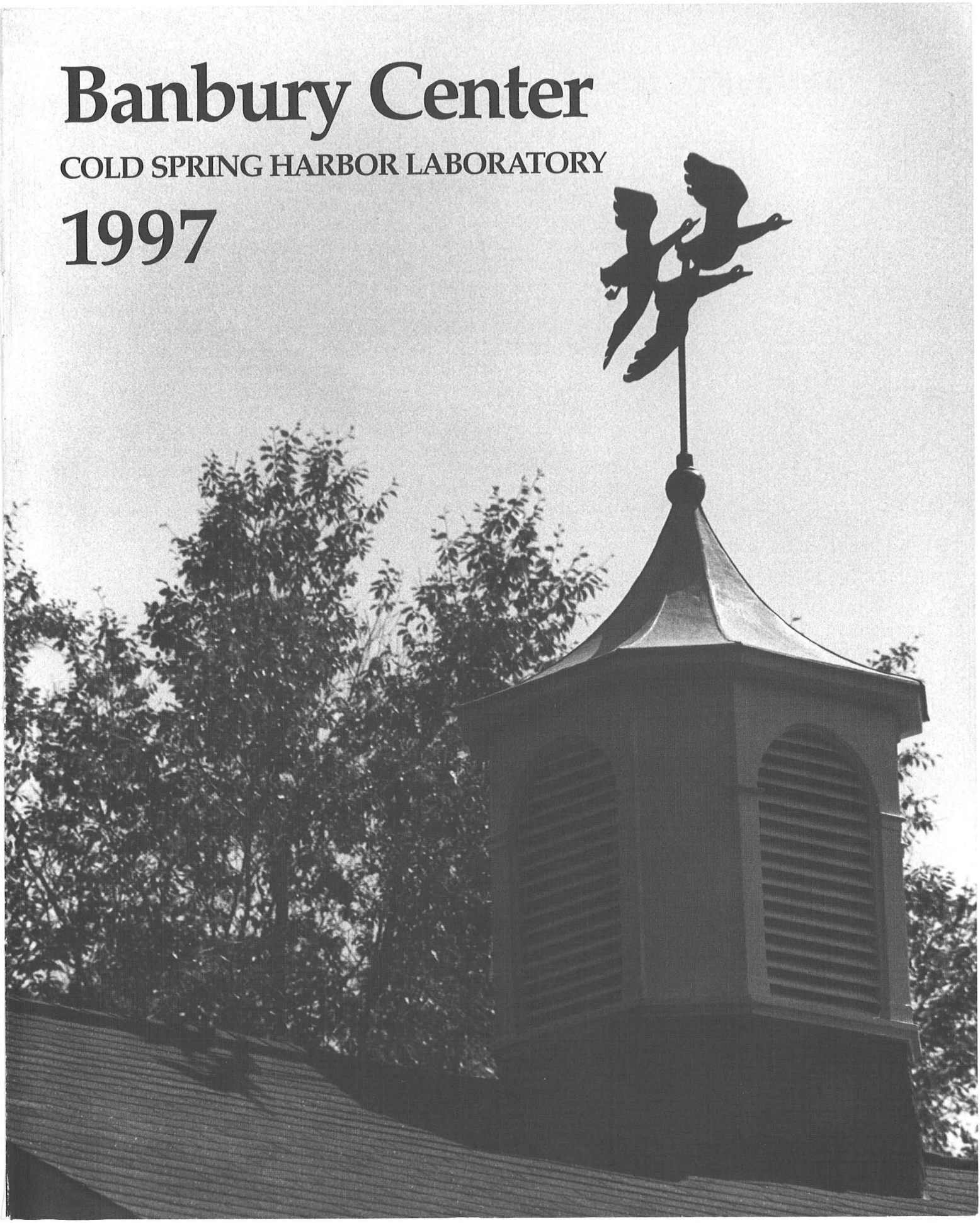
Banbury Center

COLD SPRING HARBOR LABORATORY

1997



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 international reputation for research and education, the magnificent Banbury grounds and buildings are an ideal site for a complementary program of smaller conferences concentrating on aspects of the biological sciences which also bear significant social implications. Banbury's primary concerns are in the areas of molecular biology and genetics, especially as they relate to health, social, and policy issues.

What was once the estate's original seven-car garage is now administrative offices, a small library, and—at its center—a conference room of an ideal shape and size for workshop-style discussion meetings. Complete with extensive, unobtrusive sound and projection facilities as well as wall-to-wall blackboard space, the room can accommodate as many as 40 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.

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BANBURY CENTER DIRECTOR'S REPORT

Banbury Center had a very busy 1997, with no fewer than 18 meetings in the course of the year. In addition, the Center was used on a further 18 occasions for Laboratory meetings and by local nonprofit organizations. The meetings program was as eclectic as usual, covering fundamental research and topics of special interest in biotechnology as well as scientific education.

Participants

More than 570 participants came to the scientific meetings. The majority were of course drawn from institutions in the United States, but the fact that 15% came from other countires underscores the international character of biomedical research and the high esteem in which Banbury Center meetings are held. Most foreign visitors came from the United Kingdom (29), followed by France (15) and Germany (9). The majority of participants from the United States came from the Northeast, with New York, Massachusetts, and Maryland accounting for 26% of our visitors. The second largest grouping came from California (12%). The Corporate Sponsors sent 42 scientists, and 45 of the invited participants came from other companies.

Meetings on Genetics

Banbury Center has had a long-standing interest in genetics, originally dealing with the mutagenic effects of environmental hazards. But, more recently, a sizable proportion of the Banbury Center year has been devoted to human genetics, reflecting, in part, the success of the Human Genome Project. Meeting topics have dealt with technical matters such as cloning genes or have been devoted to specific disorders. We had examples of both meetings in 1997.

Duchenne muscular dystrophy (DMD) has the distinction of being one of the first genetic disorders on which recombinant DNA techniques made a significant impact. The DMD gene was cloned in 1986, and DNA-based diagnosis has played an important part in the lives of many thousands of afflicted families. Unfortunately, progress has been slow in developing treatments based on this molecular knowledge. The *Up-regulation of Utrophin Gene Expression* meeting examined a new approach based on the finding that there is a fetal form of the protein defective in DMD. This fetal gene is largely turned off in adults, but it may be possible to make it active again. Experiments in mice have shown that this protein can replace defective dystrophin, and the hope and expectation are that utrophin will be able to do the same in young males with DMD. We brought human geneticists working on this approach together with scientists interested in expression of muscle proteins and researchers who have been using this strategy successfully in treating thalassemias.

We held also the third in a series of meetings on neurofibromatosis (NF). Banbury Center has played a part in the NF story since the first meeting was held in 1990—an opportune moment for the gene was cloned later that same year. Our 1997 meeting, *The Pathogenesis of NF1 and NF2: Therapeutic Strategies*, had the goal of examining the special clinical features of NF1 and NF2 in the light of what is known of molecular changes in the genes. For example, cognitive dysfunction is a common feature of these disorders but its basis is poorly understood. Here at Cold Spring Harbor Laboratory, the groups of Alcino Silva and Yi Zhong are making important contributions using NF1 mutant mice. In addition, there was much discussion of how knowledge of the biochemical pathways involved in NF1 and NF2 might be exploited in devising therapies.

One of the attractions of doing scientific research is when unexpected connections are made

Robertson house provides housing accommodations at Banbury Center.

in what had appeared to be unrelated fields. Such a connection had been made in research on Parkinson's Disease in the summer of 1997 when it was found that Parkinson's Disease in one family was associated with a mutation in the gene for a protein called synuclein. This same protein is known to be involved in birds learning and remembering their songs! So here is a highly suggestive link between a protein and memory in two very different organisms, and our meeting, *Genetics of Parkinson's Disease,* held in the fall, examined this new development. Although it appears that this mutation is rare, it is hoped that the synuclein connection will provide clues as to what goes wrong in this devastating disorder.

Research in Cancer

There were three meetings on cancer-related topics. The first of the year was *The Biology of p53 and Its Implications for Diagnosis and Therapy.* p53 was originally thought to be a gene involved in making cancers, but further research showed that it suppresses cancer by being a key player in controlling cell division. This workshop first reviewed what is currently known of the biology of p53—how it exerts its effects in the cell and its interactions with other proteins. The workshop then turned to the practical applications of our knowledge of p53, in particular the fact that different mutations in p53 may lead to tumors with different properties. Thus, determining the type of p53 mutation in a patient's tumor may have important implications for both diagnosis and treatment.

The Biology of BRCA1 meeting had a similar purpose. The clonings of the *BRCA1* gene in 1996 and of *BRCA2* in 1997 were significant advances in research on breast cancer. However, as in so many cases where disease genes have been cloned, the next steps have been problematic. The meeting reviewed the spectrum of mutations so far found in the *BRCA1* and *BRCA2* genes, as well as the mutations found in other tumor suppressor genes in breast cancer. The participants then turned to the vexing question of the biological functions of the BRCA1 protein,

an area of considerable controversy, but an understanding of which is essential for a rational approach to devising therapies.

For many years, it has been hoped that an immunological attack on cancer would be possible. Cancer cells are different from the cells of the body and have different molecules on their surface, molecules that the immune system might be expected to use to identify cancer cells to be destroyed. Perhaps because overoptimistic hopes were not fulfilled, research on tumor immunology has not been among the leading areas of cancer research. Nevertheless, very good research continues in this area—research that deserves to be encouraged. The Alexander and Margaret Stewart Trust has as its goal the development of less toxic therapies than those in current use, and immunological therapies could provide these. The meeting *Immunological Attacks on Cancer* brought together scientists working on a very broad range of topics; many of these researchers had not met before for any extended period of time.

Genomics

Three meetings dealt with genetic studies at the level of complete genomes. The first—*Finding Genes: Computational Analysis of DNA Sequences*—discussed highly technical issues relating to what is becoming a critical problem. DNA sequence is being produced at an ever-increasing rate, and computer analysis of the sequence is essential for trying to identify genes in the hundreds of millions of bases. However, there is still considerable discussion as to which of the present methods are best and what new developments are needed to improve the accuracy and efficiency of the strategies and computer algorithms.

But all the computer-based gene detection in the world will count for very little unless experimental biologists make use of the information for understanding how organisms function. This is the so-called "post-genomics" world where genomics data will be used to design experiments.

An important intermediate step is to make use of all the biochemical, physiological, and cell biology research that has been performed throughout this century. An amazing wealth of data exists that must be assembled into a more coherent whole, using genetics as a framework. The first steps are already being taken using the detailed knowledge of, for example, metabolic pathways in bacteria. These are not trivial tasks and *Integrating Genetic, Biochemical, and Other Data in the Post-Genomics Era* examined the problems involved. Not least of these is devising rational and consistent classifications of current knowledge. This is complicated further by the very different forms data take in different fields.

One discipline that is likely to benefit is physiology, where the knowledge of genes and their interactions should provide new insights into physiological processes. The American Physiological Society funded a meeting at Banbury Center called *Genomics to Physiology and Beyond: How Do We Get There?* Participants included geneticists who are producing genomic data, scientists already using such data to examine interesting biological processes, and physiologists who will be using genome data increasingly in planning their research.

Cell and Developmental Biology

Cells synthesize many tens of thousands of molecules, but for many of these—in particular, proteins—synthesis is not the end of the story. There follows a series of changes in which various groups, for example, sugars in glycosylation, are added to the proteins. These modifications are essential for proper functioning of the proteins and pose problems for companies making human proteins in bacteria that cannot make the necessary modifications. The *Posttranslational Modifications* meeting was not restricted to proteins but examined a wide variety of changes that cellular molecules undergo following synthesis.

A key element in the life of a cell is its interactions with its environment: the detection of mole-

cules in that environment, the conveyance of that information to the interior of the cell, and finally the development of an appropriate response. Signal transduction is of special interest to those looking for therapeutic molecules to modify cell behavior. *Signal Transduction in Endothelial Cells* examined the molecules, their receptors, and the pathways that are activated in this important group of cells. A final discussion reviewed various models and mechanisms by which endothelial cells integrate the many positive and negative signals that they receive.

Neuregulins and Neuregulin Receptors examined a particularly important group of molecules involved in signal transduction. This family of proteins is large and their receptors are diverse, and thus they are involved in many systems and not just, as their name implies, in neurons. They have a role, for example, in signaling at synapses and the neuromuscular junction, in interactions with glial cells, and in signaling in sensory systems.

Development was the theme of what was, perhaps, the most "basic" and intriguing of the year's meetings. Animals are generally symmetrical during their early development and then develop asymmetries, that is to say, handedness becomes apparent. *Handedness and Symmetry in Development* brought to Banbury Center scientists whose expertise went from studies of molecular asymmetry, through embryology, to social studies of handedness in human beings. There was extensive and speculative discussion of the genetics, mechanisms, and evolutionary implications of this symmetry breaking during development.

Plant Molecular Biology

Banbury Center's plant meeting for 1997 dealt with *Molecular and Genetic Approaches to Transport in Plants*, a topic of considerable economic and social importance. The geographical distribution of plants is limited not only by climate, but also by the nature of the soil. The presence of metals such as aluminum and heavy metals and the nitrogen and phosphate content of the soil restrict the areas in which plants can be grown. Recombinant DNA techniques have led to the isolation of genes for the transporters that take up these elements and compounds. The practical consequences of these studies are of great potential significance for increasing the range of habitats in which a crop plant can be grown. We have been trying to promote plant molecular biology and genetics meetings, and the enthusiasm of both the participants and the members of the Laboratory's Plant Corporate Associates Program for this meeting was very gratifying.

Lyme Disease

Lyme Disease is of special interest in our region and Banbury Center has held a series of meetings on the topic since 1991. Research on Lyme Disease has changed dramatically since that meeting, becoming increasingly molecular in its basis. This was reflected in the 1997 meeting, entitled *Molecular Immunobiology of Lyme Disease*, which covered the latest findings on topics such as antigen expression, immune response, the importance of mixed infections, and progress in developing a vaccine. We can expect the nature of Lyme Disease research to change even more dramatically in the coming years, now that the complete genome sequence of the spirochaete has been determined. I expect Banbury Center to continue its role of promoting this research through further workshops.

Neuroscience

Banbury Center continues to hold meetings in the field of neuroscience, especially in topics related to learning and memory, research areas of special interest to the Laboratory. The John A. Hartford Foundation is interested in problems of learning and memory in human aging and has made a substantial grant to the Laboratory for exploring how our research on learning and memory in *Drosophila* and mice relates to human beings. Banbury Center held a discussion workshop on *Human Cognition and How It Fails* as part of this program. The subjects covered were

extremely diverse, ranging from the development of learning and memory in infants through hippocampal functioning and Alzheimer's Disease to models of memory formation.

Science Education for Nonscientists

We were very pleased to join with the Federal Judicial Center in holding the second seminar on *The Art of Judging: Perspectives of Science.* Some 30 Federal and State judges came to Banbury Center to hear presentations on a wide variety of topics, ranging from the history of biology through human genetics to viruses and plagues. A highlight of the meeting was a talk by Leon Lederman, Nobel Laureate for Physics, on the very first moments after the Big Bang.

The J.P. Morgan/Cold Spring Harbor Laboratory Executives' Seminar

This was the 12th in this unique series of weekend seminars, intended to introduce areas of novel biological research to the senior executives of pharmaceutical and biotechnology companies and financial institutions. Each seminar has seven scientists as speakers, chosen both for the excellence of their research and for their ability to communicate with others. This year's seminar was on *Genetic Engineering*—a particularly appropriate subject, it being 25 years since Stan Cohen and Herb Boyer published their classic paper on cloning. We were very fortunate to have Stan Cohen as the opening speaker. In addition, we moved to the latest form of cloning, when Alan Colman of PPL Therapeutics told us about Dolly the Sheep. And in-between we fitted genetic engineering of molecules, plants, and human beings.

Other Meetings

The Banbury Center is a facility of Cold Spring Harbor Laboratory and is used by scientists for small discussion meetings on the Laboratory's research. For example, the DNA Tumor Virus group used the Center for the annual review of their research. We also make the Center available on a necessarily limited number of occasions for local nonprofit groups, including the Lloyd Harbor Village Conservation Board and Cold Spring Harbor High School, and for Board meetings of Holiday House and Huntington Hospital. The Lloyd Harbor Village Seminar series continued successfully.

Funding

With each passing year, Banbury Center's debt to the Corporate Sponsors continues to grow. The Program supports one third of Banbury Center meetings and provides us with the opportunity to have meetings that are both important for their relevance to biotechnology and pharmaceutical research and at the forefront of "basic" research. This year, the Corporate Sponsor Program funded the following meetings: *Signal Transduction in Endothelial Cells; Finding Genes: Computational Analysis of DNA Sequences; Integrating Genetic, Biochemical, and Other Data in the Post-Genomics Era; Neuregulins and Neuregulin Receptors; Handedness and Symmetry in Development; and Molecular and Genetic Approaches to Transport in Plants.*

Funding from other companies is playing an increasing role in our activities. This year, for example, Applied Microbiology, Inc. supported *Posttranslational Modifications*; OncorMed, Inc. funded *The Biology of p53 and Its Implications for Diagnosis and Therapy*; and J.P. Morgan again provided us with the means to do the Executives' Seminar *Genetic Engineering.*

We are particularly pleased that Foundations continue to find that Banbury Center meetings make important contributions to their efforts. In 1997, four Foundations came here: the Oxnard Foundation (*Up-regulation of Utrophin Gene Expression*); The Alexander and Margaret Stewart Trust (*Immunological Attacks on Cancer*); The John A. Hartford Foundation (*Human Cognition and How It Fails*); and the National Neurofibromatosis Foundation (*The Pathogenesis of NF1 and NF2: Therapeutic Strategies*). The American Physiological Society was the primary supporter of

the *Genomics to Physiology and Beyond: How Do We Get There?*, and a contribution was made to the meeting by the Burroughs-Wellcome Fund.

Federal funding is important, although the long lead times needed to make grant applications conflict with Banbury Center's goal of holding meetings on current and controversial research. Nevertheless, the National Cancer Institute was very helpful in contributing to both *The Biology of* BRCA1 and *Integrating Genetic, Biochemical, and Other Data in the Post-Genomics Era,* while the National Human Genome Research Institute and the National Institute for Neurological Disorders and Stroke funded the meeting on the *Genetics of Parkinson's Disease.* Two Institutes—the Centers for Disease Control and Prevention and the Federal Drug Administration—were the primary funding agencies for *Molecular Immunobiology of Lyme Disease.* Federal funding, through the Federal Judicial Center, covered the costs of *The Art of Judging: Perspectives of Science.*

Companies were also generous in providing supplemental funding, all of which contributed significantly to the Center's program. These companies included Cambridge Neuroscience, Inc. (*Neuregulins and Neuregulin Receptors*); CIBA-GEIGY, Ltd. (*Genomics to Physiology and Beyond: How Do We Get There?*); Amgen, Inc. (*The Biology of BRCA1*); and Fort Dodge Animal Health; Glaxo-Wellcome, Inc. and Pasteur Merieux Connaught (*Molecular Immunobiology of Lyme Disease*).

Acknowledgments

That Banbury Center is able to hold 18 meetings in a single year is a great tribute to the Center's staff—Bea Toliver and Ellie Sidorenko—and Katya Davey at Robertson House. Chris McEvoy and Andy Sauer continue to make the Center a beautiful place for our participants. Our schedule also places a burden on Housekeeping and Facilities, especially when we have meetings back-to-back with those in the main Cold Spring Harbor Laboratory meetings program. I thank all these people and the scientists at the Laboratory who continue to support our activities.

Jan Witkowski

Banbury Conference Center

MEETINGS

Up-regulation of Utrophin Gene Expression

February 7–9

FUNDED BY
Oxnard Foundation

ARRANGED BY
K.E. Davies, University of Oxford, United Kingdom
D. Weatherall, University of Oxford, United Kingdom

SESSION 1: DMD and Utrophin
Chairperson: K.E. Davies, University of Oxford, United Kingdom

K.E. Davies, University of Oxford, United Kingdom: Background.
M. Grady, Washington University School of Medicine, St. Louis, Missouri: Double knockouts.
J.M. Tinsley, University of Oxford, United Kingdom: Transgenic utrophin *mdx* mice.
Discussion: Implications of this research.

SESSION 2: Defining Promoters in Muscle Genes
Chairperson: P.W.J. Rigby, National Institute for Medical Research, London, United Kingdom

B. Jasmin, University of Ottawa, Ontario, Canada: The utrophin promoter.
S.D. Hauschka, University of Washington, Seattle: Muscle genes.
P.W.J. Rigby, National Institute for Medical Research, London, United Kingdom: Muscle genes.
Discussion: What do we know about the properties of muscle promoters?

SESSION 3: Up-regulation Therapy
Chairperson: D. Weatherall, University of Oxford, United Kingdom

V.L. Funanage, Alfred I. DuPont Institute, Wilmington, Delaware: Up-regulation of utrophin: Effects of hemin.
D. Weatherall, University of Oxford, United Kingdom: The hemoglobinopathies: Background.
G.D. Ginder, University of Minnesota Medical School, Minneapolis: Embryonic globin gene activation in adult erythroid cells.
D. Weatherall, University of Oxford, United Kingdom: Clinical trials update.
Discussion: What can up-regulation of the hemoglobinopathies tell us?

SESSION 4: Strategies for Targeting Promoters
Chairperson: A.M. Bruskin, Oncogene Science, Inc., Uniondale, New York

C. Passananti, University of Rome, Italy: Targeting zipper motifs.
A.M. Bruskin, Oncogene Science, Inc., Uniondale, New York: Oncogene Science general strategies.
P. Baeuerle, Tularik, Inc., South San Francisco, California: Targeting gene transcription.
K. Giese, Chiron Corporation, Emeryville, California: Positive selection system to screen for modulators of transcription.
Discussion: Strategies to find new compounds.

SESSION 5: Other Possible Consequences of Up-regulation of Utrophin
Chairperson: L.M. Kunkel, Howard Hughes Medical Institute, The Children's Hospital, Boston, Massachusetts

B. Jasmin, University of Ottawa, Ontario, Canada: The neuromuscular junction and transcriptional control–1.
K.P. Campbell, Howard Hughes Medical Institute, University of Iowa College of Medicine, Iowa City: Reconstitution of the complex at the membrane.
J.S. Chamberlain, University of Michigan Medical School, Ann Arbor: Toxicity of overexpression; levels of expression needed; timing of delivery.

The Biology of p53 and Its Implications for Diagnosis and Therapy

March 5—8

FUNDED BY
OncorMed, Inc.

ARRANGED BY
A.J. Levine, Princeton University, New Jersey
S. Lowe, Cold Spring Harbor Laboratory

SESSION 1: Basic Biology of p53—What are the aspects of p53 biology that may be relevant to the clinic?
Chairperson: S. Lowe, Cold Spring Harbor Laboratory

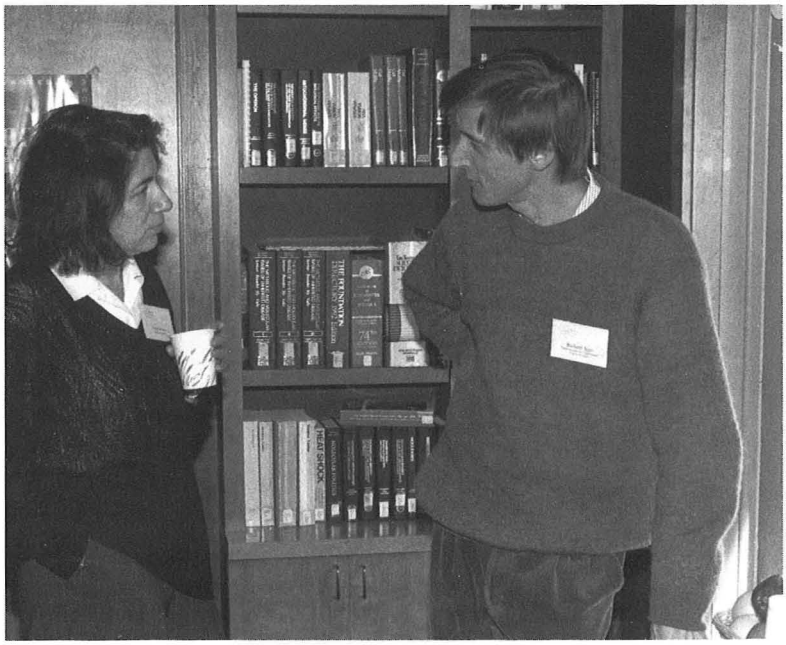
D.P. Lane, Dundee University, Scotland, United Kingdom: Regulating p53 function through amino- and carboxy-terminal domains.
T. Waldman, The Johns Hopkins Oncology Center, Baltimore, Maryland: p21 checkpoint function and sensitivity to anticancer agents.
J. Windle, University of Texas Health Science Center at San Antonio: Effect of p53 on tumor properties and response to chemotherapy in a transgenic mouse model.
A.J. Levine, Princeton University, New Jersey: The functions of the MDM2 oncoprotein.
S.P. Linke, The Salk Institute for Biological Studies, San Diego, California: p53-dependent cell cycle effects of γ-radiation and nucleotide antimetabolites.

SESSION 2: Complexities of p53 Biology—How might the complexities of p53 biology confound simple analysis of clinical data? Are the biological consequences of p53 mutation dependent on the type of p53 mutation? Tissue type?
Chairperson: A.J. Levine, Princeton University, New Jersey

P.A. Hall, Ninewells Hospital and Medical School, Dundee, Scotland, United Kingdom: The heterogeneity of the p53 response in mice.
T.D. Tlsty, University of California, San Francisco: Loss of genomic integrity in preneoplastic cells.
C. Prives, Columbia University, New York, New York: Impact of p53 status on drug treatment of cells.
M. Oren, The Weizmann Institute of Science, Rehovot, Israel: Anti-apoptotic gain of function of mutant p53.
S. Lowe, Cold Spring Harbor Laboratory: Activation of p53 by oncogenes.

SESSION 3: Determining p53 Mutational Status—What are the current strategies for identifying p53 mutations? Their limitations? Can we assess pathways rather than genes?
Chairperson: C. Cordon-Cardo, Memorial Sloan-Kettering Cancer Center, New York, New York

M. Bywater, Cytometrics, Inc., Philadelphia, Pennsylvania.
B. Neri, Third Wave Technologies, Inc., Madison, Wisconsin: The detection of p53 mutations using cleavase fragment-length polymorphism (CFLP).
T. Soussi, Institut Curie, Paris, France: Serological analysis of p53 alterations in human cancer.
D. Mack, Affymetrix, Inc., Santa Clara, California: Profiling of cancer gene expression patterns and genotypic analysis using high-density oligonucleotide arrays.
R. Iggo, Swiss Institute for Experimental Cancer Research, Lausanne, Switzerland: Analysis of p53 tumor suppressor gene function in yeast.



C. Prives, R. Iggo

SESSION 4: p53 Mutations and Clinical Parameters—What are the clinical implications of p53 mutations for cancer patients? How does this relate to p53 biology? Should patients be tested for p53 mutations?
Chairperson: P.A. Hall, Ninewells Hospital and Medical School, Dundee, Scotland, United Kingdom

R. Cote, University of Southern California School of Medicine, Los Angeles: p53 and bladder cancer: Tumor progression, response to therapy, and analytical methods.
C. Cordon-Cardo, Memorial Sloan-Kettering Cancer Center, New York, New York: p53 as a biological determinant in human solid tumors.
E. Newcomb, New York University Medical Center, New York: p53 mutations and survival: Our experience with lymphoid, brain, and ovarian cancers.
R. Elledge, University of Texas Health Science Center at San Antonio: Prognostic and predictive value of p53 in breast cancer.
J.S. Kovach, City of Hope National Medical Center, Duarte, California: Null and missense p53 mutations in primary breast cancers are associated with adverse prognosis.

SESSION 5: Using p53 for Therapeutic Gain—How can p53, or knowledge of p53 status, be used to improve cancer management? What are the potential problems? What is needed from basic research to overcome these problems?
Chairperson: D. Lane, Dundee University, Scotland, United Kingdom

D. Kirn, Onyx Pharmaceuticals, Richmond, California: The use of an E1B-55 kD gene-deleted adenovirus for the treatment of p53-deficient tumors.
P. O'Connor, National Cancer Institute, Bethesda, Maryland: Can molecular characterization aid drug discovery? A test case with the p53 pathway in the NCI Anticancer Drug Screen.
M. Rolfe, Mitotix Inc., Cambridge, Massachusetts: Small-molecule inhibitors of p53 ubiquitination.
M.I. Sherman, PharmaGenics, Inc., Allendale, New Jersey: Strategic approaches to restoring lost p53 function.
D.P. Carbone, Vanderbilt University Cancer Center, Nashville, Tennessee: Oncogene-targeted cellular immunotherapy.
M. Harper, Introgen Therapeutics, Inc., Houston, Texas: Strategies for p53 gene therapy in cancer: Molecular, biological, and clinical endpoints.

Posttranslational Modifications

March 9–12

FUNDED BY
Applied Microbiology, Inc.

ARRANGED BY
S.L. Mowshowitz, Applied Microbiology, Inc., Tarrytown, New York
R. Pollack, Columbia University, New York, New York

SESSION 1
Chairperson: S.L. Mowshowitz, Applied Microbiology Inc., Terrytown, New York

H. Freeze, The Burham Institute, La Jolla, California: Mannose and *N*-glycosylation: A minority report.
B. Stillman, Cold Spring Harbor Laboratory: Histone acetylation in chromatin assembly.
R.G.W. Anderson, University of Texas Southwestern Medical Center, Dallas: Tyrosine kinase signal transduction from caveolae.

SESSION 2
Chairperson: B. Stillman, Cold Spring Harbor Laboratory

E.R. Stadtman, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, Maryland: Reactive oxygen-mediated modification of proteins.
W.I. Sundquist, University of Utah School of Medicine, Salt Lake City: Proteolytic processing and cyclophilin a binding by the HIV-1 capsid protein.
A.J. Franzusoff, University of Colorado Health Sciences Center, Denver: Intracellular trafficking pathways and HIV infectivity.

F. Perlin, R. Morimoto

SESSION 3
Chairperson: S.L. Mowshowitz, Applied Microbiology, Inc., Tarrytown, New York

F.B. Perler, New England BioLabs, Inc., Beverly, Massachusetts: Protein splicing.
M.-Q. Xu, New England BioLabs, Inc., Beverly, Massachusetts: Mechanism of protein splicing and its applications.
S.B. Prusiner, University of California, San Francisco: Conformational templating in the formation of the scrapie prion protein.
D.J. Selkoe, Brigham and Women's Hospital/Harvard Medical School, Boston, Massachusetts: Posttranslational processing of the β-amyloid precursor protein and the genesis of Alzheimer's disease.
M. Gasson, Institute of Food Research, Norwich, United Kingdom.
J.N. Hansen, University of Maryland, College Park: Formation, properties, and biological roles of the unusual residues in nisin and subtilin.
R.I. Morimoto, Northwestern University, Evanston, Illinois: Molecular chaperones in protein folding and protein degradation.
T. Muir, Rockefeller University, New York, New York: Protein synthesis via chemical ligation: New tools for probing protein structure and function.

NEUREGULINS AND NEUREGULIN RECEPTORS

March 16–19

FUNDED BY
Cold Spring Harbor Laboratory Corporate Sponsor Program, with additional support from Cambridge NeuroScience, Inc.

ARRANGED BY
M.A. Marchionni, Cambridge NeuroScience, Inc., Massachusetts
G. Lemke, The Salk Institute for Biological Studies, San Diego, California

SESSION 1: Neuregulin Receptors and Signaling
Chairperson: G. Plowman, Sugen, Redwood City, California

Y. Yarden, National Institute of Child Health & Human Development, Bethesda, Maryland: Signal diversification by neuregulin receptors.
K.L. Carraway, Beth Israel Hospital, Boston, Massachusetts: A ring-finger-containing protein that binds and clusters ErbB receptors.
M.X. Sliwkowski, Genentech, Inc., South San Francisco, California: Structure-function relationships of neuregulin with its receptors.
D.F. Stern, Yale University School of Medicine, New Haven, Connecticut: Hormonal regulation of the erbB receptor family network.
D.L. Falls, Emory University, Atlanta, Georgia: Functions of the neuregulin cytoplasmic domain.

SESSION 2: Genetics of Neuregulins and Neuregulin Receptors
Chairperson: C. Ibanez, Karolinska Institute, Stockholm, Sweden

C. Birchmeier, Max-Delbrueck-Centrum, Berlin, Germany: Genetic analysis of neuregulin and its receptors.
S.L. Erikson, Genentech, Inc., South San Francisco, California: ErbB3 is essential for normal cardiac and cerebellar development: A comparison with NRG- and ErbB2-deficient mice.
K.-F. Lee, The Salk Institute, La Jolla, California: Role of neuregulin receptor erbB2 in mammalian development.
M. Gassmann, The Salk Institute, La Jolla, California: Neural phenotypes in ErbB4 neuregulin receptor mutant embryos.
G. Lemke, The Salk Institute for Biological Studies, San Diego, California: Neuregulin ablation by ribozymes.

SESSION 3: Neuregulins in Neuron/Glial Interactions
Chairperson: S. Scherer, University of Pennsylvania Medical Center, Philadelphia

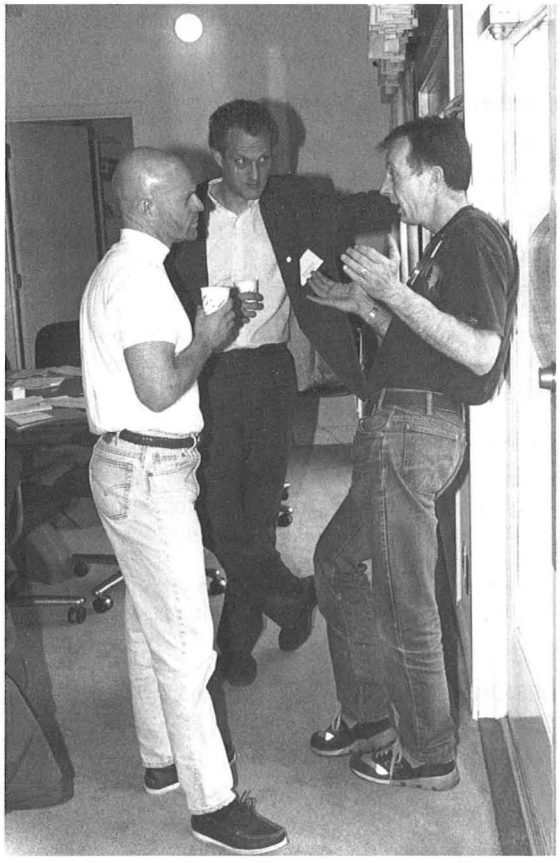
N. Ratner, University of Cincinnati College of Medicine, Ohio: Modulation of Schwann cell proliferation through alterations in Ras signaling and neuregulin production.
C.D. Stiles, Dana-Farber Cancer Institute, Boston, Massachusetts: Activation of erbB2 during Wallerian degeneration of sciatic nerve.
K.R. Jessen, University College London, United Kingdom: Neuregulin signaling in early Schwann cell development.
J. Grinspan, Children's Hospital of Philadelphia, Pennsylvania: Neuregulin as a survival factor for Schwann cells in development peripheral nerve.
A. Mudge, University College London, United Kingdom: Role of neuregulin in Schwann cell development.
J. Salzer, New York University Medical Center, New York: Role of the neuregulins in the axonal-glial interactions of myelination.
R.H. Miller, Case Western Reserve University, Cleveland, Ohio: Role of neuregulins in the induction of oligodendrocyte precursors.
C.S. Raine, Albert Einstein College of Medicine, Bronx, New York: Effect of neuregulins on autoimmune demyelination.
E. Anton, Yale University School of Medicine, New Haven, Connecticut: GGf/neuregulin is a mediator of reciprocal interactions between migrating neurons and radial glia in the developing cerebral cortex.
G. Corfas, Harvard Medical School, Boston, Massachusetts: Neuregulins in the developing cerebellum.

SESSION 4: Neuregulin Signaling at Synapses
Chairperson: A. Goodearl, Millennium Pharmaceuticals, Inc., Cambridge, Massachusetts

W. Thompson, University of Texas, Austin: Neuregulins and Schwann cells at the neuromuscular junction.
G.D. Fischbach, Harvard Medical School, Boston, Massachusetts: Neuregulins at the neuromuscular junction.
S. Burden, New York University Medical Center, New York: NRG-mediated signaling at neuromuscular synapses.
X. Yang, New York University Medical Center, New York: Regulation of neuronal nAChR expression by neuregulins.

SESSION 5: Neuregulin Signaling in Sensory Systems and New Ligands
Chairperson: C. Birchmeier, Max-Delbrueck-Centrum, Berlin, Germany

J.T. Corwin, University of Virginia, Charlottesville: Neuregulins in the sensory epithelia of the ear.
H. Chang, Stanford University School of Medicine, California: Ligands for ErbB family receptors encoded by a newly characterized neuregulin-like gene.
C. Lai, The Scripps Research Institute, La Jolla, California: ErbB receptor expression in the nervous system and neuregulin-2, a novel neuregulin-like molecule.
M.A. Marchionni, Cambridge NeuroScience, Inc., Massachusetts: Perspectives and summary.



G. Lemke, S. Scherer

Finding Genes: Computational Analysis of DNA Sequences

March 23–26

FUNDED BY
Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY
R. Gibbs, Baylor College of Medicine, Houston, Texas
P. Green, University of Washington, Seattle
J.-M. Claverie, CNRS, Marseille, France

SESSION 1: Overview

R.H. Waterston, Washington University, St. Louis, Missouri: Challenges in genome sequencing interpretation.
J.-M. Claverie, CNRS, Marseille, France: Introductory talk on practical methods for gene identification current concepts and current problems.

SESSION 2: Computational Analysis

S. Karlin, Stanford University, California: Computational biases in eukaryotic and prokaryotic genome sequences.
M. Borodovsky, Georgia Institute of Technology, Atlanta: Statistical determinants of protein-coding regions in DNA sequence.
M. Adams, The Institute for Genomic Research, Rockville, Maryland: Use of constraints, consensus, and contradiction in merging gene-prediction methods.
G.D. Stormo, University of Colorado, Boulder: New kinds of information for DNA parsing.
A. Krogh, Technical University of Denmark, Lyngby: Hidden Markov models for gene finding.
M. Gelfand, University of Southern California, Los Angeles: Las Vegas algorithms for gene recognition.

SESSION 3: Signatures in DNA

S. Audic, CNRS, Marseille, France: Promoter detection in mammalian DNA.
J.W. Fickett, SmithKline Beecham Pharmaceuticals, King of Prussia, Pennsylvania: Eukaryotic promoter recognition: Where do we stand?
M.Q. Zhang, Cold Spring Harbor Laboratory: What do we know about core promoters?
A. Smit, University of Washington, Seattle: Improving database searches and gene prediction by identifying repetitive and low-complexity DNA.
L. Hillier, Washington University, St. Louis, Missouri: Use and interpretation of EST hits in gene prediction.
E.-C. Uberbacher, Oak Ridge National Laboratory, Tennessee: Large-scale gene modeling with pattern recognition and ESTs.
S. Banfi, Telethon Institute of Genetics & Medicine, Milan, Italy: DRES: *Drosophila*-related expressed sequences.

SESSION 4: Comparisons of Computational and Experimental Gene Finding

A. Ansari-Lari, Baylor College of Medicine, Houston, Texas: Large-scale sequencing in human chromosome 12p13: Experimental and computational gene structure determination.
B.A. Roe, University of Oklahoma, Norman: Human and bacterial genomic DNA sequence annotation.
E.M. Rubin, University of California, Berkeley: Computational and biological results from the analysis of ~700 kb of genomic sequence from a megabase region at human 5q31.
Discussion: Testing computational models: Designing a benchmark.

SESSION 5: Gene Finding and Databases

W. Gish, Washington University, St. Louis, Missouri: Analysis of human genomic sequence data at the GSC.
R. Durbin, Sanger Centre, Cambridge, United Kingdom: Managing gene annotation for genomic sequencing projects.
R.A. Manning, ApoCom Inc., Oak Ridge, Tennessee: Discovery tools for genomics.
D. Haussler, University of California, Santa Cruz: Design of the Genie Genefinder.
V. Solovyev, Amgen Inc., Thousand Oaks, California: Sequence analysis by WWW: From gene finding to structure prediction.
Summary: What Next?

The Biology of *BRCA1*

April 2–4

FUNDED BY
National Cancer Institute, with additional support from Amgen Inc.

ARRANGED BY
M.-C. King, University of Washington, Seattle
D. Livingston, Dana-Farber Cancer Institute, Cambridge, Massachusetts

SESSION 1: Mutations in Breast Cancer
Chairperson: M.-C. King, University of Washington, Seattle

Opening discussion: Identifying the Key Questions.
Chairperson: E. Harlow, Massachusetts General Hospital Cancer Center, Charlestown

A. Borg, University Hospital, Lund, Sweden: Biological and genetic features of *BRCA1* and *BRCA2* tumors.
D. Haber, Massachusetts General Hospital Cancer Center, Charlestown: Mutational analysis of *BRCA1, BRCA2,* and ataxia telangiectasia in early onset breast cancer.
Discussion: Mutations in Breast Cancer.

A. Efstratiadis, Columbia University, New York, New York: Phenotypes of *BRCA1, BRCA2, BRCA1/BRCA2, BRCA1*/p53, and *BRCA2*/p53 nullizygous mouse embryos.
T. Mak, Ontario Cancer Institute, Toronto, Canada: *BRCA1* and *BRCA2* are required for embryonic cell proliferation.

SESSION 2: Biology of BRCA1
Chairperson: D. Livingston, Dana-Farber Cancer Institute, Cambridge, Massachusetts

L.A. Chodosh, University of Pennsylvania School of Medicine, Philadelphia: Role of *BRCA1* in mammary epithelial growth and differentiation.
P. Polakis, Onyx Pharmaceuticals, Richmond, California: Response of the *BRCA1* protein in cellular stress.
E. Solomon, UMDS-Guy's Hospital, London, United Kingdom: Transcriptional regulation of *BRCA1.*
Discussion: Biology of *BRCA1.*

SESSION 3: BRCA1-Protein Interactions and Tumor Suppression I
Chairperson: D. Livingston, Dana-Farber Cancer Institute, Cambridge, Massachusetts

R. Baer, University of Texas Southwestern Medical Center, Dallas: Proteins that associate with the *BRCA1* gene product.
F.J. Rauscher, The Wistar Institute, Philadelphia, Pennsylvania: BAP-1, a novel enzyme that binds to the RING finger of the *BRCA1* gene product and exhibits properties of a tumor suppressor.

Coffee break

SESSION 4: BRCA1-Protein Interactions and Tumor Suppression II
Chairperson: T. Mak, Ontario Cancer Institute, Toronto, Canada

C. Wilson, University of California, Los Angeles, School of Medicine: Expression and subcellular localization of *BRCA1* and *BRCA1Δ11b.*

D. Livingston, Dana-Farber Cancer Institute, Cambridge, Massachusetts: Functional analysis of the *BRCA1* gene product.

J. Feunteun, Institut Gustave Roussy, Villejuif, France: Role of *BRCA1* in tumor suppression.

R. Jensen, Vanderbilt University School of Medicine, Nashville, Tennessee: Mechanisms of tumor suppression by *BRCA1.*

M.-C. King, University of Washington, Seattle: Possible genetic mechanisms underlying the biology of *BRCA1* in sporadic tumors.

SESSION 5: BRCA1-Protein Interactions and Tumor Suppression III
Chairperson: E. Harlow, Massachusetts General Hospital Cancer Center, Charlestown

J. Holt, Vanderbilt University School of Medicine, Nashville, Tennessee: Tumor suppression by *BRCA1.*

S. Tavtigian, Myriad Genetics, Inc., Salt Lake City, Utah: Predisposing mutations in *BRCA1:* Drawing connections between protein-protein interactions and cancer risk.

SESSION 6: Discussion: What Don't We Know? Where Next?
Chairperson: E. Harlow, Massachusetts General Hospital Cancer Center, Charlestown

Integrating Genetic, Biochemical, and Other Data in the Postgenomics Era

April 6–9

FUNDED BY
Cold Spring Harbor Laboratory Corporate Sponsor Program, with additional support from the National Cancer Institute

ARRANGED BY
M. Ashburner, University of Cambridge, United Kingdom
E. Harlow, Massachusetts General Hospital Cancer Center, Charlestown
P. Karp, SRI International, Menlo Park, California

SESSION 1
Chairperson: C. Sander, European Bioinformatics Institute, Cambridge, United Kingdom

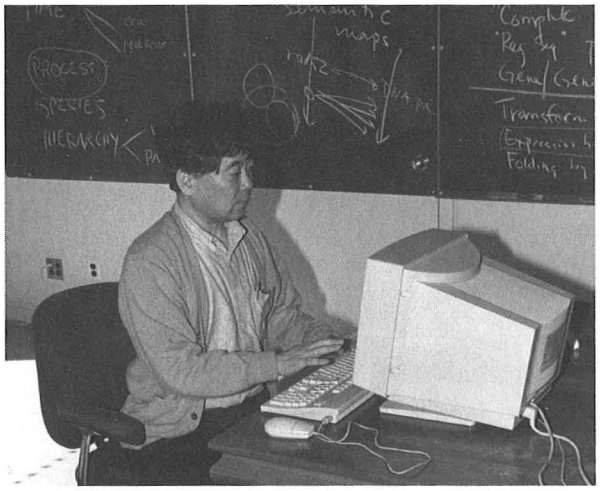
E. Harlow, Massachusetts General Hospital Cancer Center, Charlestown: Opening remarks.

S. Letovsky, Johns Hopkins University School of Medicine, Baltimore, Maryland: Representation of gene function in GDB.

M. Ashburner, University of Cambridge, United Kingdom: On the representation of gene function in genetic databases.

J.T. Eppig, The Jackson Laboratory, Bar Harbor, Maine: De-fined vocabularies and functional/phenotypic classifications.

N. Maltsev, Argonne National Laboratory, Illinois: Representation of function in the PUMA/WIT systems.



M. Kanehisa

SESSION 2
Chairperson: M. Ashburner, University of Cambridge, United Kingdom

C. Sander, The European Bioinformatics Institute, Cambridge, United Kingdom: Functional genome comparison.
A. Danchin, Institut Pasteur, Paris, France: Integration of methodological knowledge and genetic knowledge.
P. Slonimski, Centre National de la Recherche Scientifique, Gif-Sur-Yvette, France: Population genetics of genes within genomes.
S. Lewis, University of California, Berkeley: Issues in data management for large-scale genomic analysis.
O. White, The Institute for Genomic Research, Rockville, Maryland: Bacterial sequence annotation in high throughput systems.
M. Fonstein, University of Chicago, Illinois: The Rhodobacter capsulatus genome project.

SESSION 3
Chairperson: A. Danchin, Institut Pasteur, Paris, France

M.L. Mavrovouniotis, Northwestern University, Evanston, Illinois: Metabolic pathways.
P. Karp, SRI International, Menlo Park, California: A pathway ontology is the key to computing with pathways.
R. Overbeek, Argonne National Laboratory, Illinois: WIT: A system to support metabolic reconstruction.
E. Selkov, Argonne National Laboratory, Illinois: Genome reconstruction: Methodology, status, and outlook.
M. Kanehisa, Kyoto University, Japan: From gene catalogs to functional catalogs: The KEGG project.

SESSION 4
Chairperson: P. Karp, SRI International, Menlo Park, California

A. Zollner, Max-Planck-Institute for Biochemistry, Martinsried, Germany: Functional categories of proteins (yeast genome).
C. Ouzounis, The European Bioinformatics Institute, Cambridge, United Kingdom: Representing and classifying protein function.
M. Riley, Marine Biological Laboratory, Woods Hole, Massachusetts: Functions of almost all *E. coli* gene products.

SESSION 5
Chairperson: L.T. Williams, Chiron Corporation, Emeryville, California

H. McAdams, Infernus, Stanford, California: What do we have to know to model developmental decision points in the cell?
J. Reinitz, Mount Sinai Medical School, New York, New York: Circuitry from gene expression: Computational analysis of segment determination in *Drosophila*.
S. Shaw, National Cancer Institute, National Institutes of Health, Bethesda, Maryland: Strategies for efficiently harnessing the expertise of biologists in cumulative information assembly: The PROW experiment.
J. Wagg, The Rockefeller University, New York, New York: Computational tools for bridging the gap between molecular and integrative biology.

The Pathogenesis of NF1 and NF2: Therapeutic Strategies

July 14–17

FUNDED BY
The National Neurofibromatosis Foundation and The Wilson Foundation

ARRANGED BY
E. Casper, Memorial Sloan-Kettering Cancer Center, New York, New York
J. Gusella, Massachusetts General Hospital, Boston
D. Gutmann, Washington University School of Medicine, St. Louis, Missouri
B. Korf, Children's Hospital, Boston, Massachusetts
K. North, Royal Alexandra Hospital for Children, Parramatta, Australia
A. Rubenstein, Mt. Sinai School of Medicine, New York, New York

SESSION 1: Cognitive Function in NF1
Chairperson: K. North, Royal Alexandra Hospital for Children, Parramatta, Australia

K. North, Royal Alexandra Hospital for Children, Parramatta, Australia: Overview of cognitive deficit in NF1.
P. Frankland, Cold Spring Harbor Laboratory: Molecular and cellular mechanisms underlying the learning impairments of NF1 mutant mice.
A. Bernards, Massachusetts General Hospital Cancer Center, Charlestown: Genetic analysis of NF1 function in *Drosophila*.
Y. Zhong, Cold Spring Harbor Laboratory: Molecular basis of learning deficits in NF1 mutants.

SESSION 2: Optic Glioma
Chairperson: D.H. Gutmann, Washington University School of Medicine, St. Louis, Missouri

D.H. Gutmann, Washington University School of Medicine, St. Louis, Missouri: Overview.
R. Listernick, Children's Memorial Hospital, Chicago, Illinois: Clinical overview and natural history of pathway optic glioma.
C.D. James, Mayo Foundation, Rochester, Minnesota: Molecular genetics of astrocytomas.
A.J. Wong, Kimmel Cancer Institute, Philadelphia, Pennsylvania: Signal transduction in astrocytes and astrocytomas.
D.H. Gutmann, Washington University School of Medicine, St. Louis, Missouri: Neurofibromin as a negative growth regulator for astrocytes.
R.J. Packer, Children's National Medical Center, Washington, D.C.: Chemotherapy and investigational drugs for optic pathway gliomas.

SESSION 3: Neurofibroma
Chairperson: B.R. Korf, Children's Hospital, Boston, Massachusetts

B.R. Korf, Children's Hospital, Boston, Massachusetts: Overview of neurofibromas in NF1.
D. Viskochil, University of Utah, Salt Lake City: Molecular genetics of neurofibroma.
J.B. Gibbs, Merck & Company, West Point, Pennsylvania: Farnesyl transferase inhibitors.
F. Lieberman, Mt. Sinai Medical Center, New York, New York: Differentiation induction strategies for neuroectodermal tumors.
N. Ratner, University of Cincinnati College of Medicine, Ohio: Experimental systems.
T. Jacks, Massachusetts Institute of Technology, Cambridge: Mouse model.
J.A. Epstein, University of Pennsylvania, Philadelphia: Cardiovascular defects in NF1-deficient mice.
L.F. Parada, University of Texas Southwestern Medical Center, Dallas: Neurotrophin-independent survival of neurons in the NF (–/–) mouse.

SESSION 4: Malignancy in NF1
Chairperson: E.S. Casper, Memorial Sloan-Kettering Cancer Center, Denville, New Jersey

E.S. Casper, Memorial Sloan-Kettering Cancer Center, Denville, New Jersey: Overview of malignancy in NF1.
A.I. Neugut, Columbia-Presbyterian Medical Center, New York, New York: A critique of the association between neurofibromatosis and sarcomas.
J. Woodruff, Memorial Sloan-Kettering Cancer Center, New York, New York: Pathology of malignant peripheral nerve sheath tumors.
LH. Baker, University of Michigan Cancer Center, Ann Arbor: The relationship of cafe au lait spots and sarcomas other than neurofibrosarcoma.
K.M. Shannon, University of California, San Francisco: Biologic and therapeutic studies in a murine model of NF1-associated leukemia.

SESSION 5: NF2
Chairperson: J.F. Gusella, Massachusetts General Hospital, Charlestown

J.F. Gusella, Massachusetts General Hospital, Charlestown: Overview.
V. Ramesh, Massachusetts General Hospital, Charlestown: Cell biology of NF2 protein merlin.
R.G. Fehon, Duke University, Durham, North Carolina: Structure/function analysis of *Drosophila* merlin.
G. Thomas, Foundation Jean Dausset/CEPH, Paris, France: Toward a mouse model for NF2.
M. MacCollin, Massachusetts General Hospital, Charlestown: Phenotype suppression using aminoglycoside antibiotics: A potential treatment for NF2.

Coffee break

The Art of Judging: Perspectives of Science

October 14–17

FUNDED BY
The Federal Judicial Center, Judiciary Leadership Development Council, and Cold Spring Harbor Laboratory

ARRANGED BY
J.A. Apple, The Federal Judicial Center, Washington, D.C.
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory

SESSION 1

D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory: Cold Spring Harbor Laboratory and its place in science.

SESSION 2

A.N.H. Creager, Princeton University, New Jersey: From Darwin to Dolly: Developments in the biological sciences in the 20th century.
D. Wilkinson, Princeton University, New Jersey: Life in an inhospitable universe.

SESSION 3

M.D. Lemonick, *Time Magazine,* New York, New York: An exploration of life.
J.A. Deddens, University of Cincinnati, Ohio: Statistics and probability in science.

SESSION 4

D. Wilkinson, Princeton University, New Jersey: Discussion on new concepts of the universe.

SESSION 5

M. Gallo, Robert Wood Johnson Medical School, Piscataway, New Jersey: Toxicology, the environment, and risk assessment.
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: Human genetics: A look at the past.

SESSION 6

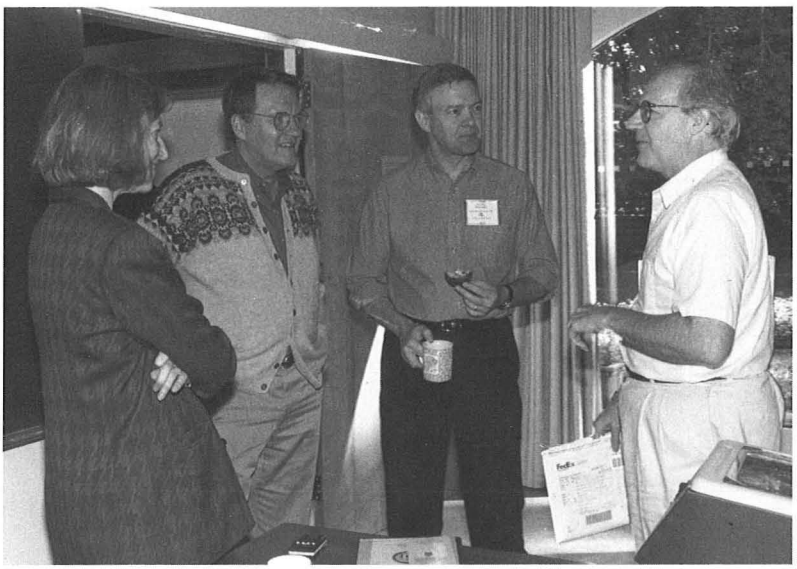
J.A.Witkowski, Banbury Center, Cold Spring Harbor Laboratory: DNA and the Human Genome Project.

SESSION 7

R.M. Henig, Takoma Park, Maryland: Viruses and plagues: The menace of the 21st century?
P. Reilly, Shriver Center of Mental Retardation, Waltham, Massachusetts: Social implications of genetic research.

SESSION 8

L. Lederman, Fermi Laboratory, Chicago, Illinois: Great issues in science; the challenge of the 21st century.



R. Henig, J. Apple, J. Witkowski, D. Boggs

Immunological Attacks on Cancer

October 19–22

FUNDED BY
The Alexander and Margaret Stewart Trust

ARRANGED BY
B. Stillman, Cold Spring Harbor Laboratory
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory

SESSION 1: MHC and Antigen Processing

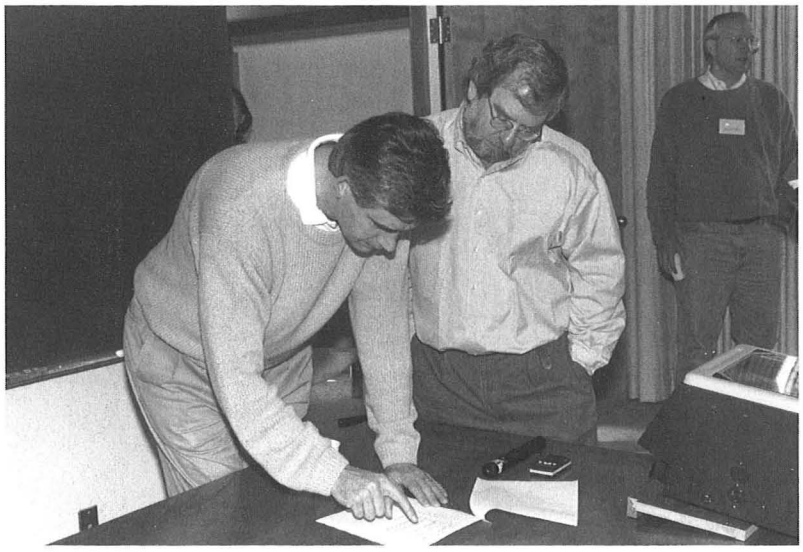
D.M. Pardoll, Johns Hopkins Oncology Center, Baltimore, Maryland: Harnessing the cryptic universe of endogenous antitumor T cells.
P.J. Lehner, Howard Hughes Medical Institute, Yale University School of Medicine, New Haven, Connecticut: A critical role for tapasin in the assembly of MHC class I molecules.
L.L. Lanier, DNAX Research Institute, Palo Alto, California: Inhibitory receptors for MHC class I regulate immune responses.
P.K. Srivastava, University of Connecticut School of Medicine, Farmington: The case for uniqueness and pan-valency.
R. Glas, Harvard Medical School, Boston, Massachusetts: A nonproteasomal pathway for the generation of MHC class I ligands in mouse tumor cells.
General Discussion: MHC and Antigen Processing

SESSION 2: Tumor Antigens

V.H. Engelhard, University of Virginia, Charlottesville: Isolation and characterization of class-I-associated tumor antigen peptides.
W. Zhou, The Johns Hopkins Oncology Center, Baltimore, Maryland: Identifying tumor markers by looking at gene expression.
S. Ladisch, Children's Research Institute, Washington, D.C.: Shedding and immunosuppression by tumor ganglioside.

SESSION 3: Immune Regulation: Activation vs. Tolerance

H. Levitsky, Johns Hopkins University School of Medicine, Baltimore, Maryland: Peripheral tolerance to tumor antigens.
G. Trinchieri, Wistar Institute, Philadelphia, Pennsylvania: Interactions of innate and adaptive immunity in cancer immunotherapy.
R.N. DuBois, Vanderbilt University Medical Center, Nashville, Tennessee: Colorectal carcinogenesis and prevention: Underlying mechanisms. Immunomodulation by prostaglandins.
T.F. Gajewski, University of Chicago, Illinois: The role of costimulation, cytokines, and Th1/Th2 differentiation in antitumor immunity in vivo, and application for tumor antigen immunization protocols in patients with melanoma.
J. Allison, University of California, Berkeley: The yin and yan of T-cell activation.



B. Stillman, J. Allison

SESSION 4: Immune Regulation: Activation vs. Tolerance II

C. Lieping, Mayo Clinic, Rochester, Minnesota: The role of T-cell costimulators in the induction of tumor immunity against tumor antigens.
O.J. Finn, University of Pittsburgh School of Medicine, Pennsylvania: The importance of tumor-specific helper T cells and examples of tolerance at the helper T-cell level in case of tumor antigens that are also autoantigens.
Y. Hahn, University of Virginia Health Sciences Center, Charlottesville: Mechanism of immune evasion by tumorigenic hepatitis C virus.
E. Gilboa, Duke University Medical Center, Durham, North Carolina: Tumor RNA transfected dendritic cell vaccine: Preclinical and clinical studies.
D.P. Carbone, Vanderbilt University Cancer Center, Nashville, Tennessee: Mechanisms of dendritic cell dysfunction in cancer patients.

SESSION 5: Vaccines

M.T. Lotze, University of Pittsburgh School of Medicine, Philadelphia: Dendritic cells enhance effector mechanisms in the immune response to cancer.
W.M. Kast, Loyola University of Chicago, Illinois: Vaccine development against HPV-induced cervical cancer.
H. Kaufman, Albert Einstein College of Medicine, Bronx, New York: Recombinant viral vaccines and adjuvants for immunotherapy of human cancer.
R. Newman, IDEC Pharmaceuticals Corporation, San Diego, California: Monoclonal antibodies: Evolution to mainstream therapeutics.

J.P. Morgan & Co. Incorporated/Cold Spring Harbor Laboratory Executive Conference on Genetic Engineering

October 24–26

ARRANGED BY
J.D. Watson, Cold Spring Harbor Laboratory
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory

SESSION 1

S. Cohen, Stanford University, California: Genetic engineering.

SESSION 2

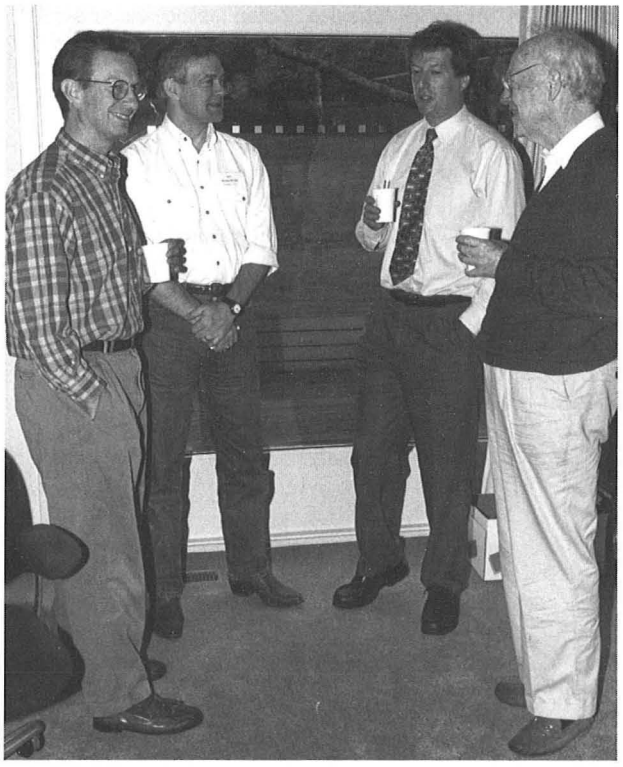
J. Wells, Genentech, Inc., South San Francisco, California: From bigger molecules to smaller ones.
S. Tilghman, Howard Hughes Medical Institute, Princeton University, New Jersey: Exploring gene function in mice.
A. Colman, PPL Therapeutics plc, Edinburgh, Scotland, United Kingdom: A tale of three sheep, Tracy, Dolly & Polly: Implications for the biomedical uses of transgenic livestock.

SESSION 3

S. Lowe, Cold Spring Harbor Laboratory: Oncogenes, tumor suppressor genes, and chemosensitivity.

SESSION 4

K. Davies, University of Oxford, United Kingdom: Gene therapy–genetic engineering in human beings.
R. Michelmore, University of California, Davis: The second green revolution.
S. Fodor, Affymetrix, Inc., Santa Clara, California: Genes, chips, and the human genome.



P. Ringose, J. Witkowski, A. Colman, J. Watson

Molecular Immunobiology of Lyme Disease

November 2–5

FUNDED BY
Centers for Disease Control and Prevention, Food and Drug Administration, Fort Dodge Animal Health, Glaxo Wellcome, Inc., MedImmune, Inc., Pasteur Merieux Connaught, and SmithKline Beecham Pharmaceuticals

ARRANGED BY
J.J. Dunn, Brookhaven National Laboratory, Upton, New York
S.E. Schutzer, UMDNJ-New Jersey Medical School, Newark

SESSION 1: Antigen Expression
Chairperson: M.T. Philipp, Tulane Regional Primate Research Center, Covington, Louisiana

E. Fikrig, Yale University School of Medicine, New Haven, Connecticut: Arthropod- and host-specific *Borrelia* gene expression.

A. deSilva, Yale University School of Medicine, New Haven, Connecticut: *Borrelia* gene expression and transmission from ticks.

T.G. Schwan, Rocky Mountain Laboratories, NIAID, NIH, Hamilton, Montana: Common themes in *Borrelia* proteins expressed in ticks.

S.E. Schutzer, UMDNJ-New Jersey Medical School, Newark: In vivo expression of *Borrelia* antigens in cerebrospinal fluid.

S.W. Barthold, University of California, Davis: Biologically relevant antibody responses to *B. burgdorferi* antigens expressed in vivo.

SESSION 2: Diagnostics
Chairperson: B.J. Luft, State University of New York at Stony Brook

. Ticehurst, ODE/CDRH/FDA, Rockville, Maryland: FDA Public Health Advisory on assays for antibodies to *B. burgdorferi:* Background/advice (2-step testing)/responses/future.

M.E. Schriefer, DVBID, NCID, CDC, Ft. Collins, Colorado: Diagnostic serology: Recommendations, performance, future.

P.K. Coyle, State University of New York at Stony Brook: Markers for neurological involvement.

A.E. Levin, Immunetics, Inc., Cambridge, Massachusetts: Total automation of the two-step testing procedure for Lyme antibodies: From esoteric procedure to routine clinical lab test.

R.J. Dattwyler, State University of New York at Stony Brook

SESSION 3: Genetics
Chairperson: J.J. Dunn, Brookhaven National Laboratory, Upton, New York

A.G. Barbour, University of California, Irvine: Analysis of expression of OspA in bacterial and eukaryotic cells.

C.L. Lawson, Brookhaven National Laboratory, Upton, New York: Structural analysis of *B. burgdorferi* outer surface proteins A and B.

J. Radolf, University of Texas Southwestern Medical Center, Dallas: Model systems for studying differential expression of *B. burgdorferi* antigens.

P.A. Rosa, Rocky Mountain Laboratories, NIAID, NIH, Hamilton, Montana: Gene activation by allelic exchange in *B. burgdorferi.*

S. Bergstrom, Umea University, Sweden: OspH, a novel chromosomally encoded outer-surface-exposed lipoprotein of Lyme disease *Borrelia.*

J. Dunn, P. Coyle

SESSION 4: Immune Response
Chairperson: S.E. Schutzer, UMDNJ-New Jersey Medical School, Newark

A.C. Steere, New England Medical Center, Boston, Massachusetts: Phase III SmithKline Beecham Vaccine Trial.

J.J. Weis, University of Utah School of Medicine, Salt Lake City: The role of CD14 in signaling mediated by outer membrane lipoprotiens of B. *burgdorferi.*

L.K. Bockenstedt, Yale University School of Medicine, New Haven, Connecticut: T-cell regulation of murine Lyme carditis.

M.T. Philipp, Tulane Regional Primate Research Center, Covington, Louisiana: Is *B. burgdorferi* able to modulate the inflammation it elicits?

J.L. Benach, State University of New York at Stony Brook: Utilization of host proteases by *Borrelia.*

R.H. Jacobson, Cornell University, Ithaca, New York: Canine cytokine responses to *B. burgdorferi.*

SESSION 5: Vaccines
Chairperson: W. Golde, State University of New York at Stony Brook

R.C. Huebner, Pasteur Merieux Connaught, Swiftwater, Pennsylvania.

M. Hanson, MedImmune, Inc., Gaithersburg, Maryland: B. burgdorferi decorin binding protein A (DbpA) as a second generation vaccine candidate.

J.N. Miller, University of California School of Medicine, Los Angeles.

W. Zhong, Max-Planck-Institute fur Immunbiologie, Freiburg, Germany: New strategies to vaccinate against Lyme disease.

SESSION 6: General Discussion
Chairperson: W. Golde, State University of New York at Stony Brook

SESSION 7: Mixed Infections
Chairperson: J.N. Miller, University of California School of Medicine, Los Angeles

E. Hofmeister, Mayo Clinic, Rochester, Minnesota: Naturally occurring coinfections in mammalian hosts.

E.M. Bosler, State University of New York at Stony Brook: Coinfection in ticks and mammal hosts.

W. Golde, State University of New York at Stony Brook: Multiple cases of human coinfection with three different pathogens, *Babesia, Ehrlichia,* and *Borrelia*, transmitted by *Ixodes scapularis.*

G.P. Wormser, Westchester County Medical Center, Valhalla, New York: HGE and Lyme disease coinfections.

SESSION 8: Open Discussion
Chairperson: A.G. Barbour, University of California, Irvine

B.J.B. Johnson, Centers for Disease Control, Fort Collins, Colorado

A.R. Marques, LCI/NIAID, Bethesda, Maryland

J. Soreth, U.S. Food and Drug Administration, Rockville, Maryland

Signal Transduction in Endothelial Cells

November 9–12

FUNDED BY
Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY
D. Hanahan, University of California, San Francisco
F. McCormick, University of California, San Francisco
W. Risau, Max-Planck-Institut, Bad Nauheim, Germany

Introductory Remarks: D. Hanahan, University of California, San Francisco

SESSION 1: The Big Picture: Endothelial Cell States and Their Regulators
Chairperson: J.M. Folkman, Children's Hospital, Boston, Massachusetts

W. Risau, Max-Planck-Institut, Bad Nauheim, Germany: Overview of vasculogenesis, angiogenesis, and morphogenesis of endothelial cells for nonspecialists.
G.D. Yancopoulos, Regeneron Pharmaceuticals, Inc., Tarrytown, New York: Introduction to the major angiogenesis activators and their receptors (including FGFs, VEGFs, HGF, IL-8, TGF-α, B61/Lerck1, and the angiopoeitins).
L. Holmgren, Karolinska Institute, Stockholm, Sweden: Introduction to the major negative regulators of angiogenesis (including interferon, PF4, AGM1470, 16-kD prolactin, angiostatin, and endostatin).

SESSION 2: Signal Transduction: Major Pathways, Latest Concepts
Chairperson: F. McCormick, University of California, San Francisco

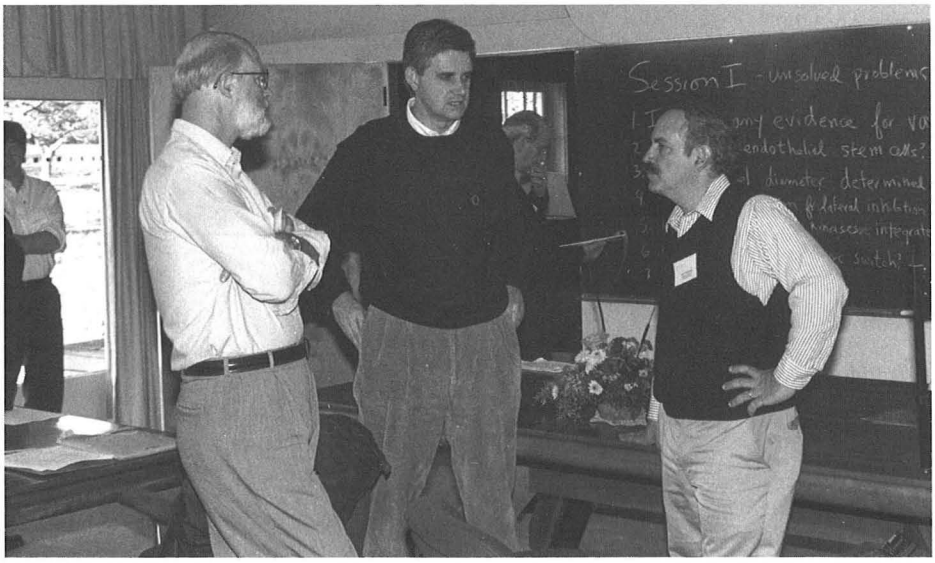
M. Whitman, Harvard Medical School, Boston, Massachusetts: TGF-β signals.
N.C. Reich, State University of New York, Stony Brook: IFN signaling and overview of the jak/stat circuits.
N. Tonks, Cold Spring Harbor Laboratory: Regulation by phosphatases.

SESSION 3: Cell-Matrix and Cell-Cell Interactions
Chairperson: R.A. Weinberg, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts

D.A. Cheresh, The Scripps Research Institute, La Jolla, California: Integrins controlling angiogenesis.
R.O. Hynes, Howard Hughes Medical Institute, Massachusetts Institute of Technology, Cambridge: Angiogenesis and vasculogenesis in α-v-null mice.
E. Dejana, Instituto Mario Negri, Milan, Italy: Cadherins controlling endothelial cell states.

SESSION 4: Endothelial Receptors
Chairperson: J. Rossant, Samuel Lunenfeld Research Institute, Toronto, Canada

G.D. Yancopoulos, Regeneron Pharmaceuticals, Inc., Tarrytown, New York: Inhibitory signals imparted by angiopoeitins.
C. Betsholtz, Goteborg University, Sweden: PDGF/PDGF-R control of pericytes.
W.A. Frazier, Washington University School of Medicine, St. Louis, Missouri: TSP-1 and its receptors.
J. Liu, Massachusetts Institute of Technology, Cambridge: The AGM1470 receptor.



R. Hynes, B. Stillman, R. Weinberg

SESSION 5: Signaling Events in Endothelial Cells
Chairperson: W. Risau, Max-Planck-Institut, Bad Nauheim, Germany

E.F. Wagner, Research Institute of Molecular Pathology, Vienna, Austria: src family kinases.
A. Zimmer, National Institute of Mental Health, National Human Genome Research Institute, Bethesda, Maryland: rafB signals in endothelial cells.
D. Falb, Millennium Pharmaceuticals Inc., Cambridge, Massachusetts: Novel smads in endothelial cells.
R.I. Weiner, University of California, San Francisco: Signals from the 16-kD prolactin receptor.
D. Linzer, Northwestern University, Evanston, Illinois: Placental hormones sending angiogenic signals.

SESSION 6: General Discussion on the Integration of Positive and Negative Signals in Endothelial Cells
Chairperson: D. Hanahan, University of California, San Francisco

M. Krasnow, Stanford University School of Medicine, California: Genetic studies of signaling during branching morphogenesis in the *Drosophila* tracheal network.
M.C. Fishman, Massachusetts General Hospital-East, Charlestown: Genetic screens for vascular patterning mutants in zebrafish.
Discussion: Mechanisms by which endothelial cells might integrate so many positive and negative signals; models and wild speculation.

Handedness and Symmetry in Development

November 16–19

FUNDED BY
Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY
C. Tabin, Harvard Medical School, Boston, Massachusetts
L. Wolpert, University College London, United Kingdom
H.J. Yost, University of Utah, Salt Lake City

SESSION 1: Theories of Development of Asymmetry
Chairperson: H.J. Yost, University of Utah, Salt Lake City

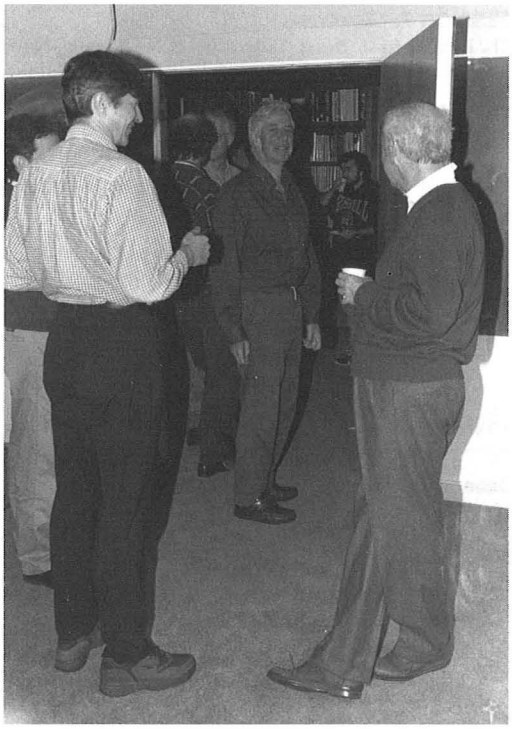
L. Wolpert, University College London, United Kingdom: Models for the generation of left/right asymmetry.
J. Frankel, University of Iowa, Iowa City: Hereditary handedness in cell surface structural patterns of ciliates.
D.R. McClay, Duke University, Durham, North Carolina: Specification of symmetry in the sea urchin embryo.

SESSION 2: Human Behavioral Handedness I
Chairperson: H.J. Yost, University of Utah, Salt Lake City

I.C. McManus, University College London, United Kingdom: Human handedness: Genetics, neurobiology, and evolution.
A.J.S. Klar, NCI-Frederick Cancer Research & Development Center, Maryland: Tests of genetics and cultural models for human handedness.

SESSION 3: Human Behavioral Handedness II
Chairperson: C. Tabin, Harvard Medical School, Boston, Massachusetts

M.C. Corballis, University of Auckland, New Zealand: Genetics and evolution of human handedness and cerebral asymmetry.



J. Buon, C. Wolpert, J. Watson

SESSION 4: Heart Asymmetry
Chairperson: C. Tabin, Harvard Medical School, Boston, Massachusettss

M.C. Fishman, Massachusetts General Hospital-East, Charlestown: Genetic dissection of asymmetry in zebrafish.
R.P. Harvey, Royal Melbourne Hospital, Victoria, Australia: Intrinsic control of heart asymmetry.
E.N. Olson, University of Texas Southwestern Medical Center, Dallas: Regulation of heart handedness by hand genes.

SESSION 5: Signals
Chairperson: L. Wolpert, University College London, United Kingdom

H.J. Yost, University of Utah, Salt Lake City: The left-right coordinator and the initiation of the left-right axis.
M. Mercola, Harvard Medical School, Boston, Massachusetts: Role of Wnt-responsive signals.
C.V.E. Wright, Vanderbilt University School of Medicine, Nashville, Tennessee: Xnr-1 and L-R determination in *Xenopus*.
J. Cooke, National Institute for Medical Research, London, United Kingdom: The lateralized expression component of the cSnR gene and its position in a putative cascade of L-R information.
C. Tabin, Harvard Medical School, Boston, Massachusetts: Transfer of left-right asymmetric positional information to and from Hnesen's node in the chick embryo.
M. Levin, Harvard Medical School, Boston, Massachusetts: Gap junctions and L-R asymmetry.

SESSION 6: Genetics I
Chairperson: E.J. Robertson, Harvard University, Cambridge, Massachusetts

W.B. Wood, University of Colorado, Boulder: A gene affecting initial establishment of handedness in *C. elegans* embryos.
H. Hamada, Osaka University, Japan: The roles and transcriptional regulation of lefty genes.
M. Brueckner, Yale University School of Medicine, New Haven, Connecticut: L-R dynein: An axonemal dynein involved in L-R pattern formation in the mouse.
S.S. Potter, University of Cincinnati College of Medicine, Ohio: Dyneins and L-R asymmetry in mice.
M.R. Kuehn, National Cancer Institute, Bethesda, Maryland: Beyond *iv* and *inv:* Phenotypic and molecular analysis of four additional mouse mutants with abnormal left/right development.

SESSION 7: Genetics II
Chairperson: J. Burn, University of Newcastle, Newcastle upon Tyne, United Kingdom

B.M. Casey, Baylor College of Medicine, Houston, Texas: Genetic aspects of *situs inversus* and other human L-R axis malformations.
P.A. Overbeek, Baylor College of Medicine, Houston, Texas: YAC gene cure of the *inv situs inversus* mutation.
M. Penman Splitt, University of Newcastle, Newcastle upon Tyne, United Kingdom: Human malformations associated with disturbance of L-R asymmetry.

General Discussion
Chairperson: L. Wolpert, University College London, United Kingdom

Genetics of Parkinson's Disease

December 2–5

FUNDED BY
National Institute of Neurological Disorders & Stroke and National Human Genome Research Institute

ARRANGED BY
Z.W. Hall, National Institute of Neurological Disorders & Stroke, Bethesda, Maryland
R.L. Nussbaum, National Human Genome Research Institute, Bethesda, Maryland

SESSION 1: Synaptic Function and Biology of Synuclein I
Chairperson: Z.W. Hall, National Institute of Neurological Disorders & Stroke, Bethesda, Maryland

Z.W. Hall, National Institute of Neurological Disorders & Stroke, Bethesda, Maryland: Introduction.
T.C. Sudhof, University of Texas Southwestern Medical Center, Dallas: Synaptic proteins, protein phosphorylation, and the genetic analysis of synaptic functions.
P. DeCamilli, Yale University School of Medicine, New Haven, Connecticut: Molecular mechanism in synaptic vesicle endocytosis.
D.F. Clayton, University of Illinois at Urbana-Champaign: Constraints on evolution and expression of synucleins: Functional implications.
K. Nakaya, Showa University, Tokyo, Japan: The role of phosphoneuroprotein 14 (β-synuclein) in neuronal formation and function.
J. George, University of Illinois at Urbana-Champaign: Lipid-dependent changes in α-synuclein structure.

SESSION 2: Pathophysiology
Chairperson: M. Goedert, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom

M. Goedert, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom: Introduction.
M.G. Spillantini, University of Cambridge, United Kingdom: α-synuclein in lewy bodies.
V.M.-Y. Lee, University of Pennsylvania, Philadelphia: α-synuclein in lewy bodies in Parkinson's Disease and dementia with lewy bodies.
A.L. Goldberg, Harvard Medical School, Boston, Massachusetts: Functions of the ubiquitin proteasome pathway in mammalian tissues in normal and diseased states.

SESSION 3: Genetics I
Chairperson: R.L. Nussbaum, National Human Genome Research Institute, Bethesda, Maryland

R.L. Nussbaum, National Human Genome Research Institute, Bethesda, Maryland: Genetic studies of Parkinson's disease, an overview.
M.H. Polymeropoulos, National Center for Human Genome Research, Bethesda, Maryland: Alpha synuclein and autosomal dominant Parkinson's disease.
Z.K. Wszolek, University of Nebraska Medical Center, Omaha: Clinical assessment of Parkinson's disease and parkinsonian-plus syndromes, genealogical investigations, and longitudinal observations.
T. Gasser, University of Munich, Germany: Genetic linkage and association studies Parkinson's disease: Evaluation of candidate genes.
D.J. Selkoe, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts: Multiple genotypes produce a common phenotype in Alzheimer's disease.

SESSION 4: Genetics II
Chairperson: R.L. Nussbaum, National Human Genome Research Institute, Bethesda, Maryland

W. Scott, Duke University Medical Center, Durham, North Carolina: Unraveling the complex etiology of Parkinson's disease: Alzheimer's disease as a model.
R.H. Myers, Boston University School of Medicine, Massachusetts: Contrasting the genetic component in Parkinson's disease with that of Alzheimer's disease.
L. Ozelius, Massachusetts General Hospital, Charlestown: Identification of a gene for early-onset dystonia.

SESSION 5: Models
Chairperson: D.L. Price, The Johns Hopkins University School of Medicine, Baltimore, Maryland

J.Q. Trojanowski, University of Pennsylvania, Philadelphia: NFH-LacZ transgenic mouse with lewy body-like inclusions show increased behavioral deficits following brain trauma.
D.L. Price, The Johns Hopkins University School of Medicine, Baltimore, Maryland: Transgenic models of neurodegenerative disease.
A.Y. Chiu, City of Hope Medical Center, Duarte, California: Motor neurons are more vulnerable to injury in a transgenic mouse model of familial amyotrophic lateral sclerosis.
P.H. St. George-Hyslop, University of Toronto, Ontario, Canada: Genetic models of human neurodegenerative disease.

Human Cognition and How It Fails

December 7–10

FUNDED BY
The John A. Hartford Foundation

ARRANGED BY
A. Baddeley, University of Bristol, United Kingdom
D.L. Price, Johns Hopkins University School of Medicine, Baltimore, Maryland
T. Tully, Cold Spring Harbor Laboratory

SESSION 1: Dynamics of Memory Formation
Chairperson: Y. Dudai, Weizmann Institute of Science, Rehovot, Israel

A. Baddeley, University of Bristol, United Kingdom: Working memory deficits in normal aging and Alzheimer's disease.
C.K. Rovee-Collier, Rutgers University, Piscataway, New Jersey: Dissociations in infant memory.
K. Thoroughman, Johns Hopkins University, Baltimore, Maryland: Human motor memory processes.
Y. Dudai, Weizmann Institute of Science, Rehovot, Israel: Dynamics of memory formation: The unique case of taste.
D.B. Willingham, University of Virginia, Charlottesville: A neuropsychological theory of motor skill learning.
T.J. Carew, Yale University, New Haven, Connecticut: Temporally and mechanistically distinct phases of constitutive PKA activity in *Aplysia* sensory neurons.

SESSION 2: Structure of Memory Formation
Chairperson: J.P. Aggleton, University of Wales, Cardiff, United Kingdom

L.R. Squire, Veterans Administration Medical Center, San Diego, California: Memory and the hippocampal formation.
M. Mishkin, National Institute of Mental Health, Bethesda, Maryland: Hierarchical organization of cognitive memory.
J.P. Aggleton, University of Wales, Cardiff, United Kingdom: Dissociating aspects of event memory.
P.S. Goldman-Rakic, Yale University School of Medicine, New Haven, Connecticut: Domain-specific and receptor-specific aspects of working memory.
A.P. Shimamura, University of California, Berkeley: Role of the prefrontal cortex in human memory and cognition.

SESSION 3: Disruption/Enhancement of Memory Formation
Chairperson: E.R. Kandel, Columbia University, New York, New York

H.P. Davis, University of Colorado, Colorado Springs: Changes in declarative memory, nondeclarative memory, and frontal lobe functioning across the life span.
P.W. Landfield, University of Kentucky College of Medicine, Lexington: Neurobiology of memory impairment with aging: Implications for organization of memory.
Y. Stern, Sergievsky Center, Columbia University, New York: Understanding individual differences in memory performance in normal aging and Alzheimer's disease: Reserve and compensation.
A.R. Mayes, University of Sheffield, United Kingdom: The specific effects on memory of hippocampal lesions and the amnesia syndrome.
T. Tully, Cold Spring Harbor Laboratory: Genes, memory, and rest.
E.R. Kandel, Columbia University, New York, New York: Memory suppressor genes in the hippocampus.

D. Price, K. Hsiao, R. Mayeux

SESSION 4: Memory Dysfunction
Chairperson: Tim Tully, Cold Spring Harbor Laboratory

A. Silva, Cold Spring Harbor Laboratory: Gene targeting: A tool to unravel mechanisms of learning and memory.
D.L. Price, Johns Hopkins University School of Medicine, Baltimore, Maryland: Animal models of aging and Alzheimer's disease.
R. Mayeux, Columbia University, New York, New York: Genetic epidemiology of Alzheimer's disease and related disorders.
J. Gabrieli, Stanford University, California: Roles for prefrontal cortex in episodic memory.
M.S. Albert, Massachusetts General Hospital, Charlestown: The boundary between aging and Alzheimer's disease.

SESSION 5: Memory Models
Chairperson: J.H. Byrne, University of Texas Medical School at Houston

K. Hsiao, University of Minnesota, Minneapolis: Behavioral deficits and electrophysiological abnormalities in transgenic mice overexpressing the Alzheimer amyloid precursor protein.
A. Sailer, The Salk Institute for Biological Studies, La Jolla, California: Functional analysis of kainate receptors using gene targeting.
J.H. Byrne, University of Texas Medical School at Houston: Insights into the neural mechanisms of operant conditioning: The neglected form of associative learning.
S. Dehaene, INSERM U-334, Orsay, France: A neuronal model for the role of prefrontal cortex in evaluation and planning.

SESSION 6: Closing Discussion: What are the critical next experiments for memory research?
Moderator: T.J. Carew, Yale University, New Haven, Connecticut

Molecular and Genetic Approaches to Transport in Plants

December 14—17

FUNDED BY
Cold Spring Harbor Laboratory Corporate Sponsor Program

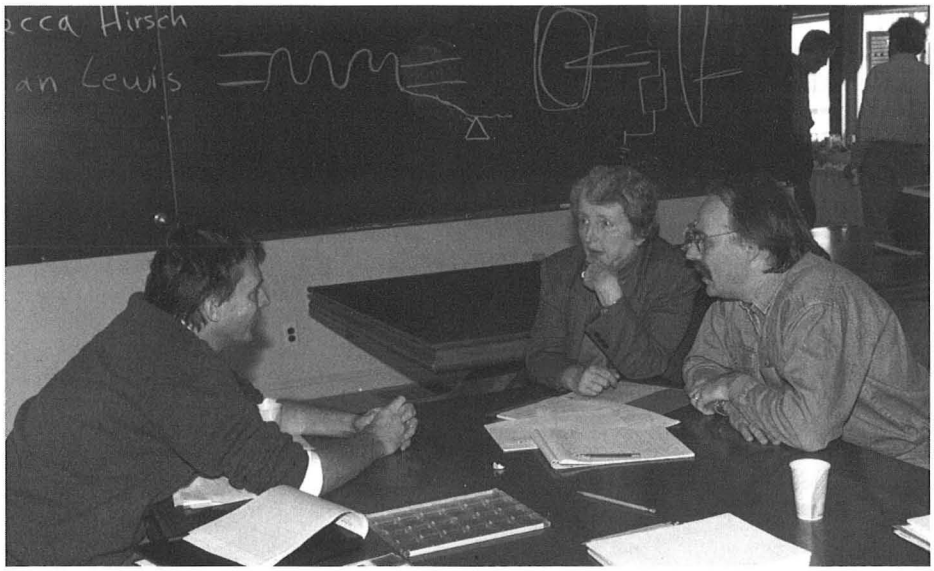
ARRANGED BY
J.I. Schroeder, University of California, San Diego, La Jolla
M.R. Sussman, University of Wisconsin, Madison

SESSION 1: Nitrogen Nutrition in Plants
Chairperson: A. Goffeau, University of Louvain, Belgium

W.-B. Frommer, Universität Tübingen, Germany: Molecular biology of nitrogen uptate.
N. Crawford, University of California, San Diego, La Jolla: Recent advances in nitrate uptake.
S.D. Tyerman, Flinders University of South Australia, Adelaide: Ammonium exchange across symbiotic membrane and aluminum-activated anion channel.
D.P.S. Verma, Ohio State University, Columbus: Regulation of nitrogen assimilation in root nodules.
A.D.M. Glass, University of British Columbia, Vancouver, Canada: Nitrogen absorption by plant roots: Regulation of fluxes.
G. Coruzzi, New York University, New York: *Arabidopsis* mutants define rate-limiting steps in nitrogen assimilation into N-transport amino acids.

SESSION 2: Proton Pumps
Chairperson: J.I. Schroeder, University of California, San Diego, La Jolla

M.R. Sussman, University of Wisconsin, Madison: Proton pumps and K^+ channel knockouts.
A. Goffeau, University of Louvain, Belgium: Functional expression of plant membrane proteins in yeast.
C. Slayman, Yale University School of Medicine, New Haven, Connecticut: H^+ ATPases.



D. Hilgemann, C. Slayman, D. Sanders

SESSION 3: K^+ Nutrition and Na^+ Stress I
Chairperson: R.F. Gaber, Northwestern University, Evanston, Illinois

H.J. Bohnert, University of Arizona, Tucson: Potassium transport and water uptake in relation to plant salinity tolerance.
E.J. Kim, University of California, San Diego, La Jolla: Characterization of novel potassium transporters in plants.
D. Sanders, University of York, United Kingdom: Monovalent cation transport: K^+ nutrition and salinity tolerance.

SESSION 4: K^+ Nutrition and Na^+ Stress II
Chairperson: C. Slayman, Yale University School of Medicine, New Haven, Connecticut

D. Hilgemann, University of Texas Southwestern Medical School, Dallas: Study of membrane transports in giant membrane patches.
J.-K. Zhu, University of Arizona, Tucson: Mutational analysis of salt tolerance and osmotic signal transduction in *Arabidopsis thaliana.*
E.P. Spalding, University of Wisconsin, Madison: Electrophysiological analysis of K^+ channel knockouts.

SESSION 5: Sucrose, Glucose: Sensing and Transport I
Chairperson: G. Coruzzi, New York University, New York

R.F. Gaber, Northwestern University, Evanston, Illinois: Glucose sensing and signaling in budding yeast.
J.-Y. Sheen, Massachusetts General Hospital, Boston: Sugar sensing and signaling in plants.
W. Tanner, University of Regensburg, Germany: Structure-function analysis of hexose/H^+-symporters.

SESSION 6: Sucrose, Glucose: Sensing and Transport II
Chairperson: W.-B. Frommer, Universität Tübingen, Germany

D.R. Bush, University of Illinois, Urbana: Sucrose and amino acid transporters: Recent advances in defining their structure and regulation.

SESSION 7: Micronutrients and Heavy Metal Transport
Chairperson: J.A.C. Smith, University of Oxford, United Kingdom

D.W. Ow, USDA-Plant Gene Expression Center, Albany, California: Heavy metal transport and sequestration.
Stephan Clemens, University of California, San Diego: A plant Ca^{++} and heavy metal transporter.
M.L. Guerinot, Dartmouth College, Hanover, New Hampshire: Characterization of a new family of metal transport proteins.

SESSION 8: Whole-plant Metal Transport and Tolerance
Chairperson: M.L. Guerinot, Dartmouth College, Hanover, New Hampshire

J.A.C. Smith, University of Oxford, United Kingdom: Metal transport and accumulation.

L. Herrera-Estrella, Centro de Investigaciones y Estudios Avanzados, Guanajuato, Mexico: Genetically engineered tolerance to aluminum toxicity.

J. Harper, The Scripps Research Institute, La Jolla, California: Cadmium and calcium pumps.

SESSION 9: Phosphate and Root-Soil Interactions
Chairperson: A.D.M. Glass, University of British Columbia, Vancouver, Canada

M. Harrison, The Samuel Roberts Noble Foundation, Inc., Ardmore, Oklahoma: Two phosphate transporters from *M. truncatula* roots: Regulation of expression in response to phosphate and to colonization by arbuscular mycorrhizal fungi.

D. Shibata, Mitsui Plant Biotechnology Research Institute, Ibaraki, Japan: Overexpression of an *Arabidopsis thaliana* high-affinity phosphate transporter gene in tobacco-cultured cells enhances cell growth under phosphate-limited conditions.

P. Doerner, The Salk Institute for Biological Studies, La Jolla, California: Cell division control and nutrient availability.

Banbury Center Grants

Grantor	*Program/Principal Investigator*	*Duration of Grant*	*1997 Funding*[+]
FEDERAL SUPPORT			
CDC Centers for Disease Control and Prevention	Lyme Disease Workshop: In Vivo Expression and Recognition of Antigenes of *Borelia burgdorferi*	1997	10,000 *
FDA Food and Drug Administration	Molecular Immunobiology of Lyme Disease Workshop	1997	15,000 *
The Federal Judicial Center Judiciary Leadership Developmental Council	The Art of Judging Workshop	1997	18,122 *
NINDS National Institute of Neurological Disorders and Stroke	Genetics of Parkinson's Disease	1997	27,849 *
NONFEDERAL SUPPORT			
Meeting Support			
Albert B. Sabin Vaccine Foundation, Inc.	Case Studies in Vaccine Development	1996	27,243
Albert B. Sabin Vaccine Foundation, Inc.	Sabin HIV	1996	14,987
Alexander and Margaret Stewart Trust	Immunological Attacks on Cancer	1997	28,760 *
American Physiological Society	Genomics to Physiology and Beyond	1997	34,146 *
Amgen, Inc.	Breast Cancer	1997	5,000 *
Applied Microbiology, Inc. (AMBI)	Posttranslational Modifications	1997	17,007 *
Cambridge Neuroscience, Inc.	Neuregulins and Neuregulin Receptors	1997	3,000 *
Fort Dodge Animal Hospital	Lyme Disease	1997	1,000 *
Glaxo Wellcome Inc.	Lyme Disease	1997	5,000 *
John A. Hartford Foundation	Human Cognition	1997	33,000 *
MedImmune, Inc.	Lyme Disease	1997	2,000 *
The National Neurofibromatosis Foundation, Inc.	Neurofibromatosis	1997	30,189 *
OncorMed, Inc.	p53	1997	28,278 *
Pasteur Merieux Connaught	Lyme Disease	1997	5,000 *
SmithKline Beecham Pharmaceuticals	Lyme Disease	1997	5,000 *
The Wilson Foundation	Neurofibromatosis	1997	6,813 *
SPECIAL PROJECT SUPPORT			
Oxnard Foundation	Utrophin Project	11/96–10/99	40,000

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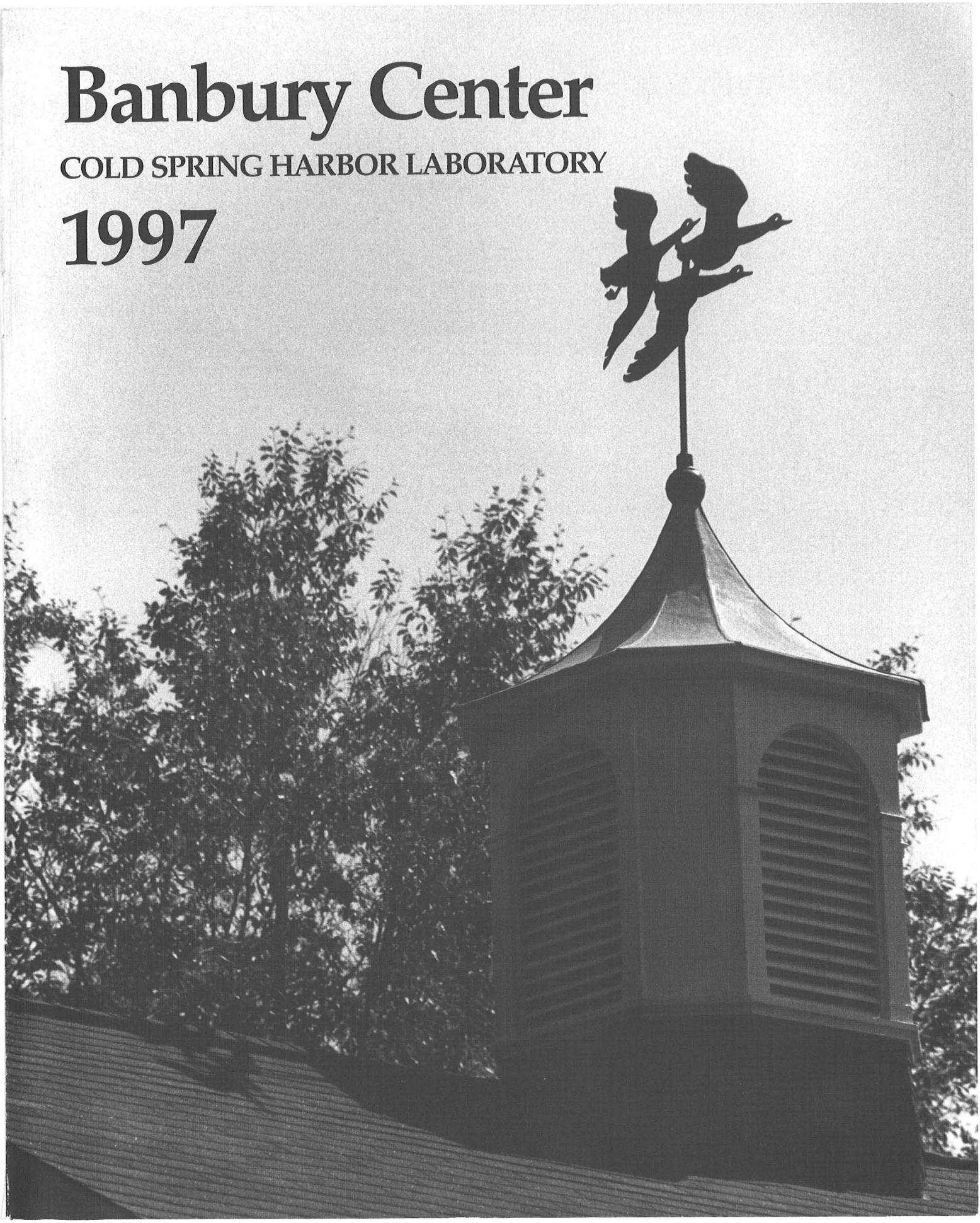
Banbury Center

COLD SPRING HARBOR LABORATORY

1997



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 international reputation for research and education, the magnificent Banbury grounds and buildings are an ideal site for a complementary program of smaller conferences concentrating on aspects of the biological sciences which also bear significant social implications. Banbury's primary concerns are in the areas of molecular biology and genetics, especially as they relate to health, social, and policy issues.

What was once the estate's original seven-car garage is now administrative offices, a small library, and—at its center—a conference room of an ideal shape and size for workshop-style discussion meetings. Complete with extensive, unobtrusive sound and projection facilities as well as wall-to-wall blackboard space, the room can accommodate as many as 40 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.

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Internet: http://www.cshl.org/banbury