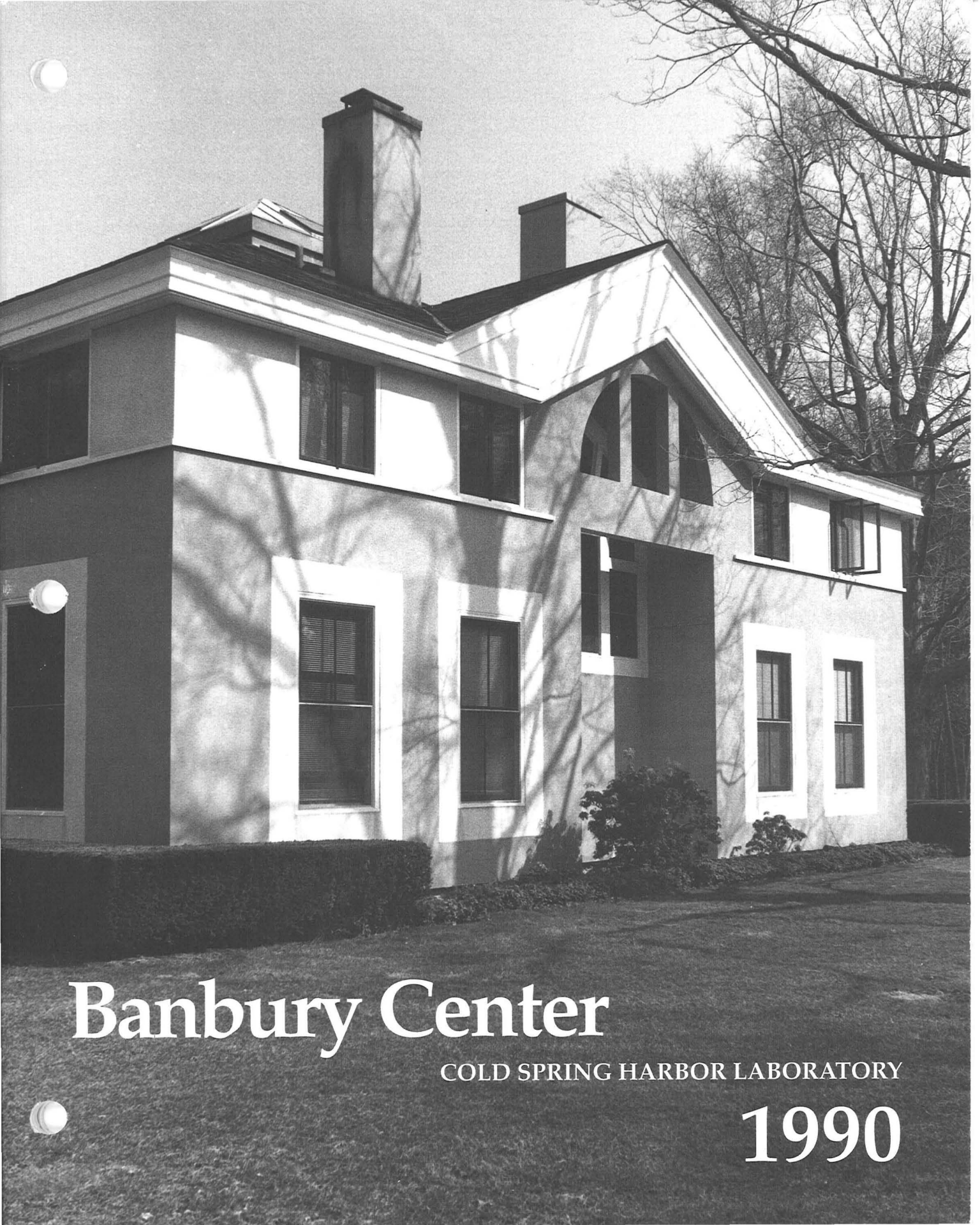


Banbury Center

COLD SPRING HARBOR LABORATORY

1990

BANBURY CENTER

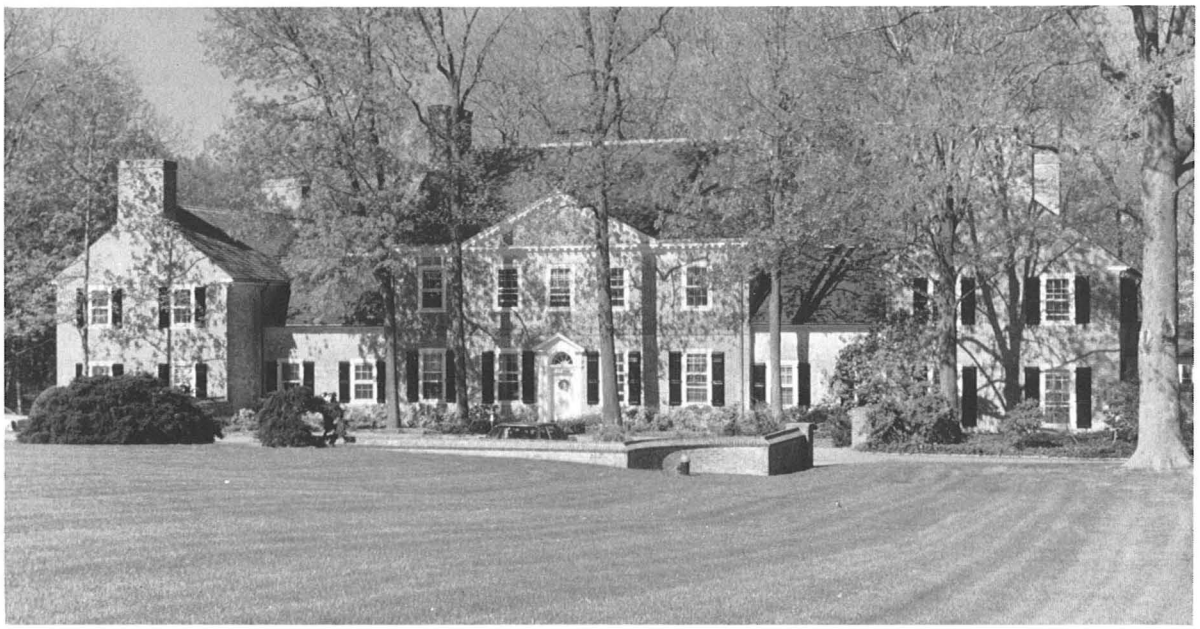
Banbury Center is a 45-acre estate adjoining the waters of Long Island Sound on the north shore of Long Island, barely 40 miles east of downtown Manhattan and located just across the harbor from Cold Spring Harbor Laboratory. The estate was donated to the laboratory in 1976 by Charles Sammis Robertson together with funds for necessary architectural conversions and an endowment to cover upkeep of the grounds and of the original estate structures. With the laboratory's long history and international research reputation and its own renowned ongoing programs of courses and conferences, the magnificent Banbury grounds and buildings presented an ideal site for a complementary program of smaller conferences concentrating on aspects of the biological sciences which also bore significant social implications. Banbury's primary concerns are in areas of environmental and occupational risk assessment, and molecular biology and genetics, especially as they bear on health, social, and policy issues.

Banbury conferences, kept small to maximize spontaneous uninhibited exchanges between participants, achieve wider dissemination through publications by Cold Spring Harbor Laboratory Press. What was once the estate's original seven-car garage is now administrative offices, a small library, and—at its center—an opulently appointed yet intimate and informal conference room. Replete with extensive, unobtrusive sound and projection facilities as well as wall-to-wall blackboard space, the room can accommodate as many as fifty participants while remaining equally conducive to either formal presentations or informal give-and-take. The original Robertson neo-Georgian manor house, situated on the final promontory before the grounds descend to the shore of the harbor, now serves as the center for participant accommodations and dining, while the extensive grounds, swimming pool, tennis court, and beach present ample recreational resources. On-site accommodations have been further supplemented by the opening in 1981 of the Sammis Hall guest house—a modern embodiment of the sixteenth century Palladian villas—designed for the Center by the architectural firm of Moore Grover Harper.

(Cover) Sammis Hall on the Banbury Estate

Mailing address: Banbury Center, P.O. Box 534, Cold Spring Harbor, New York 11724

BANBURY CENTER DIRECTOR'S REPORT



Robertson House provides housing and dining accommodations at Banbury Center

The Banbury Center continues to play a special part in the Laboratory's meetings program. Fourteen workshop-style meetings were held here in 1990, and over 500 scientists attended them. In addition, there were three special meetings for science journalists, congressional staff, and senior executives involved in biotechnology. Bea Toliver and Ellie Sidorenko in the Center's office and Katya Davey at Robertson House once again coped wonderfully with the pressures that always arise when dealing with a program of this nature—cancellations, unusual requests, and meetings arranged at the last minute. The 1990 program at the Banbury Center seemed to be even more varied than usual, so it is even more difficult to group the meetings into categories.

Molecular Genetics

Banbury continues to be a leading center for discussion meetings on human molecular genetics, and there were four meetings on this theme in 1990. The meetings ranged from discussions of methodology, through applications to particular diseases, to the societal implications of the powers of a genetic approach to the ills that afflict human beings.

Although electrophoresis is used in every molecular biology laboratory to separate DNA molecules, the technique as originally developed could not be used for very large DNA molecules. In recent years, further developments have led to systems that separate DNA fragments as large as intact yeast chromosomes. **Electrophoresis of Large DNA Molecules** was concerned with the theory and the practice of these techniques. In addition, the participants dis-

cussed some of the novel techniques being developed for the physical analysis of DNA. The most remarkable of these uses scanning tunneling microscopy to "see" a DNA molecule directly.

The furthest extreme from analyzing individual DNA molecules is the study of human genetics as revealed by the inheritance of genes in families. This has proved to be an extremely powerful approach, as shown by the cloning of human disease genes such as that for cystic fibrosis. Genetic analysis of human disorders that may result from the effects of several genes, acting independently or together, and in which there is a strong environmental influence is much more difficult. This was the subject of the meeting on the **Genetics and Molecular Biology of Complex Diseases**. These diseases include autoimmune diseases such as arthritis, alcoholism, and schizophrenia. The participants discussed general approaches to the genetic analysis of these disorders and the progress, or lack of it, in specific disorders.

Neurofibromatosis was one of the successes of cloning human disease genes in 1990, and the Banbury Center meeting on **Neurofibromatosis** was held at just the right time, in October. The gene for one form of neurofibromatosis had been cloned in the Spring of 1990, and its similarity to genes known to be involved in cancer was recognized just a few weeks prior to the meeting. The success of research on neurofibromatosis is an example of what can be achieved through a judicious combination of cooperation and competition and by the efforts of a small foundation.

Increasingly, the results of the research laboratories' cloning of human disease genes are translated into practical, diagnostic applications. However, it is becoming clear that DNA-based diagnosis may not be an unalloyed success. **The Impact of Human Molecular Genetics on Society** considered the difficulties that may arise when DNA diagnosis becomes possible for common, complex genetic disorders. The issues discussed included how to decide when population screening programs should be implemented and how an individual's access to health care and insurance may be affected. The comments of the European geneticists, working in countries with national health care systems, were particularly interesting, and there appear to be strong parallels with these same issues in relation to AIDS.

A final meeting in this area dealt with **Mapping the Genomes of Agriculturally Important Animals**. Although concerted efforts are being made to map and analyze the genomes of human beings, the fruit fly, a nematode worm, a bacterium, and yeast, the same resources have yet to be applied to the genomes of domesticated animals. The bovine genetic map is perhaps the best developed, but even there the numbers of genes assigned to particular chromosomes is very small. This meeting was intended as a planning meeting to discuss what should be done to rectify this situation.

Sammis Hall, guest house

Plant Molecular Biology

Despite the obvious practical importance of studying the molecular biology of plants, it has not been easy to find funding for meetings on this topic. So in 1990, a meeting on **Recognition in Plant-Pathogen Interactions** was included in Banbury's Corporate Sponsor series of meetings. Plants have devised a variety of means to deal with pathogens, but little is known of the molecular specificity that determines the interaction between a plant and potential pathogens. This

meeting reviewed some of the best understood plant-pathogen interactions and dealt particularly with progress toward cloning the genes involved. The ability to manipulate the genes responsible for the resistance of plants to bacteria and fungi could have far-reaching effects for agriculture.

Topics in Basic Research

Two meetings dealt with technical developments in molecular biology. It might seem at first sight to be easy to derive the three-dimensional structure of a protein from its amino acid sequence. In fact, it is still not possible to do this, and participants in the meeting **Computational Aspects of Protein Folding** critically reviewed the approaches that have been devised. Among the topics discussed were methods based on free-energy calculations, molecular dynamics studies, and knowledge-based approaches. The importance of the subject was underscored by the large attendance of scientists from the Laboratory's corporate sponsors.

Monoclonal antibodies are among the most important tools available to molecular biologists. Because of their specificity, monoclonal antibodies allow very precise detection and purification of proteins. These antibodies are pro-

Banbury Meeting House

duced by cells growing in tissue culture, but over the past 2 years, methods have been developed for using recombinant DNA techniques to produce antibodies in bacteria. **Vectors for Cloning the Immune Response** reviewed the present state of development of this field and looked forward to new developments in vectors and techniques that will speed up the move to creating antibodies in vitro.

Cell death is usually thought of as the ultimate response of a cell to trauma,

but so-called programmed cell death is a part of normal cell and tissue functioning. The phenomenon has been studied in a variety of cells, tissues, and organisms and involves an interesting set of morphological and molecular changes. Our meeting on **Programmed Cell Death: Concepts and Mechanisms** was a first attempt at drawing these different interests together to determine the degree to which common mechanisms may be involved.

One factor contributing to cell death may be the generation of free-oxygen radicals. These are highly reactive and toxic to cells, and cells have evolved methods for neutralizing these free radicals before they can do harm. The meeting on **Molecular Biology of Free-radical Scavenging Systems** dealt with the molecular mechanisms by which cells cope with oxidative stress. In addition, there were discussions of some of the biomedical applications that might be developed for protecting cells.

Environmental Hazards

The primary focus of the first meetings at the Banbury Center was on "biological risk assessments, especially of agents thought to act at the genetic level." The first of the two 1990 meetings on environmental hazards continued this theme. **Molecular Mechanisms of Fiber Cytotoxicity and Carcinogenesis** reviewed the current research on the biological effects of asbestos and the extent to which extrapolations can be made to the possible risks associated with man-made substitutes for asbestos. The meeting was notable for the range of mechanisms examined, including the disruption of cell division by fibers, their effects on oxyradicals, and their role in inducing genetic changes.

The second of the year's meetings in this area was **The Biological Basis for Risk Assessment of Dioxins and Related Compounds**. A meeting dealing with the biological effects of dioxin was held at the Banbury Center in 1984. As its title indicates, the 1990 meeting dealt with the impact of the results of biological and epidemiological research on risk assessment and on regulations governing environmental levels. There was much discussion about the biological basis for the models that are used to estimate human exposure to dioxin. This is a highly controversial subject, and it is to be hoped that the discussions that went on at this meeting will lead to a resolution of some of the problems involved.

Sloan Foundation Workshops

The findings of biological research are having, or should have, an increasing relevance to many aspects of society. The importance of a proper interpretation and implementation of those findings cannot be overemphasized. The aim of these workshops is to provide two influential groups, congressional staff and science journalists, with an opportunity to learn at first hand about some of this research. The subject of the congressional staff meeting was **Addiction**. The workshop covered an enormous range of topics, including an historical survey of drug addiction and alcoholism in the United States, the pharmacology of addiction, the relationship (if any) between "psychological" addiction (e.g., gambling) and drug addiction. The meeting finished with a session debating whether controlled legalization of drugs would alleviate or exacerbate the drug epidemic.

The science journalists' workshop dealt with an epidemic of another kind.

Cancer rates are increasing in women, and the meeting on Women and Cancer surveyed the latest research on the genetics of breast, cervical, and lung cancer and how this research is being translated into diagnostic tests and treatments. Some of this work is controversial, as for example, studies of the effectiveness of screening tests for breast cancer. A particularly disturbing presentation showed how the increase in women smoking parallels the increasing incidence of lung cancer in women and how women are special targets for advertising.

The Baring Brothers/Cold Spring Harbor Laboratory Meeting

Cancer is one area where genetic analysis at the molecular level has led to revolutionary new insights, and it seemed to be just the right topic for our 1990 senior executives meeting. It was an outstanding meeting. A series of talks on fundamental research on cancer dealt with oncogenes and the activities of their protein products, control of the cell cycle, and genetic prognosis. These were followed by presentations on metastasis, drug-resistance genes, and new therapies for breast cancer. Cold Spring Harbor Laboratory has had a long involvement with cancer research, and it was appropriate that the participants spent an afternoon discussing research with some of the Laboratory's scientists.

Other Meetings

As in previous years, the Banbury Center has been used as a meeting center by a small number of outside groups. The Esther A. and Joseph Klingenstein Fund held their annual meeting of Klingenstein research fellows at the Center in April. A participant in this year's meeting was Walter Gilbert, who speculated on what the genome projects might mean for neurobiology research. All research in biol-

ogy is coming to depend increasingly on mathematics and computers, not just for analysis, but also for modeling. The National Science Foundation sponsored a small workshop that discussed what might be done to develop training in mathematical and computational skills for biologists. The Huntington Hospital Board of Trustees and the Psychiatry Department of Mt. Sinai Medical School also came to the Center.

Banbury Meeting House, rear view

Funding

Acknowledgments for financial support of meetings at the Banbury Center must always begin with the members of the Laboratory's Corporate Sponsor Program. In 1990, five meetings at the Banbury Center were supported by this program. It is no exaggeration to say that the number and diversity of our meetings could not be maintained without our Corporate Sponsors. Companies were also generous in their support of other meetings. Five companies interested in electrophoresis techniques contributed to the **Electrophoresis of Large DNA Molecules** meeting, and SmithKline Beecham sponsored the meeting on **Vectors for Cloning the Immune Response**. The Chlorine Institute contributed to the meeting on **The Biological Basis for Risk Assessment of Dioxins and Related Compounds**. The Environmental Protection Agency helped fund two meetings, and funding from the United States Department of Agriculture, the National Science Foundation, and Granada BioSciences helped fund the meeting on **Mapping the Genomes of Agriculturally Important Animals**. The Alfred P. Sloan Foundation continues to fund the science journalists' and congressional staff workshops. The Pew Charitable Trusts supported the meeting on **The Impact of Human Molecular Genetics on Society**. A full listing of Banbury Center funds can be found with the financial statements for the Laboratory.

We have received two major grants for meetings beginning in 1991. The Wil-

liam Stamps Farish Fund has made the Center a three-year award for meetings on the genetics of common polygenic diseases. This is undoubtedly where the next major advances in human genetics will take place. The Banbury Center and the DNA Learning Center have received a joint grant from the Department of Energy for a series of workshops on genetics. The aim of the workshops will be to provide information on human genetics for nonscientists involved in human genome projects. We hope that the participants in the workshops will make use of the information in their own special areas.

Banbury Center Books

Cold Spring Harbor Laboratory Press continues to produce an excellent series of publications based on Banbury Center meetings. There were two further books in the *Banbury Report* series, from meetings held in 1989. These were *Genetics and Biology of Alcoholism* and *Biology of Mammalian Germ Cell Mutagenesis*. The first of the new series of *Current Communications in Cell & Molecular Biology* was published in early 1991. These books will still be based on Banbury meetings but will now contain about ten selected reviews instead of short abstracts of all presentations. They have more figures and references, and the new format should result in books of lasting value. *Electrophoresis of Large DNA Molecules* is the first in the new series, and it will be followed by books based on other 1990 meetings. The Press also published a report of the meeting on *Mapping the Genomes of Agriculturally Important Animals*.

Looking Forward to 1991

As is usual at the time this report is written, the program for the current year is still being developed. However, it promises to be as stimulating and exciting as in previous years. There will be meetings on basic research (adhesion molecule receptors, receptors for viruses, and membrane proteins), molecular genetics (Marfan disease, breast cancer, *Escherichia coli* genome, and AIDS), and social issues in biological research. One of the most exciting developments, referred to above, will be the first of the genetics workshops for individuals involved in genome projects. In his 1981 Director's Report, Dr. Watson described the Banbury Center program as being a "most intellectually diverse smorgasbord" of meetings. It is this variety of subjects and the outstanding quality of the participants that makes the Banbury Center one of the most exciting meetings centers in the world.

Jan A. Witkowski

Publications

Witkowski, J.A. 1990. [correspondence]. Carrel's Cultures. *Science* **247:** 1385–1386.

Witkowski, J.A. 1990. The 51 most-cited articles in the *Cold Spring Harbor Symposia on Quantitative Biology. Current Contents* **28,** July 9 1990: 7–17.

Witkowski, J.A. 1990. The inherited character of cancer. *Cancer Cells* **2:** 229–257.

Witkowski, J.A. 1990. Milestones in the development of DNA technology. In *Forensic DNA Technology* (ed. M.A. Farley and J.J Harrington), pp. 1–23. Lewis Publishers, Inc., Michigan.

MEETINGS

Sloan Foundation Congressional Workshop on Addiction

January 25–January 27

ARRANGED BY

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

SESSION 1

M.J. Kreek, Rockefeller University, New York, New York: Pharmacology and physiology of opiate addiction.

N. Grunberg, Uniformed Services University of the Health Sciences, Bethesda, Maryland: Tobacco as an addictive substance.

M. Eckardt, National Institute on Alcohol Abuse and Alcoholism, Bethesda, Maryland: Alcohol as an addictive substance.

S. Blume, South Oaks Hospital, Amityville, New York: Gambling as an addiction.

SESSION 2

T.R. Kosten, Yale University, New Haven, Connecticut: Treatments for drug addiction.

W. Comer, Bristol-Myers Squibb Company, New York, New York: Response of the pharmaceutical industry.

SESSION 3

D. Courtwright, University of North Florida, Jacksonville: Social and legislative origins of narcotic control.

P. Reuter, RAND Corporation, Washington, D.C.: Legalization issues: The current debate.

A. Hamid, John Jay College of Criminal Justice, New York, New York: Legalization: Its potential impact on the streets.

E.A. Nadelmann, Princeton University, New Jersey: Comments on legalization.

A. Goldstein, Stanford University, California: Comments on legalization.

Mapping the Genomes of Agriculturally Important Animals

February 25–February 28

ARRANGED BY

C.J. Arntzen, Texas A&M University, College Station
N.L. First, University of Wisconsin, Madison
J.E. Womack, Texas A&M University, College Station

SESSION 1: Mammalian Gene Mapping: A Comparative Approach

Chairperson: C.J. Arntzen, Texas A&M University, College Station

D.E. Housman, Massachusetts Institute of Technology, Cambridge: The human gene map: An overview of strategies, status, and application.
D.L. Nelson, Baylor College of Medicine, Texas: Molecular dissection of human X chromosome.
J.E. Womack, Texas A&M University, College Station: Genomic conservation in humans, mice, and cattle.
L.C. Skow, Texas A&M University, College Station: The mouse gene map: Implications for the genomes of domestic animals.
V. McKusick, Johns Hopkins University, Baltimore, Maryland: Discussion: Potential interrelationships with human genome initiative.

SESSION 2: Potential Benefits of Animal Gene Maps to Agriculture

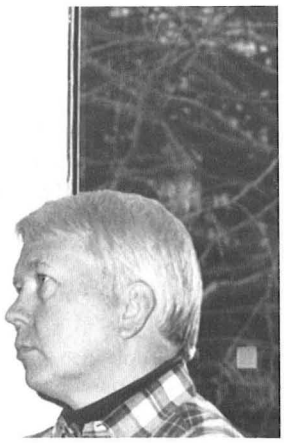
Chairperson: J. Lunney, Agricultural Research Service, USDA, Beltsville, Maryland

A.H. Paterson, E.I. du Pont de Nemours & Co., Inc., Wilmington, Delaware: Mapping QTL in tomato using genetic linkage to DNA markers.
M. Soller, The Hebrew University of Jerusalem, Israel: Experimental designs and statistical analyses for mapping QTL in animal populations.
A. Teale, ILRAD, Nairobi, Kenya: Genes controlling disease resistance as targets of bovine genome research.
L.A. Schuler, University of Wisconsin, Madison: The prolactin gene family in cattle.

SESSION 3: Approaches to the Development of Animal Gene Maps

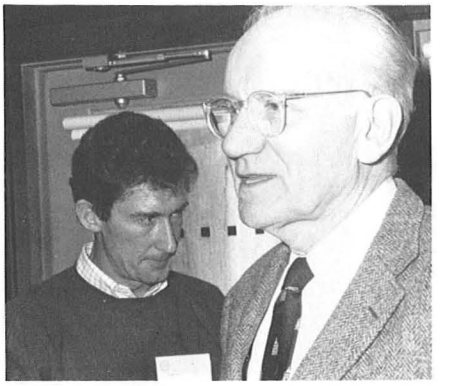
Chairperson: J.E. Womack, Texas A&M University, College Station

M.S. Georges, Genmark, Inc., Salt Lake City, Utah: Characterization of highly polymorphic bovine markers.
H. Lewin, University of Illinois, Urbana: UFO-PCR: A strategy for animal genome mapping.
R.L. White, Howard Hughes Medical Institute, University of Utah Medical Center, Salt Lake City: New and emerging technologies in linkage marker development: Parallel application in humans and animals.
J. Hetzel, CSIRO, Queensland, Australia: International collaboration: Use of pedigreed reference families.



J. Hetzel, J. Womack, C. Arntzen

M. Soller



A. Teale, V. McKusick

SESSION 4: The Current Status of Gene Maps in Animals

Chairperson: H. Lewin, University of Illinois, Urbana

J.E. Womack, Texas A&M University, College Station: Cow.
L.B. Schook, University of Illinois, Urbana: Pig.
L.C. Skow, Texas A&M University, College Station: Horse.
J. Hetzel, CSIRO, Queensland, Australia: Sheep and goat.
R.M. Shuman, North Carolina State University, Raleigh: Poultry.

SESSION 5: Discussion of Programs and Strategies

Chairperson: N.L. First, University of Wisconsin, Madison

J.E. Womack, Texas A&M University, College Station: USDA Joint Committee on Animal Genome Mapping.
L.B. Schook, University of Illinois, Urbana: NC-150 Committee on the Application of Cellular and Molecular Biology to Animal Science Research.
N.P. Clarke, Texas A&M University, College Station: National initiatives in animal agriculture.
J. Hetzel, CSIRO, Queensland, Australia: International programs.
H. Mussman, US Department of Agriculture, Washington, D.C.: Summary.

Electrophoresis of Large DNA Molecules: Theory, Practice, and Future

March 5–March 8

ARRANGED BY

B. Birren, California Institute of Technology, Pasadena
E. Lai, University of North Carolina at Chapel Hill

SESSION 1: DNA Molecules and Gels

Chairperson: P. Serwer, University of Texas Health Science Center at San Antonio

F.H. Kirkpatrick, FMC BioProducts, Rockland, Maine: Overview of agarose gel properties.
B. Akerman, Chalmers University of Technology, Gothenburg, Sweden: Reorientational dynamics and mobility of DNA during pulsed-field gel electrophoresis.
C. Bustamante, University of New Mexico, Albuquerque: Observations of kinked configurations in DNA molecules undergoing orthogonal field alternating gel electrophoresis.
J.A. Schellman, University of Oregon, Eugene: Orientation response and relaxation of DNA in agarose gels.
S. Smith, University of New Mexico, Albuquerque: Computer simulation of individual DNA molecular motion during pulsed-field gel electrophoresis.
J.M. Deutsch, University of California, Santa Cruz: Prediction of electrophoresis experiments using computer simulations.
G. Holzwarth, Wake Forest University, Winston-Salem, North

C.R. Cantor, J.A. Witkowski, E. Lai

C. Bustamante

E. Lai, L. Lerman

Carolina: Acceleration of DNA during PFGE.

L.S. Lerman, Massachusetts Institute of Technology, Cambridge: The interaction between DNA melting and its electrophoretic mobility in polyacrylamide gels.

SESSION 2: Instrumentation

Chairperson: E. Lai, University of North Carolina at Chapel Hill

J. Noolandi, Xerox Research Center of Canada, Ontario: The Xerox CAGE (computer-assisted gel electrophoresis) system for pulsed-field gel electrophoresis of DNA.

J.R. Fassett, Beckman Instruments, Inc., Fullerton, California: The transverse alternating field system: New designs.

S. Ferris, Bio-Rad Laboratories, Hercules, California: Algorithm-optimized, multistate CHEF electrophoresis.

R. Blakesley, GIBCO/BRL, Life Technologies, Inc., Gaithersburg, Maryland: Small DNA separations with a PACE apparatus.

K. Kolble, University of Oxford, United Kingdom: ST/RIDE–An angle-variable 3D-PFGE system.

G.-J.B. van Ommen, Sylvius Laboratories, Leiden, The Netherlands: Design and use of a simple space-saving CHEF system driving four independent time-ramp programs.

SESSION 3: Electrophoresis

Chairperson: L.S. Lerman, Massachusetts Institute of Technology, Cambridge

G.F. Carle, University of Nice, France: Field inversion gel electrophoresis.

G. Chu, Stanford University Medical Center, California: Separation of very large DNA with a variable angle CHEF device.

P. Serwer, University of Texas Health Science Center at San Antonio: New modes and effects of pulsed-field gel electrophoresis.

E. Lai, University of North Carolina at Chapel Hill: Studies of DNA migration made with the PACE system.

B. Birren, California Institute of Technology, Pasadena: Factors influencing pulsed-field migration of DNA.

C. Heller, University of Constance, Germany: Field inversion gel electrophoresis with different pulse-time ramps.

S. Beverely, Harvard Medical School, Boston, Massachusetts: Circular DNA and pulsed-field gel electrophoresis.

C.R. Cantor, Lawrence Berkeley Laboratory, California: Accelerating PFGE separations.

SESSION 4: Applications

Chairperson: C.R. Cantor, Lawrence Berkeley Laboratory, California

G.-J.B. van Ommen, Sylvius Laboratories, Leiden, The Netherlands: Applications of PFGE and CHEF analysis to disease study and YAC analysis.

C.L. Smith, University of Berkeley, California: Optimizing applications of PFGE electrophoresis.

H. Lehrach, Imperial Cancer Research Fund, London, United Kingdom: Experimental approaches and results in mapping large regions of mammalian genomes.

SESSION 5: The Future

Chairperson: B. Birren, California Institute of Technology, Pasadena

S. Williams, Cold Spring Harbor Laboratory, New York: Image analysis of gel patterns.

A.S. Cohen, Northeastern University, Boston, Massachusetts: Restriction fragments and DNA sequencing using open and gel high-performance capillary electrophoresis (HPCE).

W. Efcavitch, Applied Biosystems, Inc., Foster City, California: Capillary gel electrophoresis.

C. Bustamante, University of New Mexico, Albuquerque: STM studies of DNA.

Genetics and Molecular Biology of Complex Diseases

March 12–March 15

ARRANGED BY

A. Chakravarti, University of Pittsburgh, Pennsylvania
E.R. Lander, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

SESSION 1: Genetics I: The Complexity of Inheritance

Chairperson: E.R. Lander, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts

J.V. Neel, University of Michigan, Ann Arbor: The "bottom up" approach to multifactorial inheritance: Some problems.

J.-M. Lalouel, University of Utah School of Medicine, Salt Lake City: Genotypic versus phenotypic inference in complex inheritance.

M.-C. King, University of California, Berkeley: Gene mapping of complex diseases, especially cancer (inherited vs somatic alterations, choice of models, heterogeneity, etc.).

C. Sapienza, Ludwig Institute for Cancer Research, Montreal, Canada: Genetic models for penetrance and expressivity.

E.H. Leiter, The Jackson Laboratory, Bar Harbor, Maine: The role of environment in modulating the penetrance of diabetogenic susceptibility genes in nonobese diabetic (NOD) mice.

SESSION 2: Complex Diseases I: Cardiovascular and Psychiatric Diseases

Chairperson: A.G. Motulsky, University of Washington School of Medicine, Seattle

H.H. Hobbs, University of Texas Southwestern Medical Center at Dallas: Evidence for an LDL-lowering gene in a family with familial hypercholesterolemia.

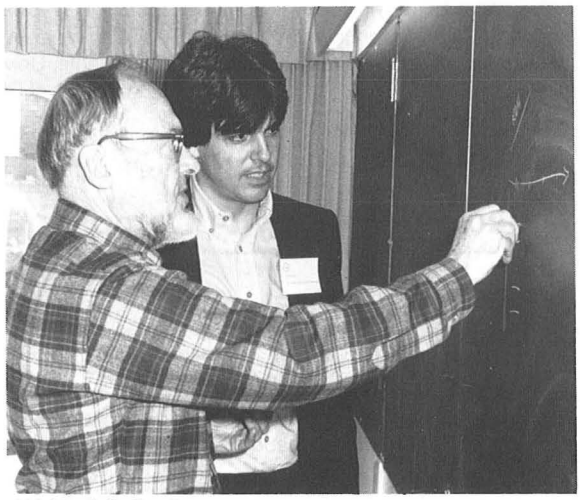
S. Humphries, Charing Cross Sunley Research Center, London, United Kingdom: Strategies to identify functionally important common polymorphisms in candidate genes involved in atherosclerosis, thrombosis, and coronary artery disease risk.

M. Baron, New York State Psychiatric Institute, New York, New York: Genetic mapping of mental illness: Opportunities and pitfalls.

I.I. Gottesman, University of Virginia, Charlottesville: Phenotypic confusion in the classification of schizophrenics and their relatives for genetic analyses.

J.D. Rine, University of California, Berkeley: A possible contribution of dogs to behavioral genetics of mammals.

A. Chakravarti



J.V. Neel, S. Beall

SESSION 3: Genetics II: Genetic Tools

Chairperson: A. Chakravarti, University of Pittsburgh, Pennsylvania

G.J. Thomson, University of California, Berkeley: Mathematical techniques for molecular mapping of complex human genetic diseases.

N.J. Risch, Yale University School of Medicine, New Haven, Connecticut: Linkage strategies for genetically complex traits.

E.R. Lander, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts: Quantitative analysis of polygenic traits.

M. Lathrop, CEPH, Paris, France: Non-HLA genes in type I diabetes.

J.H. Edwards, University of Oxford, United Kingdom: Nucleus and cytoplasm. Two maps or one.

SESSION 4: Complex Diseases II: Cancer and Autoimmune Disorders

Chairperson: M.-C. King, University of California, Berkeley

A.G. Knudson, Institute for Cancer Research, Philadelphia, Pennsylvania: Oncodemes and pathodemes.

M. Trucco, University of Pittsburgh, Pennsylvania: Susceptibility markers for IDDM.

S. Beall, California Institute of Technology, Pasadena: Strategies for determining the candidate genes involved in etiology of multiple sclerosis.

SESSION 5: Complex Diseases III: Congenital Defects

Chairperson: M.-C. King, University of California, Berkeley

D.H. Ledbetter, Baylor College of Medicine, Houston, Texas: Molecular studies of contiguous gene deletion syndromes.

A.A. Schinzel, Zurich Medical School, Switzerland: From the visible chromosome aberration to the mutant gene: Analysis of complex diseases with combined cytogenetic and molecular genetic techniques.

SESSION 6: Genetics III

Chairperson: J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

F. Smith, Mount Sinai School of Medicine, New York, New York: Analysis of the acid β-glucosidase gene by PCR: Heterogeneity of mutations in Gaucher's Disease.

C. Venter, National Institute of Neurological Disorders and Stroke, Bethesda, Maryland: Large-scale automated DNA sequencing of chromosome regions associated with genetic diseases.

G.A. Evans, Salk Institute, San Diego, California: Structure and micropathology of human chromosome.

D.R. Cox, University of California, San Francisco: New approaches for mapping bipolar affective disease genes.

A.G. Motulsky, University of Washington School of Medicine, Seattle: Summation.

Molecular Mechanism of Fiber Cytotoxicity and Carcinogenesis

March 19–March 22

ARRANGED BY

W.R. Brinkley, University of Alabama at Birmingham
C.Harris, National Cancer Institute, Bethesda, Maryland
J.F. Lechner, National Cancer Institute, Bethesda, Maryland

SESSION 1: Background

W. Rom, New York University School of Medicine, New York, New York: Epidemiology and chemoprevention.
S. Knuutila, University of Helsinki, Finland: Cytogenetics of human mesothelioma.
J.E. Craighead, University of Vermont, Burlington: Animal models.
J.F. Lechner, National Cancer Institute, Bethesda, Maryland: In vitro models and effects of growth factors.
T.W. Hesterberg, Manville Corporation, Denver, Colorado: Cytotoxic and cytogenetic effects of asbestos on human bronchial epithelial cells: Chronic inhalation study with refractile ceramic fibers in rats and hamsters—18-month interim results.

SESSION 2: Growth Factors, Signal Transduction, and Cytoskeleton

W.R. Brinkley, University of Alabama at Birmingham: Overview.
M. Gilman, Cold Spring Harbor Laboratory, New York: Intracellular mediators of c-*fos* induction.
C.J. Molloy, National Cancer Institute, Bethesda, Maryland: Oncogenes and signal transduction in malignancy.
D. Beach, Cold Spring Harbor Laboratory, New York: Genetic control of the cell cycle.
J.G. Rheinwald, Dana-Farber Cancer Institute, Boston, Massachusetts: The involvement of EGF, FGF, and a novel autocrine mitogen in human mesothelial differentiation and transformation.

SESSION 3: Mitotic Spindle Control and Aberrations

W.R. Brinkley, University of Alabama at Birmingham: The centromere mitotic apparatus and aneuploidy.
C.L. Rieder, The Wadsworth Center, Albany, New York: Mitotic spindle assembly and chromosome movement.
G. Sluder, Worcester Foundation for Experimental Biology, Shrewsbury, Massachusetts: Biology of the centrisome: Formation, function and reproduction.
J.C. Barrett, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina: Induction of chromosomal aberrations in rodent cells.

SESSION 4: Molecular Mechanisms

C. Harris, National Cancer Institute, Bethesda, Maryland: Overview.
B.T. Mossman, University of Vermont, Burlington: Role of oxy-radicals in rodent cells.
J.D. Brain, Harvard University, Boston, Massachusetts: Role of nonalveolar macrophages in lung injury.
M.-C. Jaurand, CHU Henri Mondor, France: Neoplastic transformation of rodent cells by fibers.
T.F. Hei, Columbia University, New York, New York: Interactive effects of fibers and radon in neoplastic transformation.
E.M. Johnson, Mount Sinai School of Medicine, New York, New York: DNA transfection by fibers.
R.R. Reddel, Children's Medical Research Foundation, Camperdown, Australia: Neoplastic transformation of human mesothelial cells by activated proto-oncogenes.
C. Walker, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina: Growth factor gene expression in *rat* mesothelioma.
B.I. Gerwin, National Cancer Institute, Bethesda, Maryland: Role of growth factors, oncogenes, and tumor suppressor genes in human mesothelial cell carcinogenesis.

SESSION 5: Implications for Risk Assessment

R.O. McClellan, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina: Overview.
E. McConnell, Raleigh, North Carolina: Discussion leader.

Recognition in Plant-Pathogen Interactions

April 9–April 12

ARRANGED BY

S.P. Briggs, Pioneer Hi-Bred International, Inc., Johnston, Iowa
R.W. Michelmore, University of California, Davis
B. Staskawicz, University of California, Berkeley

SESSION 1: Interactions between Viruses and Plants

Chairperson: B. Staskawicz, University of California, Berkeley

D. Baulcombe, John Innes Institute, Norwich, United Kingdom: Identification of viral components that trigger responses in the host plant: Examples from PVX, TRV, and CMV.
R.N. Beachy, Washington University, St. Louis, Missouri: Role of the TMV movement protein in host susceptibility.
J. Culver, University of California, Riverside: The role of the tobacco mosaic virus coat protein in the induction of the hypersensitive reaction.

SESSION 2: Interactions between Bacteria and Plants

Chairperson: B. Staskawicz, University of California, Berkeley

J. Leach, Kansas State University, Manhattan: Avirulence genes from *Xanthomonas campestris* pv. *oryzae*, the bacterial blight of rice pathogens.
N. Keen, University of California, Riverside: Characterization of avirulence genes from *Pseudomonas syringae* pv. *tomato*.
B. Staskawicz, University of California, Berkeley: Gene-for-gene interactions specifying disease resistance in plant-bacterial interactions.
J. Dangl, Max-Delbrück-Laboratorium in der MPG, Koln, Germany: *Arabidopsis thaliana* and *Pseudomonas syringae:* Toward a simple pathosystem.
F. Ausubel, Massachusetts General Hospital, Boston: *Pseudomonas* induction of *Arabidopsis thaliana* phenylalanine ammonia lyase and B-1,3-glucanase genes and the use of "deletion cloning" to identify *Pseudomonas* avirulence genes.
M.J. Daniels, John Innes Institute, Norwich, United Kingdom: Specificity in *Xanthomonas-Arabidopsis* interactions.

SESSION 3: Interactions between Fungi and Plants: Potential Gene-for-Gene Interactions

Chairpersons: R.W. Michelmore, University of California, Davis, and **S.P. Briggs,** Pioneer Hi-Bred International, Inc., Johnston, Iowa

B. Tyler, University of California, Davis: Molecular genetics of *Phytophthora megasperma*.

P.J.G.M. de Wit, Wageningen Agricultural University, The Netherlands: Cloning of a gene encoding a race-specific elicitor from the tomato pathogen *Cladosporium fulvum*.

N.J. Talbot, University of East Anglia, Norwich, United Kingdom: Molecular genetic analysis of *Cladosporium fulvum* race specificity.

J. Ellis, CSIRO, Canberra, Australia: Can *Ac* be used to tag rust-resistance genes in flax?

J. Jones, John Innes Institute, Norwich, United Kingdom: Strategies for the isolation of tomato genes for resistance to leaf mold.

R.W. Michelmore, University of California, Davis: Molecular markers in the analysis of lettuce downy mildew.

B. Valent, E.I. du Pont de Nemours & Company, Wilmington, Delaware: Genes for cultivar specificity in the Rice Blast fungus, *Magnaporthe grisea*.

J.E. Hamer, Purdue University, West Lafayette, Indiana: Genome evolution, genetic mapping, and race-specific interactions in Rice Blast disease.

S. Leong, University of Wisconsin, Madison: Toward the cloning of genes controlling cultivar specificity in *Magnaporthe grisea*.

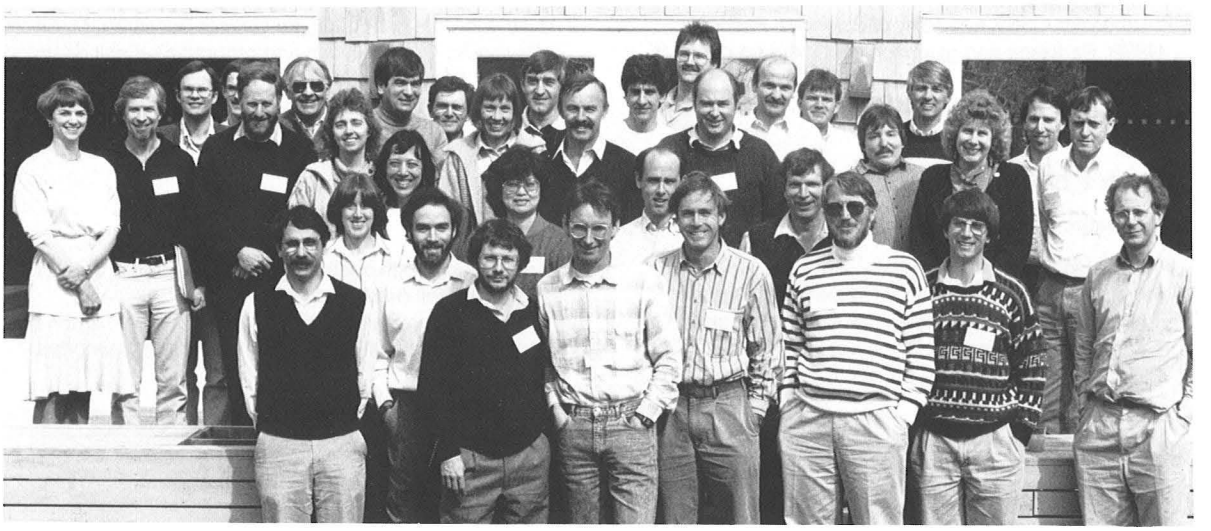
J. Bennetzen, Purdue University, West Lafayette, Indiana: Fine-structure analysis of a maize disease-resistance gene.

T. Pryor, CSIRO, Canberra, Australia: The *Rp1* gene complex specifying rust resistance in maize.

S.P. Briggs, Pioneer Hi-Bred International, Inc., Johnston, Iowa: Transposon-tagging the *Hm1* locus in maize.

S. Briggs, R. Michelmore, A. Ellingboe

B. Staskawicz



SESSION 4: Interactions between Fungi and Plants Involving Toxins

Chairperson: S.P. Briggs, Pioneer Hi-Bred International, Inc., Johnston, Iowa

C.A. Bronson, Iowa State University, Ames: The genetics of T-toxin synthesis in *Cochliobolus heterostrophus*.

O.C. Yoder, Cornell University, Ithaca, New York: Specificity in fungi-plant interactions.

J. Walton, Michigan State University, East Lansing: The biochemistry of HC-toxin synthesis.

V. Macko, Cornell University, Ithaca, New York: Host- selective toxins as molecular determinants of plant disease.

SESSION 5: Signal Transduction in Plants

Chairperson: S.P. Briggs, Pioneer Hi-Bred International, Inc., Johnston, Iowa

M.A. Lawton, Salk Institute for Biological Studies, San Diego, California: Molecular analysis of plant protein kinase genes.

C.J. Lamb, Salk Institute for Biological Studies, San Diego, California: Integration of pathways for developmental and environmental regulation of plant genes.

Programmed Cell Death: Concepts and Mechanisms

April 16–April 19

ARRANGED BY

F.O. Cope, Ross Laboratories, Columbus, Ohio
D. Goldgaber, State University of New York at Stony Brook
L.D. Tomei, Ohio State University, Columbus

Definition and Incidence of Apoptosis: An Historical Perspective
J.F.R. Kerr, University of Queensland, Australia

SESSION 1: Radiobiology and Carcinogenesis

Chairperson: L.D. Tomei, Ohio State University, Columbus

R. Schulte-Hermann, Vienna University, Austria: Role of apoptosis during carcinogenesis by nongenotoxic carcinogens.

T.R. Tritton, University of Vermont, Burlington: Cell death by chemotherapy.

S.R. Umansky, USSR Academy of Sciences, Pushcino, USSR: Radiation and glucocorticoid induced death of lymphoid cells.

A. Columbano, Universita di Cagliari, Italy: Cell proliferation and cell death in multistage chemical hepatocarcinogenesis.

K. Valerie, Virginia Commonwealth University, Richmond: Involvement of chromatin structure on radiation-induced gene expression in human cells.

J. Hully, McArdle Laboratory for Cancer Research, Madison, Wisconsin: Gap junctions and programmed cell death.

F.O. Cope, Ross Laboratories, Columbus, Ohio: Retinoid receptor cell death in carcinogenesis.

SESSION 2: Developmental Biology

Chairperson: R.A. Lockshin, St. John's University, Jamaica, New York

R.A. Lockshin, St. John's University, Jamaica, New York: Proteins synthesized during programmed cell death.

K.E. Alley, Ohio State University, Columbus: Cell death: A developmental strategy for all stages.

A. Alles, University of North Carolina, Chapel Hill: Retinoic-acid-induced cell death: Relationship to regions of programmed cell death in embryos.

J. Yuan, Massachusetts Institute of Technology, Cambridge: Mechanisms of cell death in the nematode *Caenorhabditis elegans.*

SESSION 3: Impact of Programmed Cell Death on Development of Clinical and Applied Concepts

Chairperson: F.O. Cope, Ross Laboratories, Columbus, Ohio

B. Szende, Semmelweis University Medical School, Budapest, Hungary: The role of apoptosis in the regression of experimental mammary and pancreatic tumors treated with luteinizing-hormone-releasing hormone (LHRH) and somatostatin analogs.

J.T. Isaacs, Johns Hopkins Oncology Center, Baltimore, Maryland: Programmed cell death of normal and malignant prostatic cells.

R. Buttyan, Columbia University, New York, New York: The regressing prostate gland as a model to elucidate the molecular pathway leading to programmed cell death.

L.E. Gerschenson, University of Colorado, Denver: Hormones and growth factors regulation of programmed cell death in rabbit uterine epithelium: Whole animal and cell-culture studies.

P.H. Krammer, German Cancer Research Center, Heidelberg: A monoclonal-antibody-induced tumor regression by induction of apoptosis.

SESSION 4: Immunology and Transplantation Biology

Chairperson: R.C. Duke, University of Colorado School of Medicine, Denver

D.J. McConkey, Dana-Farber Cancer Institute, Boston, Massachusetts: Cellular signaling in thymocyte apoptosis.

R.C. Duke, University of Colorado School of Medicine, Denver: Killer T cells possess the key to programmed cell death.

D.R. Green, University of Alberta, Edmonton, Canada: Activation-induced cell death in developing T cells and T-cell hybridomas.

E.A. Copelan, Ohio State University Hospital, Columbus: Selective eradication of malignant lymphoid cells from marrow using deoxycoformycin to initiate programmed cell death.

L. Fesus, University Medical School of Debrecen, Hungary: Transglutaminase-catalyzed cross-linking of proteins in the program of physiological cell death.

Open discussion: Role of programmed cell death in immune function.

Plenary discussion: Formation of an international organizing committee for an *International Conference on Apoptosis in Biology and Experimental Medicine, 1991,* and a committee on terminology.

SESSION 5: Biology of Differentiation and Aging

Chairperson: D. Goldgaber, State University of New York at Stony Brook

J.C. Barrett, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina: Tumor suppressor genes: Role of cellular senescence and differentiation.

D. Goldgaber, State University of New York at Stony Brook: Homeobox genes expression and aging.

Open discussion: How does apoptosis alter the prevailing view of aging?

SESSION 6: Neurobiology

Chairperson: D. Goldgaber, State University of New York at Stony Brook

D.P. Martin, Washington University School of Medicine, St. Louis: Neuronal cell death caused by trophic factor deprivation.

P. Davies, Albert Einstein College of Medicine, New York, New York: Cell death in the developing human brain may share features with Alzheimer's Disease.

P.B. Farel, University of North Carolina, Chapel Hill: Role of the periphery in regulating naturally occurring death among spinal motoneurons.

Open discussion: How has the concept of programmed cell death influenced neuropathology?

Vectors for Cloning the Immune Response

April 23–April 26

ARRANGED BY

R. Lerner, The Research Institute of Scripps Clinic, La Jolla, California

SESSION 1

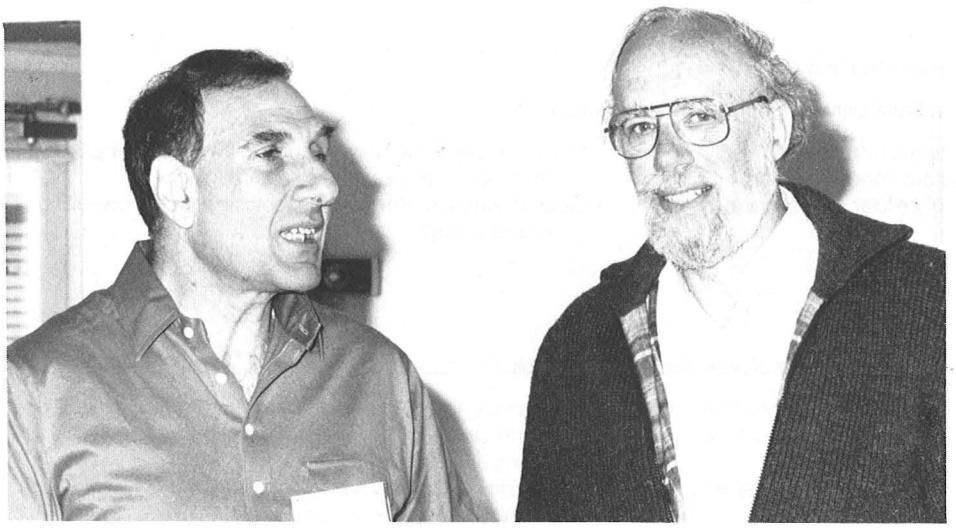
Chairperson: W. Szybalski, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison

N.R. Klinman, Scripps Clinic and Research Foundation, La Jolla, California: The rules that govern V_H diversification.

M.G. Weigert, Fox Chase Cancer Center, Philadelphia, Pennsylvania: Antibody repertoires in autoimmune mice.

N.R. Klinman, Scripps Clinic and Research Foundation, La Jolla, California: Repertoire expression in the memory B-cell lineage.

G. Smith, G.P. Moore, M. Klinman



M. Gefter, M. Scharff

SESSION 2

Chairperson: H. Wigzell, Karolinska Institute, Stockholm, Sweden

J.A. Sorge, Stratagene, La Jolla, California: New technologies for expressing the immune repertoire.

W. Huse and A.S. Kang, The Research Institute of Scripps Clinic, La Jolla, California: Generation of immunoglobulin libraries in phage lambda.

D. Burton, Scripps Clinic and Research Foundation, La Jolla, California: Expression of a human antibody repertoire in *Escherichia coli* using phage lambda.

M. Schulman, University of Toronto, Canada: Homologous recombination between transferred and chromosomal immunoglobulin genes: A low-tech method of genetic engineering.

SESSION 3

Chairperson: H. Wigzell, Karolinska Institute, Stockholm, Sweden

W. Szybalski, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison: Bacteriophage lambda vectors decorated with fusion protein.

A. Pluckthun, University of Munich, Martinsried, Germany: Improving F_V fragments by engineering for selection in *E. coli.*

D. J. Henner, Genentech, Inc., South San Francisco, California: Expression of Fab fragments in *E. coli.*

D. Filpula, Genex Corporation, Gaithersburg, Maryland: Production of anti-fluorescein antigen-binding proteins.

SESSION 4

Chairperson: E.A. Kabat, Columbia University, New York, New York

E. A. Kabat, Columbia University, New York, New York: The repertoire of anti-α (1-6) dextrans.

K. Nickerson, Columbia University, New York, New York: Cloning the antidextran repertoire.

G. Smith, University of Missouri, Columbia: Filamentous fusion phage as vectors for antibody libraries.

F.D. Finkelman, Uniformed Services University of Health Sciences School of Medicine, Bethesda, Maryland: Polyclonal B-lymphocyte activation by anti-IgD antibody and other methods.

V. Chaudhary, National Institutes of Health, Bethesda, Maryland: Cloning of functional antibody variable domains as single-chain immunotoxins.

Sloan Foundation Science Journalists Workshop on Women and Cancer

April 29–May 1

ARRANGED BY

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

C. Prives, Columbia University, New York, New York: Oncogenes and anti-oncogenes.
J. Cairns, Harvard School of Public Health, Boston, Massachusetts: Epidemiology of cancer, 1990.
H.S. Smith, Brush Cancer Research Institute, San Francisco, California: Oncogenes, chromosomal abnormalities, and diagnosis in breast cancer.
A.B. Miller, University of Toronto, Ontario, Canada: Controversial issues in breast cancer screening.
S. Swain, Lombardi Cancer Center, Washington, D.C.: Controversial issues in treatment of breast cancer.
D. Micklos and M. Bloom, DNA Learning Center, Cold Spring Harbor Laboratory: Laboratory experiment: Bacterial transformation using an antibiotic-resistance gene.
S. Naylor, University of Texas Health Science Center, San Antonio: Oncogenes, chromosomal abnormalities, and diagnosis in lung cancer.
V.L. Ernster, University of California School of Medicine, San Francisco: Lung cancer in women: Smoking and cigarette advertising.
P. Howley, National Cancer Institute, Bethesda, Maryland: Viruses and cervical cancer.
D. Spiegel, Stanford University School of Medicine, California: Psychosocial intervention in treatment of cancer.

Neurofibromatosis

October 10–October 12

ARRANGED BY

F.S. Collins, University of Michigan Medical School, Ann Arbor
B.A. Ponder, Cambridge University, United Kingdom
B.R. Seizinger, Harvard Medical School, Boston, Massachusetts

SESSION 1: Introduction to the Clinical and Cell Biological Features of NF1/NF2

Chairperson: B.A. Ponder, Cambridge University, United Kingdom

S. Huson, Oxford University, United Kingdom: Clinical characteristics of NF1 and NF2.
R. Martuza, Harvard Medical School, Boston, Massachusetts: Overview of cell types affected by NF1 and NF2.

SESSION 2: Cloning the NF1 Gene

Chairperson: F.S. Collins, University of Michigan Medical School, Ann Arbor

M.R. Wallace, University of Michigan Medical School, Ann Arbor: Identification and characterization of the NF1 gene.
P. O'Connell, University of Utah Medical Center, Salt Lake City: Identification of the neurofibromatosis type-1 gene: Characterization of a gene within gene complex.

SESSION 3: NF1, GAP, and IRA

Chairperson: D.E. Housman, Massachusetts Institute of Technology, Cambridge

K. Tanaka, University of Chicago, Illinois: Negative regulation of *RAS* activity by a yeast homolog of GAP, *IRA*.
F. McCormick, Cetus Corporation, Emeryville, California: The biochemical properties of the NF1 protein.
R.L. White, Howard Hughes Medical Institute, University of Utah Medical Center, Salt Lake City: Mutation potential of the NF1 gene.

SESSION 4: Recent Progress in Cloning the NF2 Gene

Chairperson: B.R. Seizinger, Harvard Medical School, Boston, Massachusetts

J. Gusella, Massachusetts General Hospital East, Charlestown: Neurofibromatosis 2.
D.R. Cox, University of California, San Francisco: Fine-structure mapping of the NF2 region of human chromosome 22 by using radiation hybrids.
M. Nordenskjold, Karolinska Hospital, Stockholm, Sweden: Deletion mapping of the tentative meningioma locus on chromosome 22.

SESSION 5: Developmental Aspects of Neural Crest and Schwann Cells

Chairperson: D. Pleasure, Children's Hospital, Philadelphia, Pennsylvania

G.S. Ciment, Oregon Health Science University, Portland: The melanocyte/Schwann cell progenitor: Effects of growth factors on commitment.
G. Lemke, The Salk Institute, San Diego, California: Transcriptional regulation of Schwann cell development.
D. Pleasure, Children's Hospital, Philadelphia, Pennsylvania: Effects of protein growth factors on the development of neural-crest-derived cells.
M. Noble, Ludwig Institute, London, United Kingdom: Cellular biological studies on glial division and differentiation.

SESSION 6: Round Table Discussion of NF1/NF2 Tumorigenesis

SESSION 7: Models for the Road Ahead

Chairperson: D.R. Cox, University of California, San Francisco

F.S. Collins, University of Michigan Medical School, Ann Arbor: Cystic fibrosis.
E.P. Hoffman, University of Pittsburgh, Pennsylvania: Life after cloning: Recent advances in the muscular dystrophies.
J.M. Horowitz, Duke University Medical Center, Durham, North Carolina: Function of the retinoblastoma protein.
T. Doetschman, University of Cincinnati, Ohio: Targeted gene modification in the mouse germline.
D.E. Housman, Massachusetts Institute of Technology, Cambridge: Discussion: Where do we go from here?

Biological Basis for Risk Assessment of Dioxins and Related Compounds

October 21–October 24

ARRANGED BY

M.A. Gallo, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey
R.J. Scheuplein, Food and Drug Administration, Washington, D.C.
C.A. van der Heijden, National Institute of Public Health and Environmental Hygiene, Bilthoven, The Netherlands

Introduction and Goals of the Second Conference on Dioxins
J. A. Moore, Institute for Evaluating Health Risks, Irvine, California and **A. Poland,** McArdle Laboratory for Cancer Research, University of Wisconsin, Madison

SESSION 1: Overview of the Adverse Health Effects of PCDDs and PCDFs

Chairperson: J.A. Moore, Institute for Evaluating Health Risks, Irvine, California

Animal Studies

R. Kociba, Dow Chemical Company, Midland, Michigan: Summary and interpretation of chronic rodent bioassays of TCDD.

W. Ray Brown, Research Pathology Services, Inc., New Britan, Pennsylvania: Implications following the reexamination of the slides from the chronic rat bioassay of TCDD.

D. Neubert, Free University of Berlin, Germany: Reproductive toxicity of PCDDs and PCDFs in animal models.

L. Birnbaum, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina: Developmental toxicity of TCDD and related compounds: Species sensitivities and differences.

J.G. Vos, National Institute for Public Health and Environmental Protection, Bilthoven, The Netherlands: Immunotoxicity of dioxin: Immune function and host resistance.

Human Studies

P. Mocarelli, University Hospital, Milan, Italy: Effects of acute and chronic exposure of humans to dioxins: A 9-year follow-up to Seveso.

M.A. Fingerhut, National Institute for Occupational Safety and Health, Cincinnati, Ohio: Studies of health effects from occupational exposures to dioxins.

L.L. Needham, Toxicology Branch, Centers for Disease Control, Atlanta, Georgia: Levels of TCDD in selected human populations.

Panel Discussion: Relevance of the animal studies to humans. Current state of the evidence supporting human toxicity (carcinogenicity, reproductive and developmental effects, and immunotoxicity).

SESSION 2: Sources of Exposure to Dioxins and Tissue Levels in Animals and Humans

Chairperson: C. Rappe, University of Umeå, Sweden

Environmental Sources of Exposure

C. Rappe, University of Umeå, Sweden: Primary sources of PCDDs and PCDFs and human exposure via air and water.

H. Beck, Max von Pettenkofer Institute, Berlin, Germany: PCDD/PCDF levels in human milk and the problem of breastfeeding.

P. Furst, Federal State Control Laboratory for Food and Environmental Chemistry of North Rhine Westphalia, Munich, Federal Republic of Germany: Body burden with PCDD and PCDF from food.

P.M. Cook, U.S. Environmental Protection Agency, Duluth, Minnesota: Bioaccumulation and toxicity of PCDDs, PCDFs, and PCBs in aquatic ecosystems.

A. Schecter, State University of New York, Binghamton, New York: Levels of PCDDs and related compounds in ancient and modern human tissues: Exposed and general populations.

Human Body Burden and Distribution in Tissue

C. Schlatter, Institute for Toxicology Technical High School and University, Zurich, Switzerland: Pharmacokinetics of PCDDs in humans.

V. Houk, Centers for Disease Control, Atlanta, Georgia: Health effects of service in Viet Nam.

R.M.C. Theelen, National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands: Modeling of human exposure from relevant sources of exposure.

M.E. Andersen, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina: Biological determinants of the disposition of TCDD and related compounds.

SESSION 3: Mechanism of Action

Chairperson: A. Poland, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison

Receptor Biochemistry

J.-A. Gustafsson, Huddinge University Hospital, Sweden: Molecular biology and physiology of TCDD receptor–DNA interactions.

T.A. Gasiewicz, University of Rochester School of Medicine, New York: Different forms of the Ah receptor.

M.S. Denison, Michigan State University, East Lansing: Species variation in Ah receptor transformation and DNA binding.

Regulation of Gene Expression

J.P. Whitlock, Jr., Stanford University School of Medicine, California: Genetic and molecular aspects of TCDD action.

S.H. Safe, College of Veterinary Medicine, Texas A&M University, College Station: Regulation of growth factor and hormone receptors.

W.F. Greenlee, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina: Isolation of novel dioxin-responsive genes: Implications for toxicity/carcinogenicity.

G. Lucier, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina: Tumor promotion in liver.

S. Flodstrom, Karolinska Institute, Stockholm, Sweden: Tumor-promoting activity of TCDD and related compounds.

SESSION 4: Implications of Receptor-mediated Toxicity to Carcinogenic Risk Assessment

Chairperson: M.A. Gallo, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

A. Poland, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison: TCDD and related aromatic hydrocarbons: Reexamination of the mechanism of toxicity and carcinogenesis.

S.H. Safe, L.S. Birnbaum, T.A. Gasiewicz: Short reports from the NIEHS Conference on Dioxin Risk Assessment.
(1) Survey of thresholdable dose response curves involving Ah-receptor-mediated responses.
(2) Survey of three papers on nuclear receptor response.
(3) Discussion of animal versus human sensitivity.
(4) Discussion of animal and human blood levels versus response.

M.A. Gallo, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey: Can a threshold be credibly associated with the Ah receptor mechanism.

E. Silbergeld, University of Maryland Program in Toxicology, Baltimore: Receptor-based models for risk assessment: Application to TCDD.

Panel Discussion: Integration of mechanistic/dosimetry data into human risk assessment.

The Impact of Human Molecular Genetics on Society

November 5–November 8

ARRANGED BY

C.T. Caskey, Baylor College of Medicine, Houston, Texas
P. Reilly, Shriver Center for Mental Retardation, Waltham, Massachusetts
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

SESSION 1: Genetics and Society: Past, Present, and Future

Chairperson: C.T. Caskey, Baylor College of Medicine, Houston, Texas

P. Reilly, Shriver Center for Mental Retardation, Waltham, Massachusetts: Lessons from past experiences of society's involvement with genetics.

C.T. Caskey, Baylor College of Medicine, Houston, Texas: Current studies of molecular diagnosis.

D. Botstein, Stanford University, California: Present and future prospects for genetic testing of predisposition to polygenic disease.

M.W. Shaw, Evansville, Indiana: The human genome: Private property or public domain?

Case study and discussion: Newborn and prenatal screening.

SESSION 2: Issues in Genetic Screening

Chairperson: J. Beckwith, Harvard Medical School, Boston, Massachusetts

F. Greenberg, Baylor College of Medicine, Houston, Texas: Humanitarian issues raised by prenatal and neonatal screening and diagnosis.

M. Angastiniotis, Archbishop Makarios Memorial Hospital, Nicosia, Cyprus: Social or community responses to a national control program for Thalassemia.

A. Chakravarti, University of Pittsburgh, Pennsylvania: Strategies for screening large populations: CF as a model.

N. Fost, University of Wisconsin Hospital, Madison: Ethical issues in newborn and carrier screening for CF.

Case study and discussion: Carrier testing and screening.

SESSION 3: Genetic Testing: Health Care and Insurance

Chairpersons: J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York, and **L.M. Russell,** Committee on Energy and Commerce, Washington, D.C.

T.H. Murray, Case Western Reserve University School of Medicine, Cleveland, Ohio: Genetic testing in insurance: Ethical issues.

J.M. Stein, The Prudential, Newark, New Jersey: Factors determining the implementation of genetic testing for insurance purposes.

M.A. Rothstein, University of Houston, Texas: Genetic screening in the workplace.

P. Harper, University of Wales College of Medicine, Cardiff, United Kingdom: Huntington's disease: A model for ethical problems in testing children for late onset genetic disorders.

R.E. Pyeritz, The Johns Hopkins Hospital, Baltimore, Maryland: Health-care and insurance problems of families with genetic disease.

J. Levi, Washington, D.C.: Early experience of HIV testing as a model.

R. Bachman, Kaiser-Permante Medical Center, Oakland, California: High-tech health care: Hard choices in an HMO.

Case study and discussion: Disclosure of genetic risk.

SESSION 4: Data Banks and DNA Banking

Chairperson: A. Chakravarti, University of Pittsburgh, Pennsylvania

G.J. Annas, Boston University Schools of Medicine & Public Health, Massachusetts: Legal issues in DNA banking.

G.F. Vovis, Collaborative Research, Inc., Bedford, Massachusetts: Commercial DNA banking.

P.R. Billings, Pacific Presbyterian Medical Center, San Francisco, California: Privacy issues and the human genome projects.

T. Marr, Cold Spring Harbor Laboratory, New York, and P. Reilly, Shriver Center for Mental Retardation, Waltham, Massachusetts: Data banks, DNA banking, and forensic science.

Case study and discussion: DNA forensic/genetic data banks.

Molecular Biology of Free-radical Scavenging Systems

November 11–November 14

ARRANGED BY

I. Fridovich, Duke University Medical Center, Durham, North Carolina
J.G. Scandalios, North Carolina State University, Raleigh

Introductory Remarks
J.G. Scandalios, North Carolina State University, Raleigh

SESSION 1: Prokaryotic Gene Regulation

Chairperson: K. Asada, Kyoto University, Japan

D. Touati, University of Paris, France: A double lock, implying two global regulatory systems, *fur* (ferric uptake regulation) and *arc* (aerobic respiration control) shut off anaerobic expression of MnSOD in *Escherichia coli* K12.

J.A. Fee, Los Alamos National Laboratory, New Mexico: Role of the iron uptake locus (*fur*) in the regulation of bacterial *Sod* genes.

H.M. Hassan, North Carolina State University, Raleigh: Regulation of MnSOD in *Escherichia coli:* Role of DNA topology.

P.C. Loewen, University of Manitoba, Winnipeg, Canada: Regulation of *katE* and *katF* transcription in *Escherichia coli.*

C. Foyer, National Institute of Agronomic Research, Versailles, France: Effects of variations of the activity of glutathione reductase on cellular glutathione contents and metabolism in *Escherichia coli* and tobacco.

SESSION 2: Eukaryotic Gene Regulation

Chairperson: I. Fridovich, Duke University Medical Center, Durham, North Carolina

J.G. Scandalios, North Carolina State University, Raleigh: The antioxidant defense genes *Cat* and *Sod* of maize: Structure and regulation.

T. Asahi, Nagoya University, Japan: Catalase genes in the castor bean: Structure and regulation.

J. P. Phillips, University of Guelph, Ontario, Canada: Genetic analysis of free-radical scavenging systems in *Drosophila.*

H. Ruis, University of Vienna, Austria: Differential control of synthesis of peroxisomal and a cytosolic catalase of *Saccharomyces cerevisiae* suggests different functions.

R.W. Skadsen, University of Wisconsin, Madison: Molecular mechanisms regulating *Cat2* gene expression in the acutellum of maize seedlings.

A.P. Autor, University of British Columbia, Vancouver, Canada: Regulation of MnSOD in eukaryotes.

SESSION 3: Biomedical Approaches

Chairperson: S. Linn, University of California, Berkeley

L.W. Oberley, University of Iowa, Iowa City: Role of antioxidant enzymes in cancer.

G.H.W. Wong, Genentech, Inc., South San Francisco, California: Relative protective effects of MnSOD, Cu/Zn SOD, Ec-SOD against various cellular insults.

P.A. Cerutti, Swiss Institute for Experimental Cancer Research, Lausanne, Switzerland: Genetic modulation of antioxidant enzymes in mammalian cells.

J.V. Bannister, Cranfield Institute of Technology, Bedfordshire, United Kingdom: Biomedical aspects of the application of recombinant SOD.

K. Matsushima, Frederick Cancer Research Facility, Maryland: MnSOD modulates the sensitivity of tumor cells to cytokine, radiation, and chemotherapy.

SESSION 4: Targets and Targeting

Chairperson: J.G. Scandalios, North Carolina State University, Raleigh

I. Fridovich, Duke University Medical Center, Durham, North Carolina: Enzymatic targets for the superoxide radical.

P.B. Lazarow, Mount Sinai School of Medicine, New York: Peroxisome biogenesis.

S. Linn, University of California, Berkeley: Mechanisms of damage to DNA by hydrogen peroxide.

B. Halliwell, Kings College, London, United Kingdom: Fingerprints of oxidative damage to DNA.

M. Nishimura, National Institute for Basic Biology, Okazaki, Japan: Biosynthesis, transport, and degradation of plant microbody enzymes.

R.S. Sohal, Southern Methodist University, Dallas, Texas: Relationship between generation of prooxidants and the aging process.

SESSION 5: Structure, Function, and Evolution

Chairperson: H. Hassan, North Carolina State University, Raleigh

K. Asada, Kyoto University, Japan: Molecular mechanisms of production and scavenging of active oxygen in chloroplasts.

E.A. Havir, Connecticut Agricultural Experimental Station, New Haven: Characterization of catalase isozymes with enhanced peroxidatic activity in plants.

W. Stallings, The Monsanto Company, St. Louis, Missouri: Fe and Mn SODs: Catalytic inferences from crystal structures.

R.E. Cannon, North Carolina State University, Raleigh: Structure and expression of the maize Cu/Zn *Sod4* and *Sod4A* cytosolic isozyme genes.

J. Kwiatowski, University of California, Irvine: Structure and evolution of the Cu/Zn SOD in Diptera.

Computational Aspects of Protein Folding

December 3–December 6

ARRANGED BY

R.L. Jernigan, National Cancer Institute, Bethesda, Maryland
H.A. Scheraga, Cornell University, Ithaca, New York

SESSION 1: Potentials, Free Energies, and Methods

Chairperson: D.L. Beveridge, Wesleyan University, Middletown, Connecticut

B. Honig, Columbia University, New York, New York: An evaluation of energetic contributions to protein stability.

A.A. Rashin, Biosym Technologies Inc., Parsippany, New Jersey: Electrostatics and the energetics of hydration in proteins.

G.M. Crippen, University of Michigan, Ann Arbor: Protein folding is a combinatorial contest between geometry and energy.

P.A. Kollman, University of California, San Francisco: Free-energy calculations on macromolecules.

K.D. Gibson, Cornell University, Ithaca, New York: Recent approaches to the multiple minimum problem in protein folding.

H.A. Scheraga, Cornell University, Ithaca, New York: Multiple-minima problem.

SESSION 2: Molecular Dynamics Simulations

Chairperson: P.A. Kollman, University of California, San Francisco

M. Karplus, Harvard University, Cambridge, Massachusetts: Aspects of protein folding/stability.

W.L. Jorgensen, Yale University, New Haven, Connecticut: Molecular dynamics simulations of peptide and protein unfolding.

J. Hermans, University of North Carolina at Chapel Hill: Molecular dynamics studies of peptide conformational equilibria.

D.L. Beveridge, Wesleyan University, Middletown, Connecticut: Aspects of protein-folding accessible to molecular dynamics simulation.

N. Go, Kyoto University, Japan: Description of protein dynamics in terms of normal mode variables and its application in the refinement of protein X-ray crystallography.

A. Brunger, Howard Hughes Medical Institute, Yale University, New Haven, Connecticut: Simulation of helix-helix interactions: Applications to "leucine zippers."

SESSION 3: Models of Folding

Chairperson: H.A. Scheraga, Cornell University, Ithaca, New York

F.M. Richards, Yale University, New Haven, Connecticut: On packing and cavities.

K.A. Dill, University of California, San Francisco: On the origins of structure in globular proteins.

F.E. Cohen, University of California, San Francisco: The utility of simplified models in understanding protein structure.

R.L. Jernigan, National Cancer Institute, Bethesda, Maryland: Characteristics of compact conformations.

J. Skolnick, Scripps Clinic and Research Foundation, La Jolla, California: Computer simulations of the folding of plastocyanin.

J. Moult, Center for Advanced Research in Biotechnology, Rockville, Maryland: Analysis of protein-folding pathways.

B. Robson, Proteus Molecular Design Limited, Cheshire, United Kingdom: Folding proteins by the creation of new conservation laws.

SESSION 4: Crystal Gazing and New Approaches

Chairperson: R.L. Jernigan, National Cancer Institute, Bethesda, Maryland

G.D. Fasman, Brandeis University, Waltham, Massachusetts: Prediction of protein conformation: Why have prediction methods failed to give the correct structure?

S. Rackovsky, University of Rochester, New York: Quantitative classification of protein structures.

C.H. Chothia, M.R.C. Laboratory of Molecular Biology, Cambridge, United Kingdom: Sequence determinants of protein folds.

J.J. Wendoloski, E.I. du Pont de Nemours & Company, Wilmington, Delaware: Rebuilding proteins from limited structural data.

S.J. Wodak, Free University of Brussels, Belgium: Knowledge-based structure predictions: What are the limitations?

S.H. Kim, University of California, Berkeley: Prediction of structural features by neural network.

SESSION 5: Model Building and Design

Chairperson: C.H. Chothia, M.R.C. Laboratory of Molecular Biology, Cambridge, United Kingdom

V.S. Madison, Hoffmann-La Roche, Inc., Nutley, New Jersey: A beta-barrel model for ECGF.

O. Teleman, Lund University, Sweden: Peptide folding: An attempt at a peptide catalyst, and the amino-terminal EGF-homologous peptide from blood coagulation factor X.

M.R. Pincus, State University of New York Health Science Center, Syracuse: The chain build-up procedure in protein folding: Peptide determinants of protein structure.

G. Némethy, Mount Sinai School of Medicine, New York, New York: Interactions of local structures in protein folding.

F.R. Salemme, E.I. du Pont de Nemours & Company, Wilmington, Delaware: Statistical approaches to protein reconstruction using substructure libraries.

H.R. Guy, National Cancer Institute, Bethesda, Maryland: Modeling the structure of membrane channel proteins.

C. Sander, EMBL, Heidelberg, Germany: Protein design: Theory and experiment.

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Pharmacia	Electrophoresis of Large DNA Molecules	1990	4,000*
Risk Science Institute	Molecular Mechanisms of Fiber Cytotoxicity and Carcinogenesis	1990	3,000*
Ross Laboratories	Programmed Cell Death—Concepts and Mechanisms	1990	2,500*
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William Stamps Farish Fund	Meeting on Complex Genetic Diseases	1991–1993	150,000*

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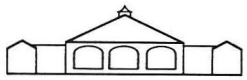

Banbury Reports

Banbury Report 35: Biological Basis for Risk Assessment of Dioxin and Related Compounds

Current Communications in Cell & Molecular Biology

Electrophoresis of Large DNA Molecules: Theory and Applications
Cellular and Molecular Aspects of Fiber Carcinogenesis
Apoptosis: The Molecular Basis of Cell Death
Animal Applications of Research in Mammalian Development
Molecular Biology of Free Radical Scavenging Systems
Computational Aspects of Protein Folding

Other Titles

Genetics and Molecular Biology of Complex Diseases