- T. J. Hudson, L. D. Stein, S. S. Gerety, J. Ma, A. B. Castle, J. Silva, D. K. Slonim, R. Baptista, L. Kruglyak, S.-H. Xu, X. Hu, A. M. E. Colbert, C. Rosenberg, M. P. Reeve-Daly, S. Rozen, L. Hui, X. Wu, C. Vestergaard, K. M. Wilson, J. S. Bae, S. Maitra, S. Ganiatsas, C. A. Evans, M. M. DeAngelis, K. A. Ingalls, R. W. Nahf, L. T. Horton Jr., M. O. Anderson, A. J. Collymore, W. Ye, V. Kouyoumjian, I. S. Zemsteva, J. Tam, R. Devine, D. F. Courtney, M. T. Renaud, H. Nguyen, T. J. O'Connor, C. Fizames, S. Fauré, G. Gyapay, C. Dib, J. Morissette, J. B. Orlin, B. W. Birren, N. Goodman, J. Weissenbach, T. L. Hawkins, S. Foote, D. C. Page, E. S. Lander

REPORTS

- Role of Langmuir Circulation in the 1955
- Deepening of the Ocean Surface Mixed Layer
- M. Li, K. Zahariev, C. Garrett
- Mantle Melting and Basalt Extraction by 1958
- Equilibrium Porous Flow
- C. C. Lundstrom, J. Gill, Q. Williams, M. R. Perfit

DEPARTMENTS

- | | | | |
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| EDITORIAL | 1901 | RANDOM SAMPLES | 1927 |
| Molecule of the Year 1995 | | ASSOCIATION AFFAIRS | 1930 |
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| A New Form of Matter Unveiled | | F. J. Ayala | |
| LETTERS | 1906 | AAAS NEWS & NOTES | 2023 |
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COVER

Artist's conception of supercooled atoms in an exotic phase of matter called the Bose-Einstein condensate, which is Molecule of the Year for 1995. Each of the atoms in the condensate (in blue) has the same quantum mechanical wave function, and so they all move as

one. Atoms outside the condensate move faster and in all directions. See Editorial on page 1901 and Molecule of the Year section beginning on page 1902. [Illustration: Steve Keller]



Complexity of Holocene Climate as Reconstructed from a Greenland Ice Core 1962
S. R. O'Brien, P. A. Mayewski, L. D. Meeker, D. A. Meese, M. S. Twickler, S. I. Whitlow

Al Coordination Changes in High-Pressure Aluminosilicate Liquids 1964
J. L. Yarger, K. H. Smith, R. A. Nieman, J. Diefenbacher, G. H. Wolf, B. T. Poe, P. F. McMillan

High-Resolution Microcoil ¹H-NMR for Mass-Limited, Nanoliter-Volume Samples 1967
D. L. Olson, T. L. Peck, A. G. Webb, R. L. Magin, J. V. Sweedler

Unusually Mild and Selective Hydrocarbon C-H Bond Activation with Positively Charged Iridium(III) Complexes 1970
B. A. Arndtsen and R. G. Bergman

Direct Perception of Three-Dimensional Motion from Patterns of Visual Motion 1973
C. Fermüller and Y. Aloimonos

A Gap in the Highest Energy Cosmic Ray Spectrum as a Signature of Unification Scale Physics 1977
G. Sigl, S. Lee, D. N. Schramm, P. Bhattacharjee

Selective Trafficking of KNOTTED1 Homeodomain Protein and Its mRNA Through Plasmodesmata 1980
W. J. Lucas, S. Bouché-Pillon, D. P. Jackson, L. Nguyen, L. Baker, B. Ding, S. Hake

Interaction of Tobamovirus Movement Proteins with the Plant Cytoskeleton 1983
M. Heinlein, B. L. Epel, H. S. Padgett, R. N. Beachy

Inhibition of Leaf Senescence by Autoregulated Production of Cytokinin 1986
S. Gan and R. M. Amasino

Tobacco MAP Kinase: A Possible Mediator in Wound Signal Transduction Pathways 1988
S. Seo, M. Okamoto, H. Seto, K. Ishizuka, H. Sano, Y. Ohashi

Tissue Plasminogen Activator Induction in Purkinje Neurons After Cerebellar Motor Learning 1992
N. W. Seeds, B. L. Williams, P. C. Bickford

A Subclass of bHLH Proteins Required for Cardiac Morphogenesis 1995
D. Srivastava, P. Cserjesi, E. N. Olson

The ARF1 GTPase-Activating Protein: Zinc Finger Motif and Golgi Complex Localization 1999
E. Cukierman, I. Huber, M. Rotman, D. Cassel

Gene Transfer into the Medfly, *Ceratitis capitata*, with a *Drosophila hydei* Transposable Element 2002
T. G. Loukeris, I. Livadaras, B. Arcà, S. Zabalou, C. Savakis

The white Gene of *Ceratitis capitata*: A Phenotypic Marker for Germline Transformation 2005
L. J. Zwiebel, G. Saccone, A. Zacharopoulou, N. J. Besansky, G. Favia, F. H. Collins, C. Louis, F. C. Kafatos

Identification of a Member of the MAPKKK Family as a Potential Mediator of the TGF- β Signal Transduction 2008
K. Yamaguchi, K. Shirakabe, H. Shibuya, K. Irie, I. Oishi, N. Ueno, T. Taniguchi, E. Nishida, K. Matsumoto

Evolution of Body Size in the Woodrat over the Past 25,000 Years of Climate Change 2012
F. A. Smith, J. L. Betancourt, J. H. Brown

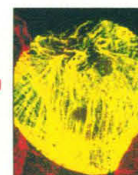
TECHNICAL COMMENTS

Age of Bacteria from Amber 2015
F. G. Priest; A. T. Beckenbach; R. J. Cano

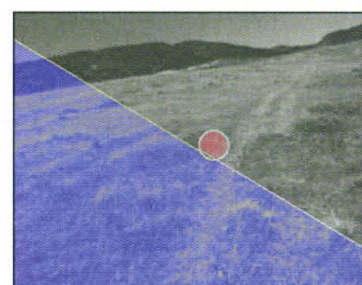
The Effect of Sodium Salicylate and Aspirin on NF- κ B 2017
B. Frantz and E. A. O'Neill; S. Ghosh and E. Kopp

Neurotrophins and Excitotoxicity 2019
M. T. Fernández-Sánchez and A. Novelli; J.-Y. Koh, B. J. Gwag, D. Lobner, D. W. Choi

Quarterly Index 2024



**1943,
1980
& 1983**
Trafficking in plants



1973
Computer vision

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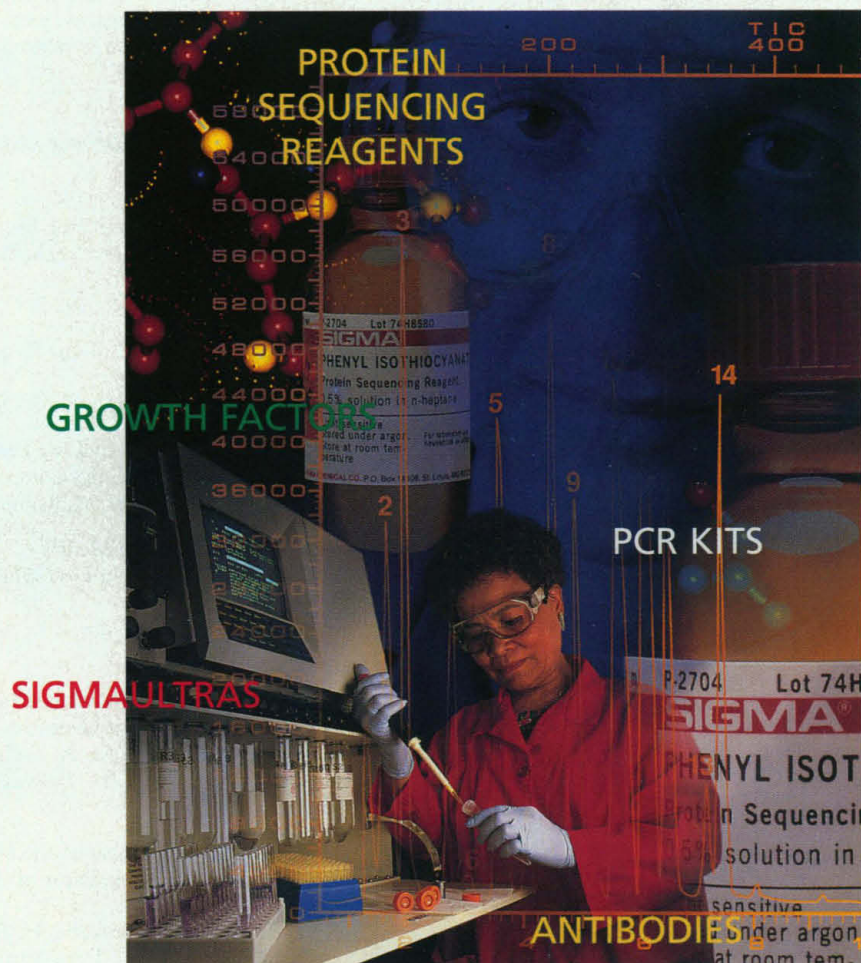
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THIS WEEK IN SCIENCE

edited by DAVID VOSS

Mild alkane activation

The carbon-hydrogen (C-H) bonds of alkanes are strong and rather unpolarized and usually become chemically reactive only under extreme conditions or in the presence of very reactive species such as superacids. Arndtsen and Bergman (p. 1970) report the synthesis of a cationic iridium complex that can thermally activate methane and terminal alkanes in solution at 10°C. The reaction is selective and can also activate C-H bonds in functionalized molecules such as ethers and esters.

A little NMR

Although nuclear magnetic resonance (NMR) is a powerful structural technique, it is not usually a method of choice for analyzing trace samples. Olson *et al.* (p. 1967) describe an approach for boosting NMR sensitivity. They have made radio-frequency (rf) coils that are about 0.5 millimeter in diameter and 1 millimeter long and wrapped around microcapillary tubes. The field is sufficiently uniform that spectra with linewidths of about 0.5 hertz can be obtained from nanoliter volume samples. Applications would include detection in capillary separation methods or for mass-limited samples of biomolecules.

Human genome map

Sequence-tagged sites (STSs) can be used to provide a physical map of a genome to connect sequences determined from large-scale cloning libraries and to aid in identifying disease genes and analyzing genomic organization. Hudson *et al.* (p. 1945; see the news story by Marx, p. 1920) present a map of the human genome that con-

tains 15,086 STSs, which corresponds to an average of 199 kilobases between markers.

Golgi GAP

The budding and fusion of transport vesicles are essential to establish and maintain intracellular organelle integrity. Several proteins have been implicated in vesicle budding; in particular, the small guanosine triphosphatase (GTPase) ARF1 (adenosine diphosphate-ribosylation factor 1) plays a role in recruiting coat proteins onto Golgi membranes as a prerequisite for the budding of transport vesicles. Cukierman *et al.* (p. 1999) have now isolated a GTPase-activating protein, or GAP, that acts on ARF1 and thus is likely to participate in the budding of transport vesicles from the Golgi complex. The GAP identified is localized to the Golgi complex and contains a zinc finger motif that is necessary for its GAP activity.

Kinase cascade

The receptors for transforming growth factor- β (TGF- β) are transmembrane serine/threonine kinases, but the signaling pathways that they activate have been obscure. Yamaguchi *et al.* (p. 2008) present evidence that, like receptor tyrosine kinases,

TGF- β receptors appear to transmit signals through a cascade of protein kinases that lead to activation of members of the mitogen-activated protein kinase (MAPK) family. They describe a new MAPK kinase kinase (MAPKKK) that participates in signaling by TGF- β .

Fountain of Youth

Senescence of leaves is a normal part of plant development that produces autumn colors as well as suboptimal crop yields. Gan and Amasino (p. 1986) have



found a way to inhibit the normal process, allowing leaves to remain on the plant and healthy for a longer time. The authors combined a promoter from a gene induced during normal senescence with a gene encoding an enzyme important in cytokinin synthesis. In response to senescence signals, transgenic plants expressing this hybrid

Cosmic ray origins

The origin of cosmic rays, which consist of energetic atomic nuclei from outer space, remains a puzzle. Sigl *et al.* (p. 1977) report an analysis of recent experimental data for ultra high energy cosmic rays (above 10^{18} eV) that indicates unusual structure in the energy spectrum. There appears to be a dip in the spectrum around 10^{20} eV, and cosmic rays above this energy may not result from acceleration mechanisms, but rather from decay of particles from some higher energy scale. Background and comment are provided in the news story by Glanz (p. 1924).

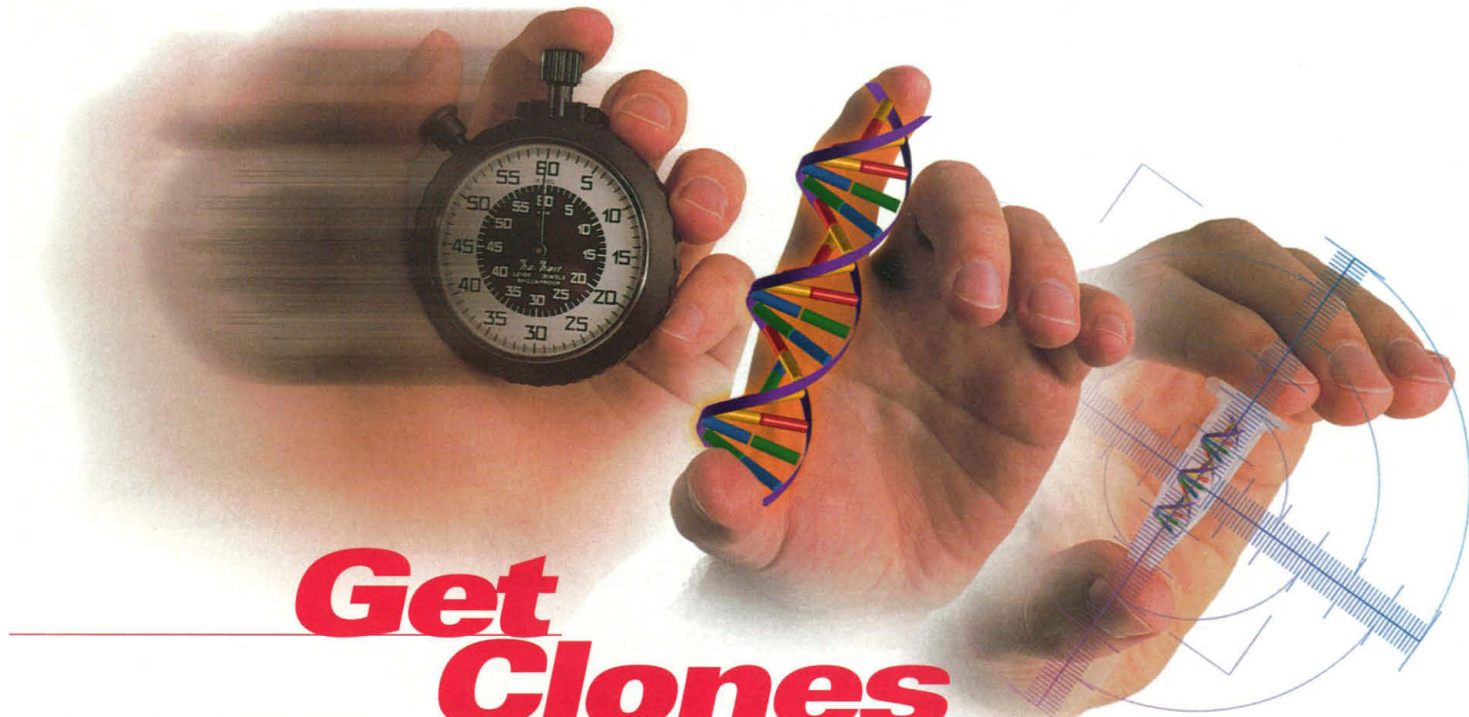
gene produce small amounts of cytokinin, which in turn inhibit the senescence process. This system may be useful for increasing the longevity and productivity of certain crops.

Better circulation models

Langmuir circulation, consisting of wind-driven vortices, provides a key mechanism for mixing surface waters of the ocean, but it has been difficult to incorporate into ocean models. Li *et al.* (p. 1955) present a scheme to take into account the effects of this process in models and, using data from the Sargasso Sea, show that at times it can be more important than shear in determining the depth of the mixed layer. It thus likely influences stratification of the ocean both seasonally and diurnally.

Medfly manipulation

The lack of a germline transformation system has blocked efforts to genetically manipulate most insects, especially those important for agriculture and disease. Zwiebel *et al.* (p. 2005) have isolated the *white* gene from the Mediterranean fruit fly (medfly), a major agricultural pest. They show that it can be used as a marker for germline transformation in *Drosophila*. Loukeris *et al.* (p. 2002) have used this *white* gene as a marker in combination with a transposable element, *Minos*, and have achieved germline transformation in the medfly. It is hoped that the use of *Minos* will permit transformation of other insects. Ashburner provides background to the story in his accompanying Perspective (p. 1941).



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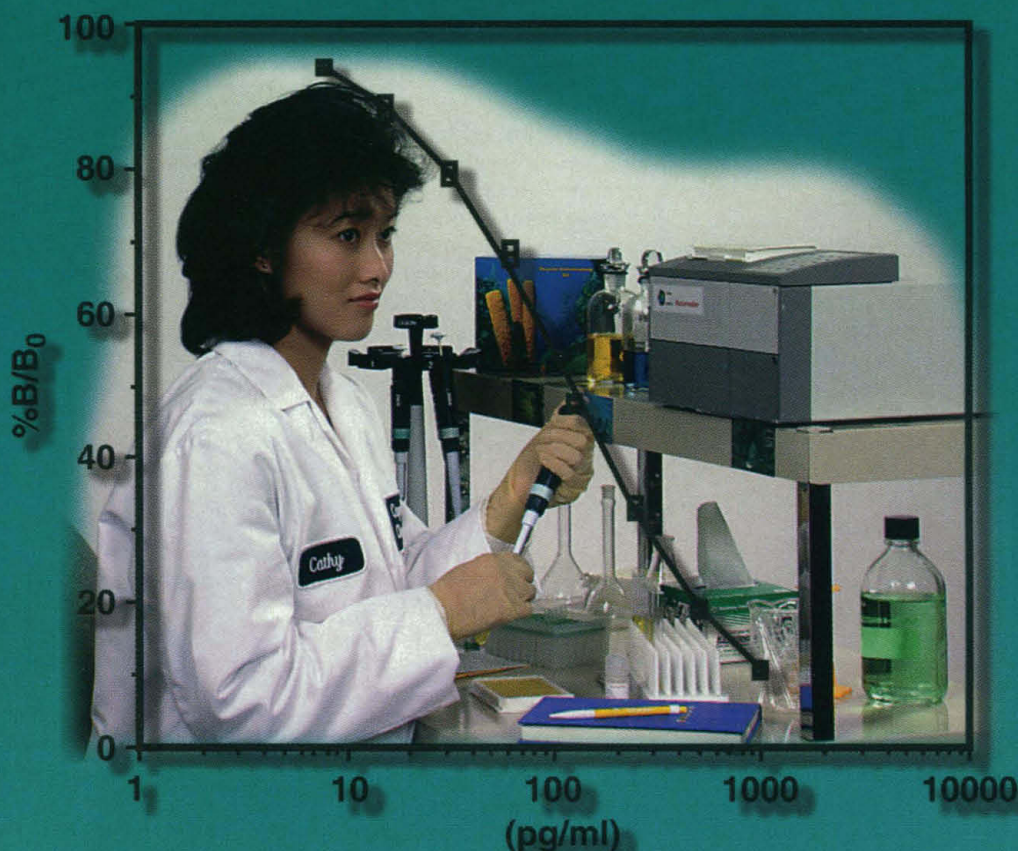
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LVMH MOËT HENNESSY ♦ LOUIS VUITTON SCIENCE PRIZE

science pour l'art

CALL FOR SUBMISSIONS

Each year, the LVMH MOËT HENNESSY ♦ LOUIS VUITTON Group rewards with the Science for Art Prize scientists chosen from all over the world for the impact of their discoveries on artistic creation and aesthetic appreciation.

The Science for Art Prize will focus on **morphogenesis** for two consecutive years:

1996 has been designated for **Biology** and **Chemistry**

1997 for **Physics, Mathematics** and **Earth Sciences**.

For 1996, the theme is:

GENESIS OF FORMS

Part 1: Biological and biomimetic forms

The 1996 theme covers basic or applied work relating to the genesis of **living** or **chemical forms**. Theoretically, the word "**form**" is to be understood in its **spatial** sense, but **time** and **dynamics** may enter into consideration. Models not explicitly associated with the founding process or set of processes in the fields of Biology or Chemistry will not be considered.

The Prize theme also encompasses the **technological applications** of concepts relating to the genesis of living forms.

The Science Prize, worth 100,000 FF (about US\$ 20,000),

will be awarded to the work that opens the widest scope of study to fundamental or applied research, based on its technological and commercial interest.

PAST WINNERS OF THE PRIZE

- 1995 Steven CHU (Stanford University, USA)
- 1994 Michael BERRY (Bristol University, Great Britain)
Harold KROTO (University of Sussex, Great Britain)
- 1993 Samuel EDWARDS (New Cavendish Laboratory, Great Britain)
Wolfgang HELFRICH (Freie Universität Berlin, Germany)
- 1992 Richard AXEL & Linda BUCK (Columbia U. & Harvard Medical School, USA)
Nicolas FRANCESCHINI (CNRS Marseille, France)
- 1991 Semir ZEKI (University College, Great Britain)
Jozsef SZEJTLI (Cyclolab Co., Hungary)
- 1990 Hans KUHN (Max Planck Institute, Germany)
Werner OSTERTAG (BASF, Germany)
- 1989 Pierre-Gilles de GENNES (Collège de France)
Jerzy-Adam DOBROWOLSKI (National Research Council, Canada)
Sueo KAWABATA (Kyoto University, Japan)
- 1988 Benoît MANDELROT (Yale University, USA)
Karl KNOP (Paul Scherrer Institute, Switzerland)

PRIX D'HONNEUR: Jean-Pierre CHANGEUX & Shosaku NUMA, 1992, Walter GEHRING and HUMAN FRONTIER SCIENCE PROGRAM, 1993.

The deadline for submitting an application is **February 2, 1996**

Guidelines for application may be obtained from:

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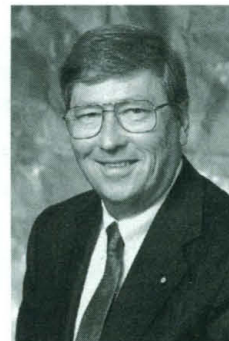
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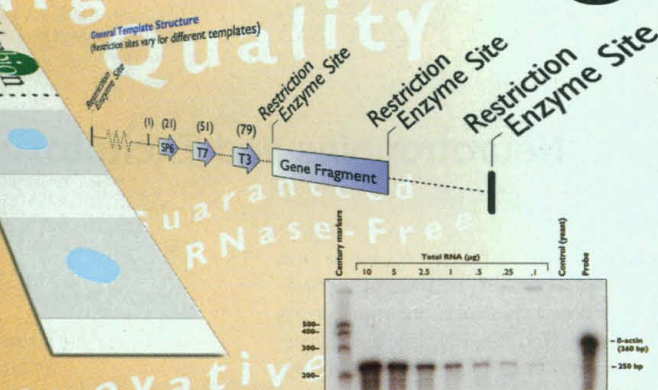
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Theme Symposia

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Human Immunodeficiency Virus Disease: Epidemiologic, Pathogenic, and Therapeutic Considerations

Anthony S. Fauci, National Institute for Allergy and Infectious Diseases

Transgenic Models of Metabolic Disease

C. Ronald Kahn, Joslin Diabetes Center
E.M. Rubin, University of California

Intracellular Membrane Trafficking

Jennifer Lippincott-Schwartz, National Institute of Child Health and Human Development

Ion Transport and Disease***

H. William Harris, Children's Hospital, Boston
Mark T. Keating, University of Utah

Health Outcomes Research

Allan S. Detsky, University of Toronto

Regulation of Apoptosis: Cellular, Molecular and Genetic Factors

John D. Mountz, University of Alabama at Birmingham

Translational Research in Dermatology*

Juoni Uitto, Thomas Jefferson Medical College

Delivering Information to Clinicians in the Era of National Networking***

Edward H. Shortliffe, Stanford University School of Medicine
David Lipman, National Library of Medicine

Developmental Biology: Organogenesis***

Jeffrey A. Whitsett, Children's Hospital Medical Center, Cincinnati
Jeffrey I. Gordon, Washington University School of Medicine

The New Biology of Obesity

Jeffrey S. Flier, Harvard Medical School

Emerging Infections***

Ruth Berkelman, National Center for Infectious Diseases
Monica M. Farley, Emory University School of Medicine

Training in Subspecialty Medicine: Current Status and Public Policy

Eric G. Neilson, University of Pennsylvania
Robert J. Mayer, Harvard Medical School

Abstract Presentations

Original abstracts will be presented either in oral session, chaired by teams of senior investigators, or in poster sessions.

Infectious Diseases/AIDS

James B. Dale, University of Tennessee School of Medicine

Cardiovascular

Christine Seidman, Harvard Medical School

Hematology

Dorothea Zucker-Franklin, New York University

Oncology

George Bosi, Memorial Sloan Kettering Cancer Center

Clinical Epidemiology/Health Care Research**

Pamela G. Williams-Russo, Cornell University Medical Center

Pulmonary/Critical Care

Jeffrey M. Drazen, Harvard Medical School

Gastroenterology/Hepatology/Nutrition

Tadataka Yamada, University of Michigan School of Medicine

Immunology/Allergy/Rheumatology

William J. Koopman, University of Alabama at Birmingham

Gerontology/Aging

Mark A. Supiano, University of Michigan School of Medicine

Endocrinology/Metabolism

Leslie DeGroot, University of Chicago Medical Center

Renal/Hypertension

Barry M. Brenner, Harvard Medical School

Inflammation

William M. Nauseef, University of Iowa

Regulation of Gene Expression

Herbert H. Samuels, New York University

Physiology

J. Chris Gillin, University of California, San Diego

Cytokines/Growth Factors

Derek LeRoith, National Institute of Diabetes and Digestive and Kidney Diseases

Dermatology*

Juoni Uitto, Thomas Jefferson Medical College

Gene Therapy

Elizabeth G. Nabel, University of Michigan

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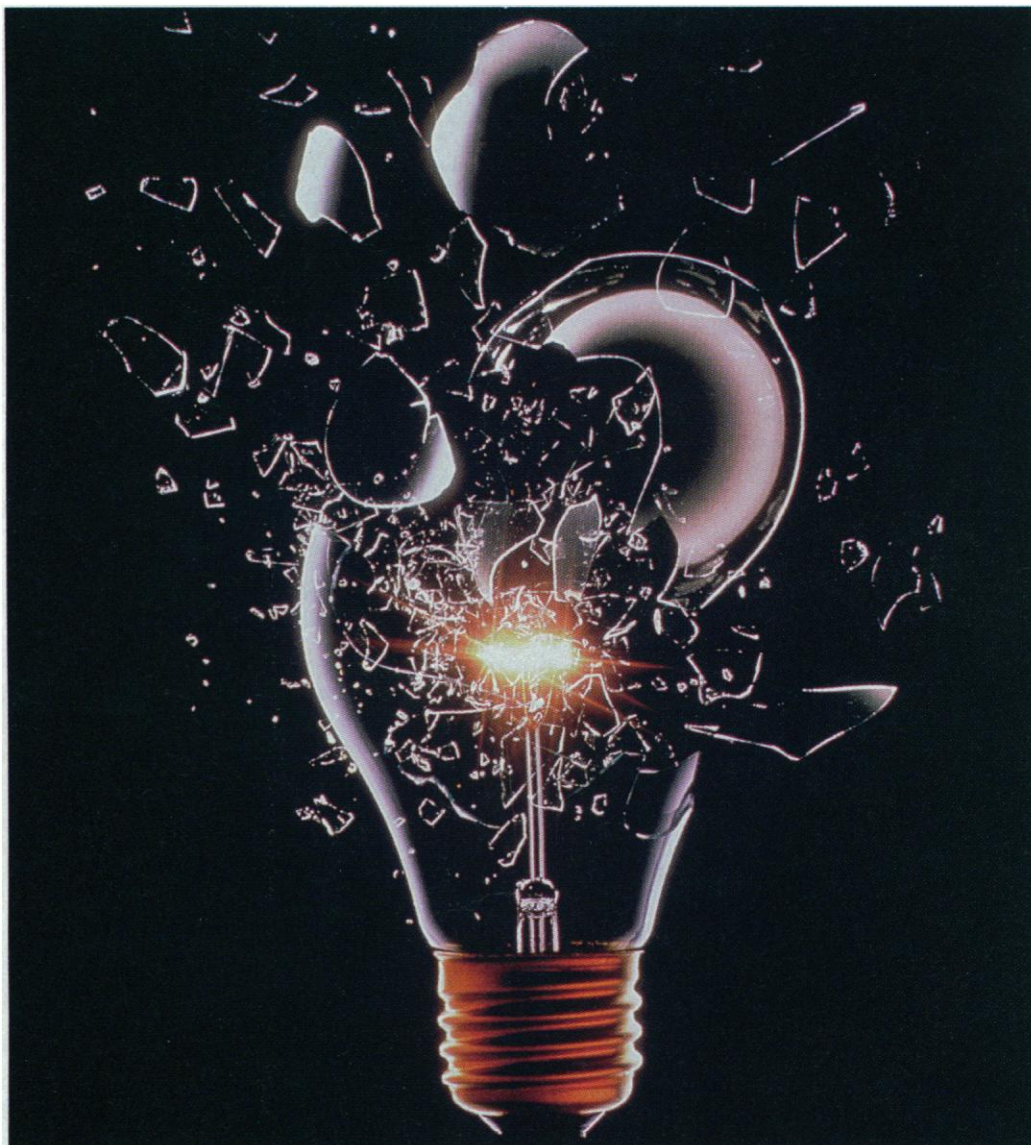
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