American Association for the Advancement of Science

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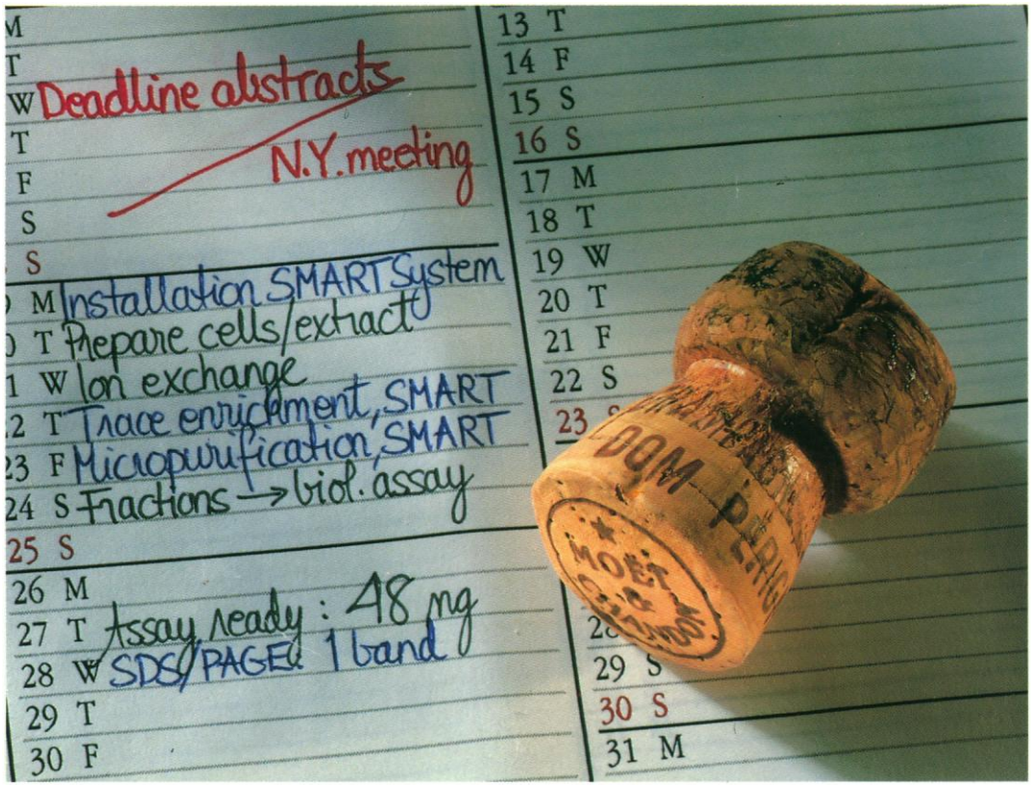

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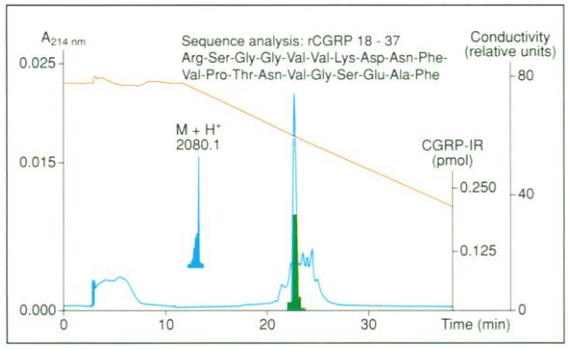

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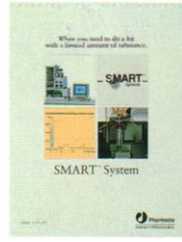

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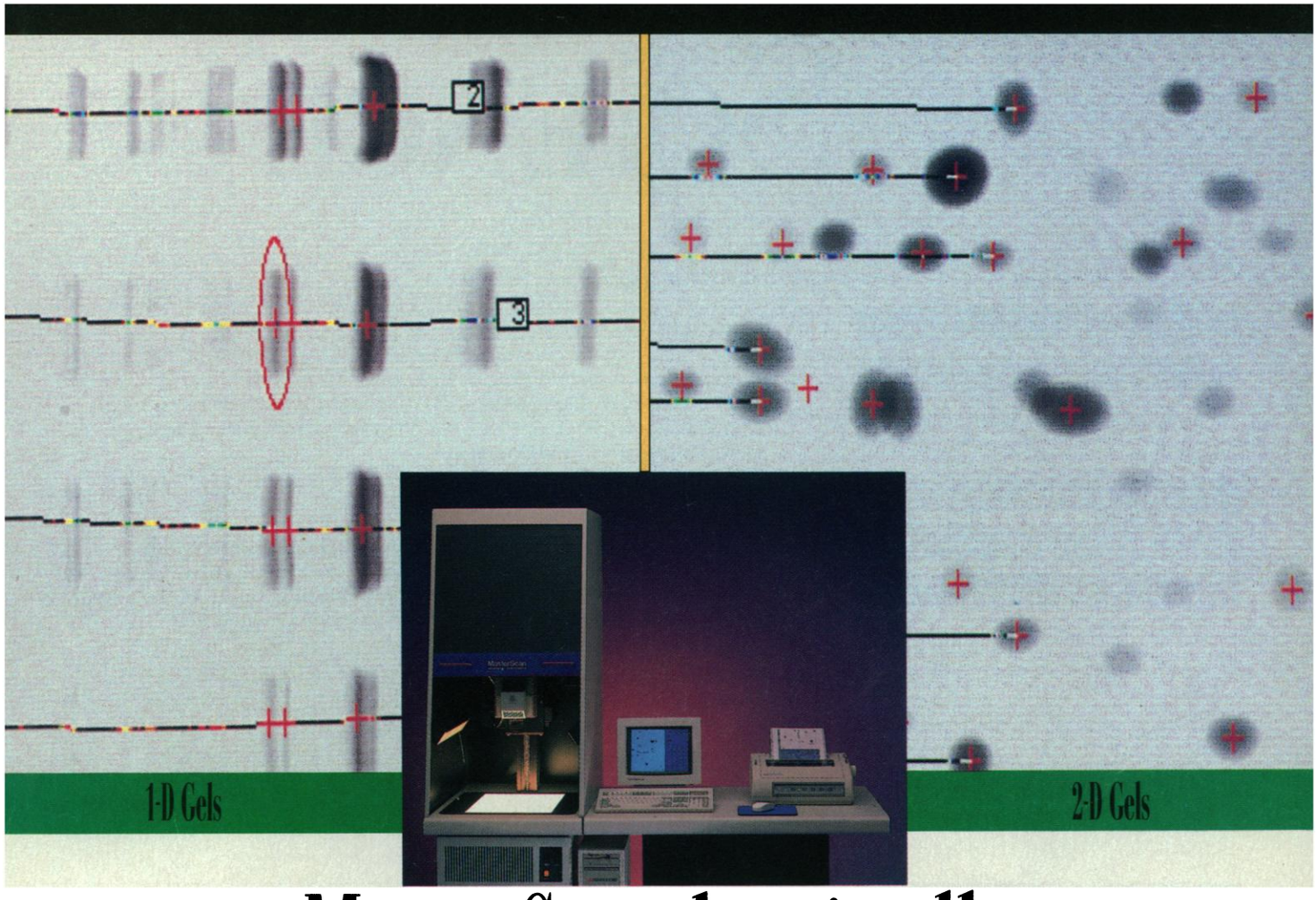

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COVER A syllable in signed languages. Identical language structure in signed and spoken languages provides clues to the biological foundations of language. A syllable similar to the one represented here was observed in deaf infants' manual babbling. Similarities between manual babbling in deaf infants and vocal babbling in hearing infants reveal that babbling is determined by an amodal, brain-based language capacity. See page 1493. [Photograph by Robert Lamarche]

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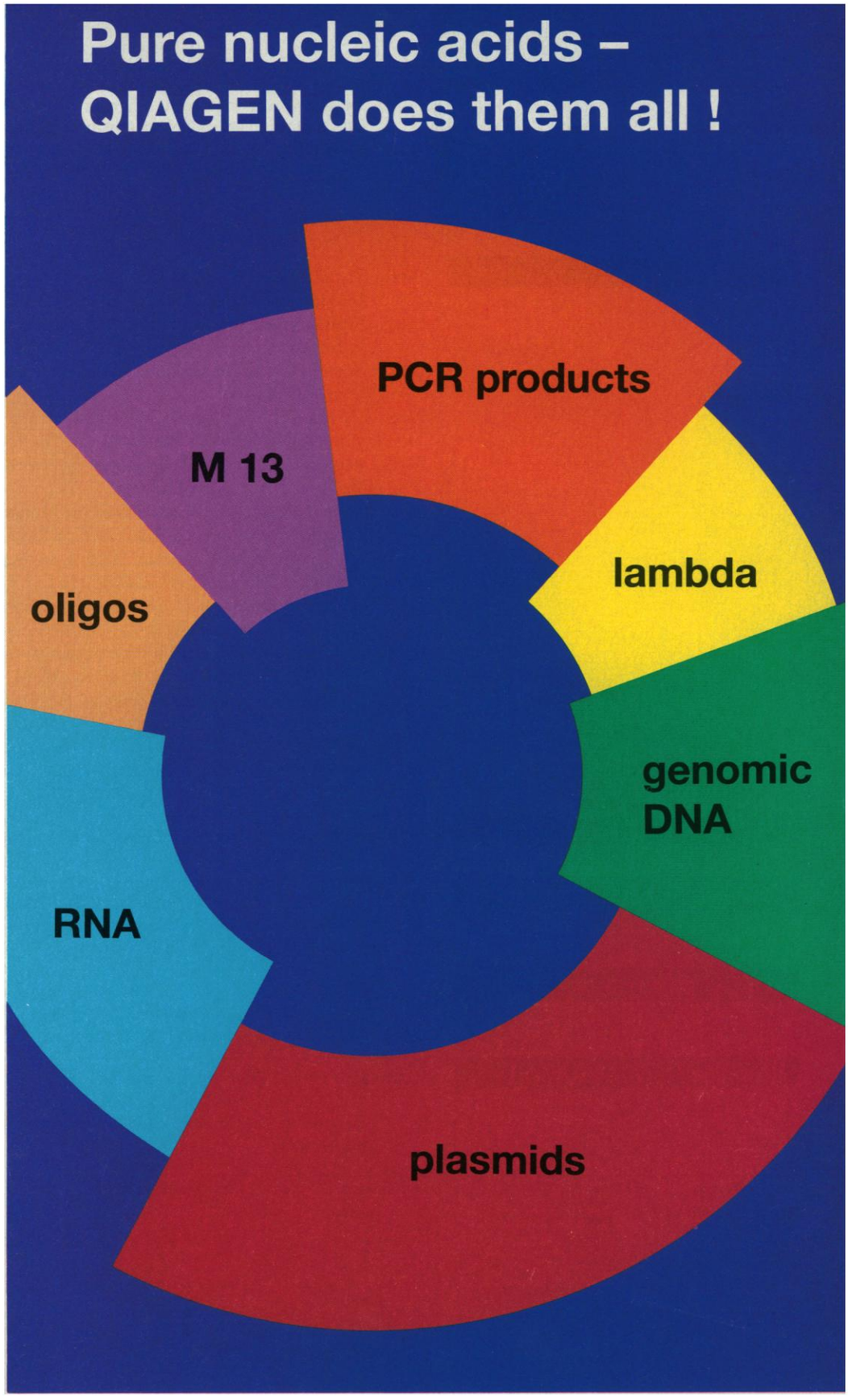

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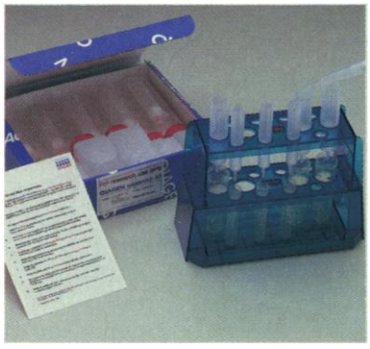

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At the interface

WHEN a thin film is layered atom by atom onto a surface, the many atomic interactions that are occurring at the surface can cause severe damage to the interface. A more gentle approach that is suitable for layering metals onto semiconductors or semiconductors onto high temperature superconductors is described by Weaver and Waddill (page 1444). A rare gas (xenon) layer was used as a "buffer" between surface layer and clusters. In one example, xenon layers were condensed onto a semiconductor and clusters of atoms were assembled onto the xenon; subsequently the xenon was removed by warming and the clusters bonded to the surface. Because the atoms are deposited not individually but in clusters of hundreds or thousands, incoming kinetic energy at the surface is greatly reduced. Analyses of photoemission spectra and surface morphology indicated that cluster assembly deposition could produce defect-free interfaces whose mechanical strengths, adhesiveness, and other properties will differ from those of interfaces produced by conventional procedures. This technology should facilitate the preparation of novel materials and provide new insights into the properties of interfaces.

Heat budget of Triton

MEASUREMENTS made by instruments on Voyager 2 in August 1989 indicated that Triton, the satellite of Neptune, is hotter than had been expected on the basis of thermal models. In order to account for Triton's relative "warmth"—with a surface temperature around 38 K it is still the coldest body known in the solar system—some nonsolar energy sources must be invoked. Brown *et al.* propose that there are three factors to be considered—heat flow from radioactive decay in the rocky interior of Triton, absorbed radiation from Neptune, and a bolometric bond albedo (the ratio of total energy out to total energy in over all wavelengths in all directions) that has changed substantially in a short time (page 1465). In addition, because the internal heat flow is unlikely to be uniform, both local sublimation rates and albedos could be highly variable. Calculations that considered older spectral data indicate that just 13 or 14 years ago the albedo was much lower and the atmospheric pressure at Triton may have been as much as an order of magnitude higher; in the next few years, the pressure may drop by an additional factor of 2 to 4. Thus Triton has yet to attain a steady state with regard to temperature and pressure.

Aerobic activity at microbial mats

SULFATE reduction by bacteria is an important process for the mineralization of organic material. It had been thought to occur only in anaerobic environments: whenever even traces of oxygen, nitrates, or other more energetically favorable electron acceptors were available, sulfate reduction seemed to be inhibited. However, Canfield and Des Marais found in a study of bacteria living in microbial mats in evaporating marine ponds in Baja California that sulfate reduction in the upper photosynthetic zone of the mat occurs at the same rate at noon and midnight (page 1471). This surprising observation indicates that neither light nor oxygen (the mats were oxic during the daytime as a result of the metabolic activity of photosynthetic bacteria and anoxic at night) affected the rate of sulfate reduction. Microbial mats provide one of several unusual environments in which aerobic sulfate reduction may be able to occur.

Cross-regulation of developmental genes

THE *achaete* and *scute* genes of *Drosophila* are central to the proper development of the fly's nervous system (page 1485). The expression of each appears to be both self-regulated and regulated by the expression of the other, and ultimately *achaete* and *scute* end up with similar patterns of expression. The reciprocal regulation is not balanced. Cis-acting regulatory elements specific to each gene first stimulate the expression of *achaete* or *scute*. Then *achaete* stimulates expression of *scute* genes in a few groups of cells, but *scute* stimulates expression of the *achaete* gene at more locations. Martinez and Modolell point out that the protein products of both *achaete* and *scute* are members of the helix-loop-helix family of transcriptional regulators. These proteins have major structural similarities that probably facilitate their binding to cis-acting regulatory elements in the promoter regions of both genes.

Origins of mitochondrial DNA

MANY recent studies in a range of animals have suggested that mitochondrial DNA is inherited directly and exclusively from the mother. Thus the standard is for individuals to be homozygous for a type of mitochondrial DNA. However, mussels of the genus *Mytilis*, collected from wide-ranging locations in the Atlantic and Pacific oceans, appear to inherit mitochondrial DNA from both the mother and the father (page 1488). Such biparental heteroplasmy was observed in 85 of 150 individuals evaluated. Most had two different types of mitochondrial DNA but some had three and two individuals had four. Other studies have shown that in these mussels paternal mitochondria are not degraded or excluded from the egg as they are in other species; however, not all matings appear to be conducive to a heteroplasmic state. Hoeh *et al.* note that while *Mytilis* seems to be an exception to the rule that currently characterizes most other metazoans, including other mollusks, additional organisms may be identified in which mitochondrial heterogeneity is common. A currently unexplored question is the extent to which heteroplasmic individuals represent progeny of interspecies matings.

■ RUTH LEVY GUYER

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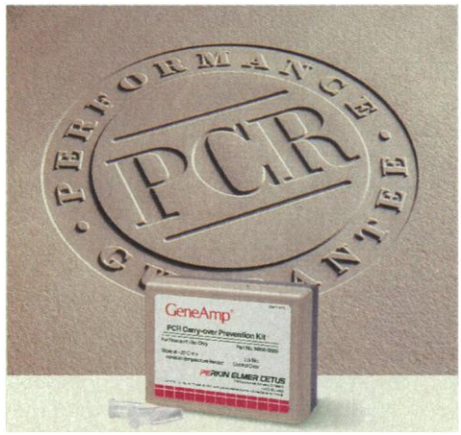
dUTP
for dTTP
in the PCR
process.

Eliminate PCR products
from a previous reaction by
excising uracil residues
using uracil N-glycosylase
(UNG) and degrading the
resulting abasic polynucleotide
with heat treatment.

Proceed
with PCR
amplification
using a reaction
mix that is free
of carry-over
contamination.



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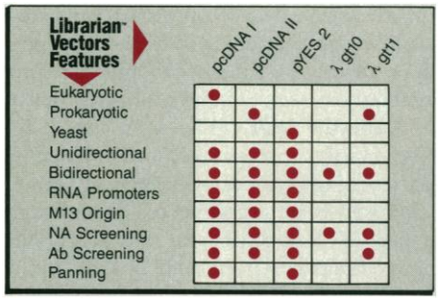

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Umbilical Vein Endothelial Cells	3×10^6	1.2×10^7

*Libraries were constructed from cDNA shown in cDNA synthesis gel entitled: Full length cDNA.

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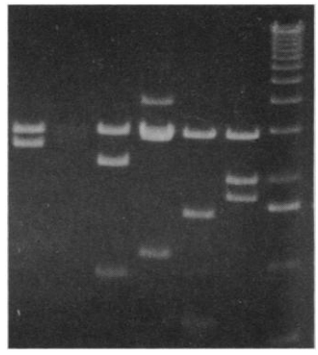

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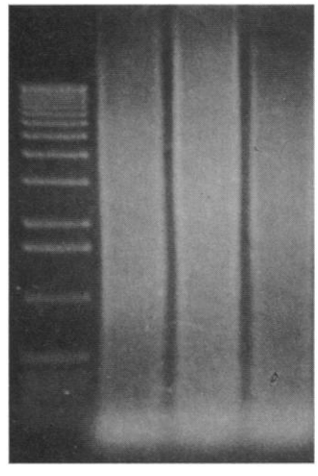

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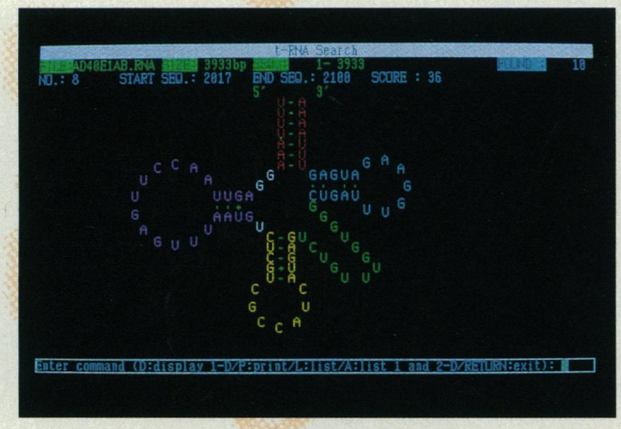
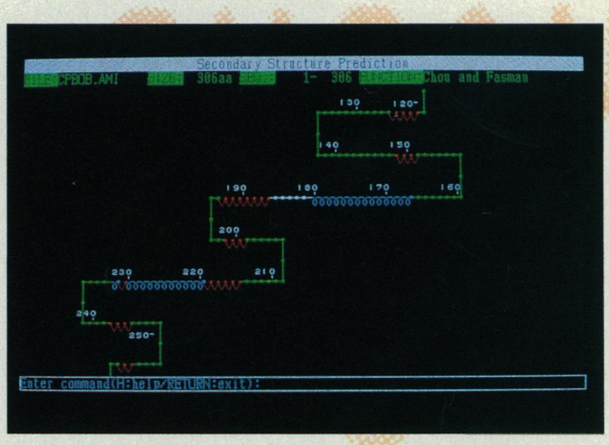


DNASIS-tRNA Search.



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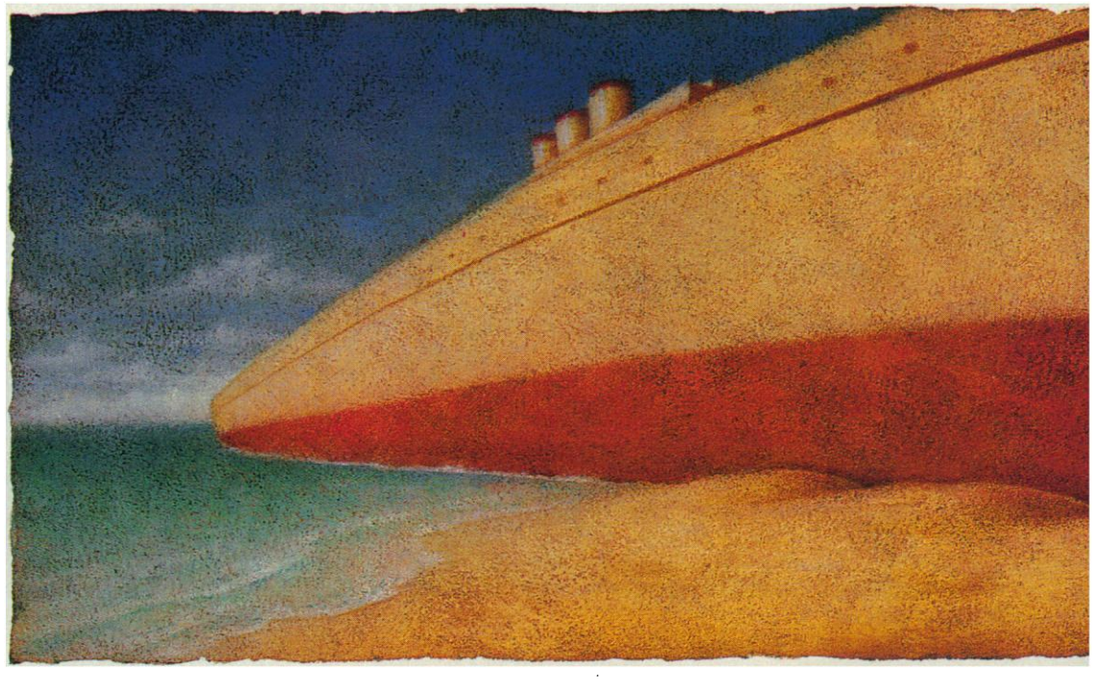

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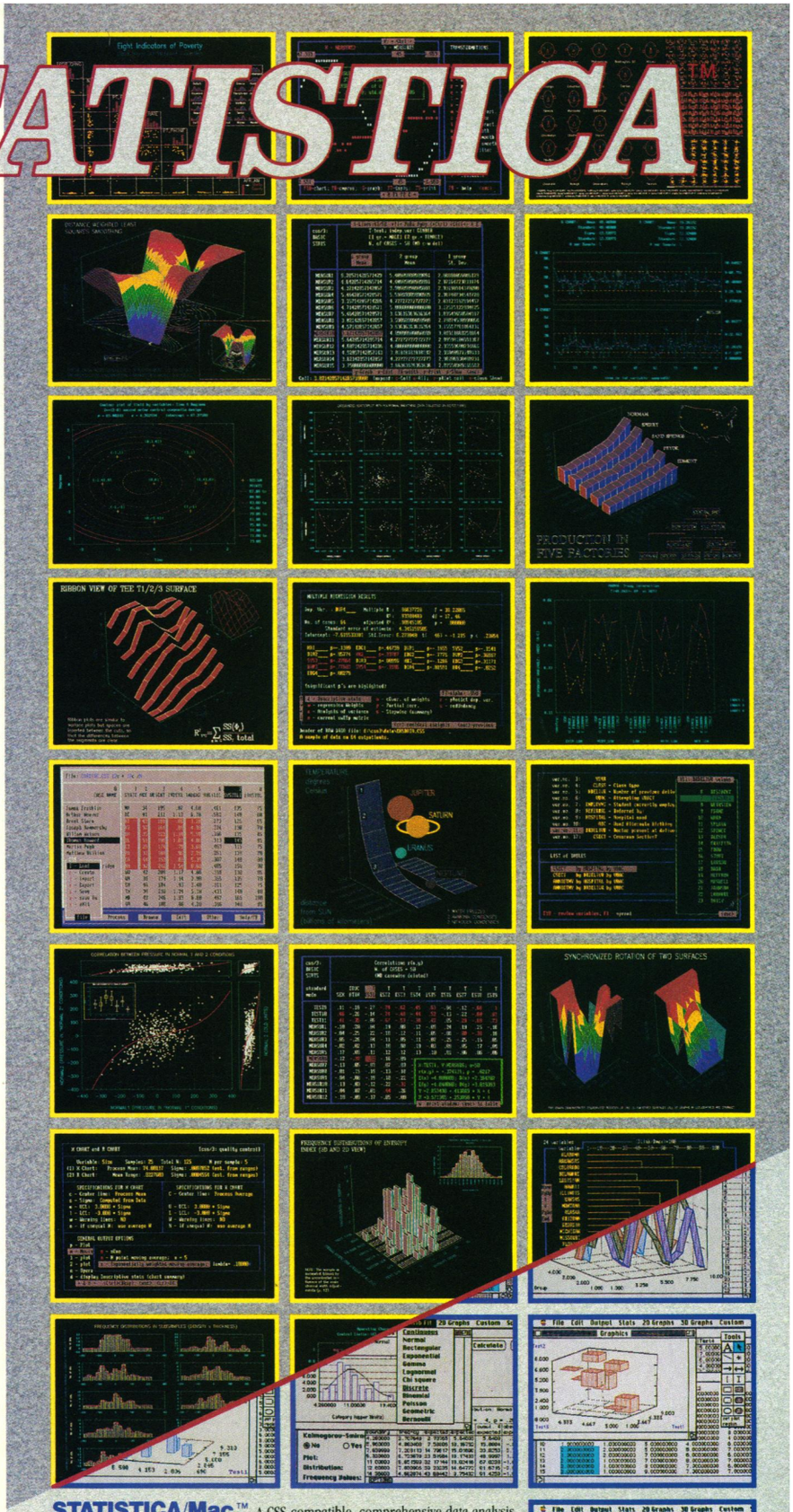

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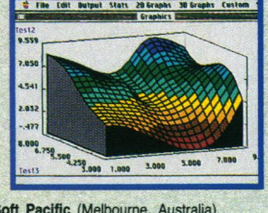

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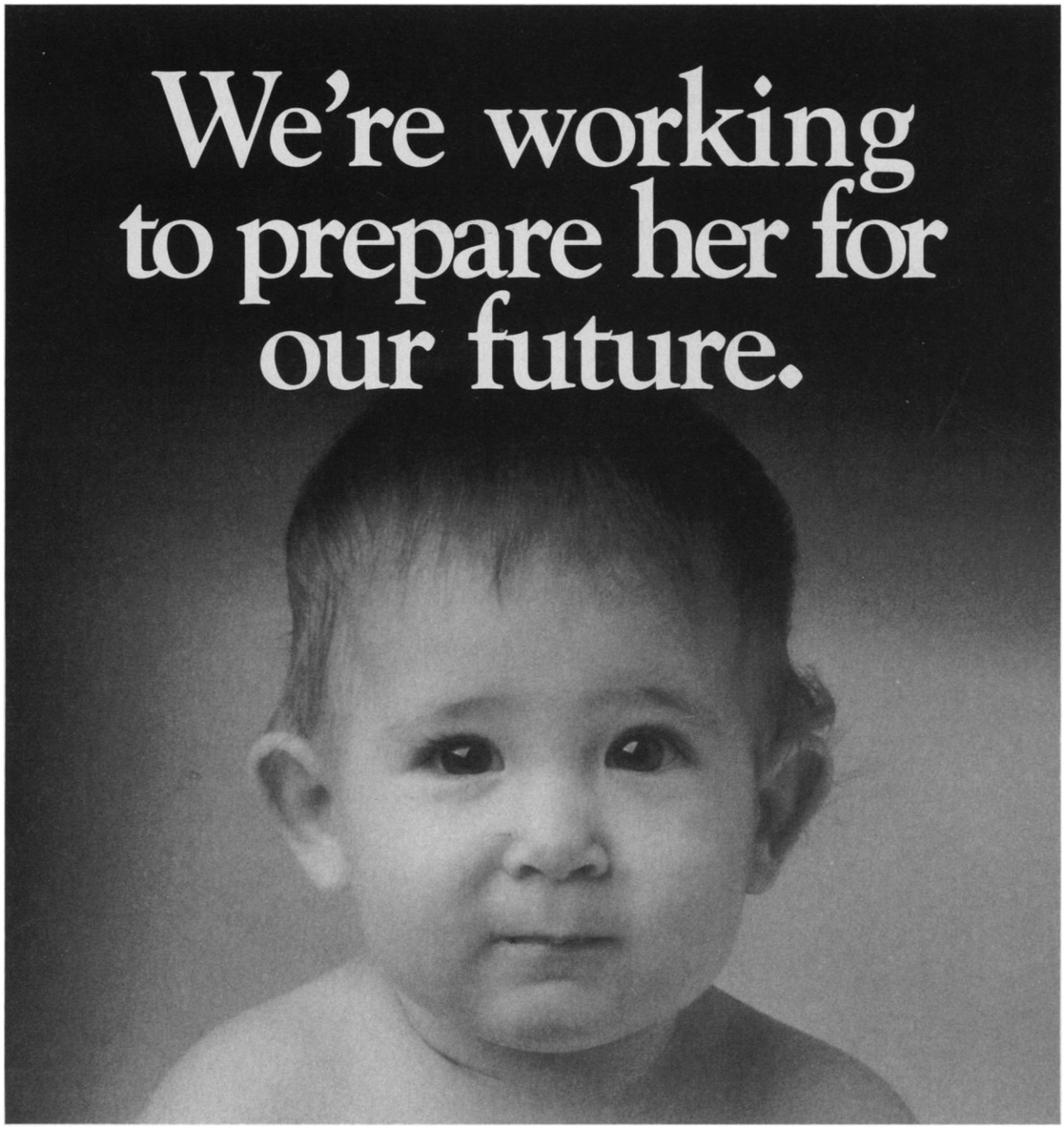

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UBIQUITIN AND PROTEIN DEGRADATION *June 9-14* Chairs: Alfred Goldberg, Harvard Med. Sch.; Richard Vierstra, Univ. of Wisconsin. **Enzymatic Systems for Ubiquitination and Deubiquitination I.** R. Vierstra, S. Prakash, S. Jentsch, C. Pickart, R.E. Cohen, A. Bachmair. **System for Protein Ubiquitination and Deubiquitination II.** S. Jentsch, K. Wilkinson, A. Varshavsky, A. Haas, T. Butt, Y.J. Yoo. **Marking Proteins for Ub-Dependent Degradation.** A. Ciechanover, D. Finley, R. Kulka, A. Varshavsky, V. Chau. **Regulation of Eukaryotic Cell Function by Protein Degradation.** M. Rechsteiner, P. Coffino, M. Kirschner or M. Glotzer, F. Luca, M. Hochstrasser, A. Hershko. **Proteasome and 1300kDa(26S) Proteolytic Complex.** A. Hershko, A.L. Goldberg, K. Tanaka, P. Kloetzel, K. Suzuki, J. Etlinger. **Regulation of Protein Degradation and Ubiquitin Expression in Pathological States.** A. Ichihara, L. Schwartz, S. Wing or R. Medina, J. Lowe, A. Taylor, K. Tanaka. **Proteolysis in Prokaryotes and Organelles.** A.L. Goldberg, M. Sherman, R. Sauer, M. Maurizi, C. Georgopoulos, F. Sherman, M. Edelman, M. Wettern. **Proteolysis in Lysosomes and Plant or Yeast Vacuoles.** D. Wolf, J.F. Dice, H-L. Chiang, R.J. Mayer, A. Ciechanover, D. Ho. **Degradation of Proteins in the Endoplasmic Reticulum.** J.F. Dice, J. Bonifacino, R. Sitia, G. van Bleck, T. Sommer or S. Jentsch, A. Smith.

NEUROIMMUNOLOGY *June 16-21* Chairs: Edward J. Goetzl, UCSF; Jean E. Merrill, UCLA. **Adhesion and Other Cell-Surface Molecules.** R.J. Milner, S.D. Rosen, B.A. Cunningham, D.R. Colman, J.L. Salzer, R.R. Lobb. **Poster Session: Mediators, Receptors, and Other Shared Molecules.** Chair: J. Majde. **Neural Circuits and Transmitters in Immunity.** D. Felten, K. Bulloch, E. Weihe, W. Maslinski, S. Felten, M. Badamchian. **Neuromediators and Cells in Immunity.** S. Leeman, B. Arnason, P. Mantyh, G.M. Jonakait, J. Weinstock, A. Kage, J. Luber-Narod. **Poster Session: Neuroendocrinology and Behavior.** Chair: N. Fabris. **Immunological Mediators of Neural Function.** J.E. Merrill, T. Roszman, M.L. Shin, W.F. Hickey, P. Paterson, E. Schreiber. **Receptors: Structure and Function.** M.S. O'Dorisio, S.P. Sreedharan, S.K. Dower, E.J. Blalock, S. Rosenzweig, L-Y. Yu-Lee. **Receptors: Transductional Pathways.** S. Gupta, C. Ottaway, P. Gardner, A. Nel, C. Ferris, R. Iyengar. **Neuroendocrine Effects in Immunity and Inflammation.** J. Martin, J. Lipton, A. Catania, J. Bienenstock, J. Levine, E. Sternberg. **Behavior and Responses to Stress.** J. Kiecolt-Glaser, J. Weiss, N. Cohen, R. Glaser, A.J. Dunn, B. Rabin. **Poster Session: Neuroimmune Diseases.** Chair: M. Yokoyama. **Viral Neuroimmunology.** R. Johnson, M. Buchmeier, R. Ahmed, L. Villarreal, B. Trapp, W.I. Lipkin, G. Koob, O. Narayan. **Anti-Synaptic and Paraneoplastic Autoimmune Neurologic Disorders.** V. Lennon, E. Lambert, S. Brimijoin, M. Solimena, K. Jaeckle, E. Lambert.

LYMPHOCYTES AND ANTIBODIES *June 23-28* Chairs: David Parker, Univ. of Massachusetts Med. Sch.; Laurie Glimcher, Harvard Sch. of Public Health. **Antigen Processing and Presentation.** P. Cresswell, E. Long, K. Rock, A. Townsend. **Mechanisms of Cellular Cytotoxicity.** P. Henkart, M. Kriegler, J. Ashwell. **Function and Dynamics of Primary and Memory Lymphocytes.** S. Swain, D. Gray, K. Hayakawa, S. Shaw. **Signals in Lymphocyte Activation.** E. Clark, J. Bolen, C. June, J. Cambier. **Patterns of Transcription in Lymphocyte Activation and Development.** L. Glimcher, K. Calame, D. Singer, J. Leiden. **Functions of Cytokines in Vivo.** R. Coffman, F. Finkelman, C. Jacob. **T Lymphocyte Development.** S. Hedrick, J.P. Allison, L. Matis. **Tolerance.** R. Schwartz, M. Julius, D. Parker. **Allorecognition and Graft Rejection.** A. Singer, H. Auchincloss, H. Winn, A. Rosenberg, K. Lafferty, S. Cobbold.

TRANSGENIC ANIMALS *June 30-July 5* Chairs: Jon W. Gordon, Mt. Sinai Med. Ctr.; George A. Scangos, Bayer AG, FRG. **Transgenic Mice in Immunology.** E. Robey, C. Breberich, K. Yamamura, J. Taurog, U. Storb, B. Hammer, N. First. **Insertional Mutagenesis.** S. Potter, R. Woychik, P. Tremblay, C. Stewart, P. Gruss, D. Wolgemuth, F. Ruddle. **Transgenic Mice and Aging.** D. Nerack, J. Mullens, J. Taylor, J. Majzoub, J. Breslow, G. Scangos, C. Markert. **Oncology/Human Disease Models.** L. Field, C. Knight, R. Manguez, T. Townes, E. Robertson, C. Stewart, G. Jay. **Genetic Engineering of Livestock.** J. Clark, S. Hughes, J. Gordon.

CELLULAR AND MOLECULAR GENETICS *July 7-12* Chairs: Kathryn Calame, Columbia Col. of Physicians and Surgeons; David Livingston, Harvard Med. Sch. **Cell Surface Receptors and Signal Transduction.** T. Roberts, M. Simon, C. Stiles, T. Parsons. **Steroid Receptors and Inducible Transcription Factors.** I. Verma, A. Berk, M. Groudine, R. Evans. **Transcriptional Controls in Cell Determination and Lineage Development.** K. Calame, M. Levine, G. Rosenfeld, B. Emerson. **Molecular Approaches to Mouse Development.** E. Robertson, L. Parada, P. Soriano, A. Bradley. **Transgenic Mice.** A. Berns, R. Jaenisch, R. Grosshedl, B. Gavin. **Human Sex Chromosomes and Sex Determination.** L. Shapiro. **Molecular Genetics of Human Diseases.** D. Housman. **Emerging Techniques for Mammalian Molecular Genetics.** D. Ward. **Recessive Oncogenes or Tumor Suppressors.** D. Livingston, S. Friend, J. Massagué, F. Spencer.

POSITIVE CONTROL OF TRANSCRIPTION INITIATION IN PROKARYOTES *July 14-19* Chair: Sankar Adhya, NCI, NIH; Co-organizers: S. Garges, G. Gussin, G. Storz. **Keynote Speaker:** R. Losick. **The Biochemistry of Transcription.** H. Bujard, M. Chamberlin, W. McClure, L. Rothman-Denes. **Sigma Factors.** C. Gross, P. Stragier, M. Susskind. **Two-Component Systems I.** S. Gottesman, B. Magasanik. **Two-Component Systems II.** J. Parkinson, H. Shinagawa, T. Silhavy. **Activator Paradigms.** R. Calender, J. Guest, W. Reznikoff, D. Wulff. **Contrasting Activators.** S. Long, M. Schwartz, M. Sekiguchi. **Protein-DNA Interactions.** R. Ebright, T. O'Halloran. **Role of DNA Structure.** H. Buc, D. Crothers, C. Higgins. **Activator-RNA Polymerase Interactions.** P. Geiduschek, G. Gussin, S. Kustu.

MOLECULAR MECHANISMS OF CARCINOGENESIS *July 21-26* Chairs: Michael W. Lieberman, Baylor Col. of Med.; Peter Howley, NCI, NIH. **Tumor Progression and Promotion.** H. Herschman, D. Hanahan, L. Liotta, G.T. Bowden. **Oncogenes and Gene Expression.** P. Vogt, B. Eisenman, I. Verma, M. Yaniv. **Oncogenes and Carcinogenesis.** M. Lieberman, D. Slamon, G. Van de Woude. **Viral Carcinogenesis.** P. Howley, F. Chisari, E. Kieff, G. Jay. **Growth Factors.** H. Moses, S. Aaronson, A. Roberts, C. Sherr. **Signal Transduction.** M. Weber, J. Brugge, T. Pawson, F. McCormick. **Tumor Suppressor Genes I.** E. Harlow, W. Cavenee, A. Levine, R. Weinberg. **Genetics of Cancer.** A. Knudson, J.C. Barrett, B. Seizinger, S. Barker. **Tumor Suppressor Genes II.** D. Livingston, W.H. Lee, S. Friend.

GENETIC RECOMBINATION AND GENOME REARRANGEMENTS *July 28 - August 2* Chairs: Richard Kolodner, Dana-Farber Cancer Inst.; Rodney Rothstein, Columbia Col. of Physicians and Surgeons. **Genome Rearrangements.** J. Roth. **Recombination Hotspots.** G. Smith. **Genetic Control of Recombination.** S. Roeder. **Physical Structures Involved in Recombination.** N. Grindley. **Recombination Enzymes From Procaryotes.** S. Kowalczykowski. **Recombination Enzymes from Eucaryotes.** L. Symington. **Transposition.** D. Sherratt. **Processing of Recombination Intermediates.** J. Haber. **Mechanisms of Recombination-Site Specific and General.** T. Petes.

LOW MOLECULAR WEIGHT GTP BINDING PROTEINS *August 4-9* Chairs: Gary M. Bokoch, Res. Inst. of Scripps Clinic; Channing J. Der, La Jolla Cancer Res. Fndn. **Overview Lectures: Evolution of the LMWG Family.** P. Chardin. **ras genes.** M. Barbacid. **ras structure.** S-H. Kim, A. Wittinghofer, S. Campbell-Burke. **Processing of LMWG.** J.E. Buss, J.F. Hancock, F. Tamanoi, J.L. Goldstein. **GTPase Activating Proteins for LMWG.** F. McCormick, J.B. Gibbs, J.A. Cooper. **rap/Krevl LMWG.** C.J. Der, M. Noda, Y. Takai, **YPT/SEC4/rab.** W.E. Balch, D. Gallwitz, P. Novick. **rho/rac LMWG.** A. Hall, J.R. Didsbury, S. Narumiya. **Miscellaneous LMWG.** R.A. Kahn, R. Cerione, D. Johnson, A. Tavitian. **Other Regulatory Molecules.** I.G. Macara, Y. Takai. **LMWG in Specialized Systems.** T.C. Sudhof, G.M. Bokoch.

RESEARCH CONFERENCES

MODULATION OF WOUND HEALING *August 11-16* Chairs: Thomas Hunt, UCSF; William Lindblad, Wayne State Univ.; H. Paul Ehrlich, Shrine Burn Unit of Massachusetts. **Cellular Response to Injury - Cytokines.** G. Grotendorst, C. Stiles, S. Aaronson, J.J. Oppenheim. **Angiogenesis and Endothelial Cell Responses.** G. Grotendorst, T. Maciag, D. Rifkin, P. DiCorleto. **Growth Factors in Repair I.** T. Hunt, G. Grotendorst, E.M. Spencer, K. Broadley. **Growth Factors in Repair II.** T. Hunt, N.A. Wright, E. Amento, S.R. Caughlin. **Collagen Biosynthetic Regulation.** W. Lindblad, J.C. Myers, G. Karsenty, T. Krieg. **Regulation of Collagen Deposition.** W. Lindblad, M.Z. Hussain, J.J. Jeffrey. **Metabolic Regulation of Wound Healing.** A. Barbul, M. Caldwell, N. Abumrad, S. Lowry. **Metabolic Regulation of Wound Healing.** A. Barbul, M. Robson, G. Warden. **Fetal Wound Healing.** I.K. Cohen, B. Mast, E. Hay, M.W.J. Ferguson.

Copper Mountain, Colorado

CHROMATIN AND TRANSCRIPTION *June 23-18* Chairs: Gordon Hager, NCI, NIH; Michael Grunstein, UCLA. **Structure of the Nucleosome and Histones.** T. Richmond, J. Thomas. **DNA Bending and Nucleosome Positioning.** R. Simpson, A. Travers, D. Crothers, A. Wolffe. **Chromatin Structure of Inducible Genes.** M. Beato, G. Hager, W. Horz. **Assembly of Chromatin.** B. Stillman, V. Jackson, R. Lasky. **Mechanisms of Repression.** M. Grunstein, R. Simpson. **Transcription from Chromatin.** B. Emerson, J. Workmann, C. Wu. **Active Domains.** G. Felsenfeld, F. Grosveld, A. Sippel. **Higher Order Structure I.** G. Hager. **Higher Order Structure II.** M. Bradbury.

OPIOIDS AND NEUROTRANSMITTERS IN ANALGESIA AND BEHAVIOR *June 30-July 5* Chairs: Thomas F. Burks, Univ. of Texas Health Sci. Ctr., Houston; Brian Cox, USUHS. **Nociceptive Systems.** T.F. Burks, W. Willis, T. Yaksh, H. Fields. **Opioid Analgesia in Animals and Man.** D. Mayer, A. Cowan, S. Holtzman, K. Foley. **Opioid Receptors.** H. Loh, P. Portoghese, V. Hruby, G. Pasternak. **Opioid Peptides.** A. Goldstein, L. Hersh, T. Davis, C. Chavkin. **Opioid-Monoamine Interactions in Spinal Cord.** J-M. Besson, M. Hamon, G. Wilcox, J. Sawynok. **Opioid - Neuropeptide Interactions.** G. Gebhart, F. Porreca, J. Fujimoto, A. Takemori. **Supraspinal Opioid-Neurotransmitter Interactions I.** A. Mulder, H. Proudfit, G. Aghajanian, J-C. Schwartz. **Keynote Speaker:** Louis Lasagna, **Clinical Studies on Opioids. Roundtable Discussion of Mechanisms of Analgesia.** B. Cox, E. Simon, A. Basbaum, A. Dray, C. Kornetsky.

PROTEIN KINASES *July 7-12* Chairs: Jackie Corbin, Vanderbilt Univ. Sch. of Med.; Michael Czech, Univ. of Massachusetts Med. Ctr. **Opening Keynote Address:** D.E. Koshland. **Calcium/Calmodulin Protein Kinases/Protein Kinase C.** T. Soderling, J. Stull, E. Severin. **Cyclic Nucleotide-Dependent Protein Kinases.** S. Taylor, J. Corbin, R. Tsien, L. Sowadski. **Tyrosine Protein Kinases.** M. Czech, R. Davis, W-H. Lee. **Gene Regulation by Protein Phosphorylation.** G.S. McKnight, M. Montminy, J. Dixon. **Ion Channels, Pumps, Membranes.** W. Catterall, M. Caron, P. Devreotes, M. Montal. **Cell Cycle Regulation by Protein Phosphorylation.** J. Maller, T. Hunt, J. Thorner, H. Piwnica-Worms. **Tyrosine Kinases.** T. Hunter, G. Carpenter, E. Krebs, N. Ahn. **Distinguished Lecture:** E. Fischer. **Novel Protein Kinases and Substrates.** D. Garbers, D. LaPorte, L. Johnson, G. Hardie.

SMOOTH MUSCLE *July 14-19* Chairs: James Stull, Southwestern Med. Ctr.; Cornelius van Breemen, Univ. of Miami. **Cell-Cell Communication.** D. Kreulen, K. Sanders, T. Cunnane. **Calcium Channels.** C. Benham, M. Nelson, H. Kuriyama. **Potassium Channels.** N. Standen, E. Stefani, T. Tomita. **Ion Pumps and Na/Ca Exchange.** R. Casteels, F. Wuytack, M. Blaustein. **Ca^{2+} Signaling Mechanisms.** C. van Breeman, F. Fay, T. Kitazawa. **Cyclic GMP Second Messenger System.** J. Corbin, D. Garbers, T. Lincoln. **Regulatory Properties of Contractile Proteins.** J. Stull, M. Ikebe, M. Walsh. **Modern Aspects of Mechanics.** D. Warshaw, J. Sellers, A. Arner. **Contractile Protein Expression: Gene Regulation and Adaptations.** C. Seidel, G. Gabbiani, R. Schwartz.

THE BIOLOGY AND CHEMISTRY OF VISION *July 21-26* Chairs: Bernard Fung, UCLA Sch. of Med.; John Lisman, Brandeis Univ. **Visual Pigments.** D. Oprian, G. Khorana, J. Nathans, R. Mathies. **Visual Transduction Mechanism - Biochemistry.** W. Baehr, Y.-K. Ho, V. Lipkin, D. Takemoto, W. Boenigk. **Visual Transduction Mechanism - Physiology.** P. Detwiler, D. Baylor, T.D. Lamb, R. Payne. **Light and Dark Adaptation.** G. Fain, R. Rando, H. Matthews, M.C. Cornwall, J. Schnapf. **Vertebrate Phototransduction and Molecular Genetics of Vision in Drosophila.** A. Fein, H. Saibil, E. Johnson, C. Montell, H. Matsumoto. **Photoreceptor Cell Biology.** J. Besharse, E. Burnside, R. Molday. **Common Motifs in Transduction Mechanisms.** G. Johnson, R. Reed, T.K. Harden. **Keynote Address:** H. Ripp. **Hereditary Diseases of the Retina.** M. LaVail, J. Turner, G. Aguirre. **Workshops: *In situ* Hybridization; Transgenic Mouse Methodology; Scanning Tunneling Microscopy.** D. Bok, M. Al-Ubaidi, N. Fisher.

ENDOTHELIUM AND CARDIOVASCULAR FUNCTION *July 28-August 2* Chairs: Paul Vanhoutte, Baylor Col. of Med.; Rudi Busse, Inst. of Applied Physiology, FRG; R. Wayne Alexander, Emory Univ. **Activation of Signal Transduction in Endothelial Cells.** R. Busse, D. Adams, P.E. DiCorleto, P. Davies, N. Flavahan, T. Brock. **Cytokines, Inflammation and the Vascular Wall.** P. Libby, M. Gimbrone, A. Mantovani, G. Zimmerman, J.S. Pober. **Blood-Endothelium Interactions.** E. Dejana, R. Cohen, D. Luskotoff, S. Silverstein, R. Rosenberg. **Endothelium-Derived Nitric Oxide.** S. Moncada, R.F. Furchgott, L. Ignarro, A. Mulsch, R. Palmer, F. Murad, D. Harrison. **Endothelium-Derived Contracting Factors.** P.M. Vanhoutte, G. Rubanyi, D. Harder, Z. Katusic, M. Yanagisawa, V. Miller, C. Boulanger. **Vascular Physiological Role of EDRF.** E. Bassenge, A. Zeiher, G. Kaley, J. Cooke, U. Pohl, W. Jackson. **Non-endothelial Origin of NO and Endothelin.** T. Masaki, V. Forsterman, V. Schini, M. Marletta, C. Romero, J. Billiar, S. Stojilkovic. **Endothelial Growth Factors.** W. Alexander, M. Majewski, T. Scott-Burden, T. Maciak, J. Folkman, M. Reidy. **Vascular Phenomena and Vascular Disease.** A. Herman, P. Henry, P. Ganz, T. Luscher, R.M. Robertson, D. Heistad, R. Levy.

GI TRACT IV: DEVELOPMENT AND REPAIR - CELLULAR AND MOLECULAR ASPECTS *August 4-9* Chairs: Michael Gershon, Columbia Col. of Physicians and Surgeons; Marian Neutra, Harvard Univ. **Stem Cells and Development (renewal of epithelium).** C. Potten, E. Birkenmeier, B. Ponder, N. LeDouarin. **Cell and Region-Specific Regulation of Intestinal Epithelial Gene Expression.** J. Gordon, R. MacDonald, A. Tyner, B. Ponder. **Models of Epithelial Differentiation.** A. Quaroni, E. Rodriquez-Boulan, D. Louvard, M. Rindler, M. Mooseker, M. Neutra. **Development and Maintenance of Polarized Epithelial Cell Function.** M. Caplan, M. Mooseker, J. Anderson, K. Mostov. **Endocytosis and Transcytosis in Mucosal Immunity.** M. Neutra, R. Rodewald, J. McGhee, J-P. Krahenbuhl, D. Powell, G. Castro. **Extracellular Modulation of GI Cell Differentiation.** J. Jamieson, V. Quaranta, P. Ekblom, L. Reid, L. Reichardt. **Cell Migration and Repair of the Epithelium.** J.L. Madara, L. Taylor, M. Sheetz, M. Beckerle, M. Sobel, L. Reichardt, V. Quaranta. **The Neural Crest and GI Development.** M. Gershon, N. LeDouarin, L. Reichardt, M. Bronner-Fraser, T. Rothman. **Intestinal Inflammation/Anaphylaxis and Neural Function.** D. Powell, M. Perdue, J. Wood, A. North, K. Barrett, G. Castro, H. Cooke, A. Suprenant. **Note: Two informal afternoon workshops will be added during the Conference. Topics: 1. Drugs and the bowel. 2. Applications of recent advances in GI research to inflammatory bowel disease.**

CYTOKINES AND LIPID MEDIATORS AS REGULATORS OF CELL FUNCTION *August 11-16* Chairs: Patrick Y-K. Wong, New York Med. Col.; Robert Lewis, Syntex Corp. **Keynote Address:** K.F. Austen. **Cytokines, Phospholipases, G-Proteins and Cell Activation.** P. Vadas, E. Dennis, E. Lapetina, A.R. Morrison, M. Clerk. **Cytokines and Phospholipase A^2.** D. Morgan, W. Pruzanski and R.W. Egan, R. Kramer, R. Crowl. **Cytokines, Oxygen Radicals and Tissue Injury.** M.S. Wolin, A.M. Lefer, R. Ramwell, G. Feuerstein, M. Palladino, F.F. Sun. **Lipid Mediators and Cell - Cell Interaction.** C.R.P. Asciak, C. Serhan, R.C. Murphy, F. Fitzpatrick, P. Borgeat, R. Soberman. **Cytokines and Lipid Mediators in Immunoregulation.** K.C. Arai, R.A. Lewis, S. Gillis, S. Dower, J.W. Chao, K. Smith, T.G. Nagabhushan. **Regulation of Arachidonic Acid Oxygenation.** K.K. Wu, K.F. Austen, R.R. Gorman, J. Evans, T. Yoshimoto. **Cytokines and Platelet Activating Factor.** J. Wallach, S. Prescott, W. Hsueh, J.M. Mencia, B.B. Vargaftig. **Cytokines, Lipid Mediators, and Inflammation.** R. Hedquist, S. Yamamoto, T. Lee, S.E. Dahlen, K.V. Honn, M. Foegh. **Cytokines, Eicosanoids and Receptor Signalling.** S. Mong, G. Fitzgerald, P. Halushka, P. Y-K. Wong, J.M. Dyer.

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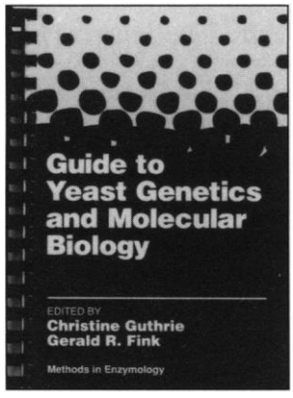

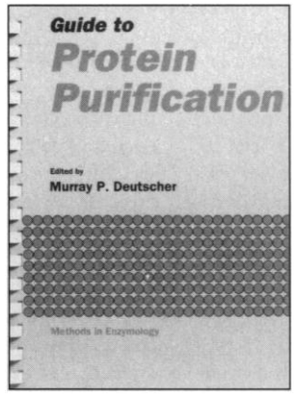

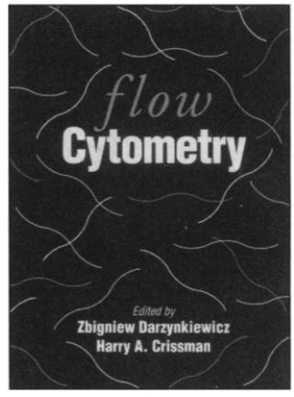

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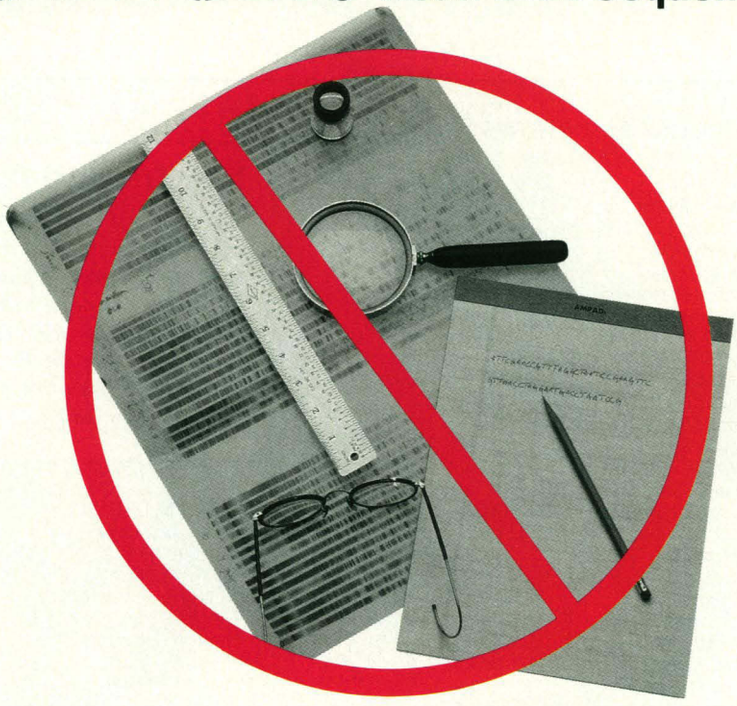

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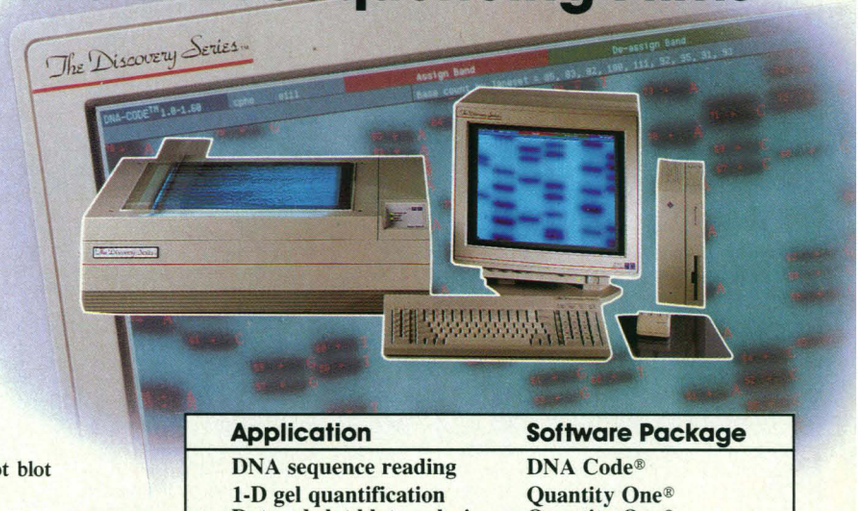

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