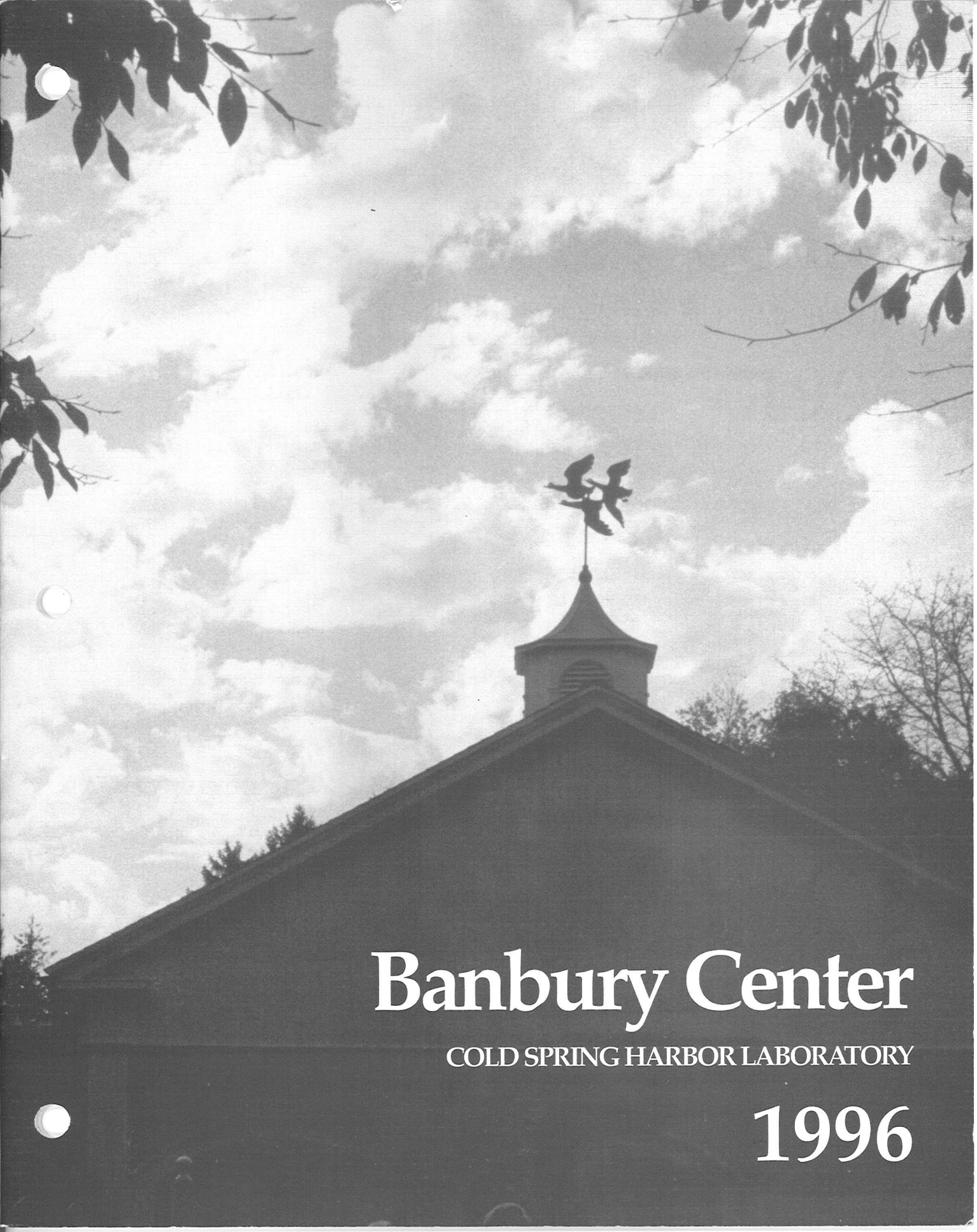


Banbury Center

COLD SPRING HARBOR LABORATORY

1996

BANBURY CENTER DIRECTOR'S REPORT

The year 1996 was a comparatively quiet one for Banbury Center, with 15 scientific meetings and 5 neurobiology courses, and the Conference Room being used on 12 other occasions. But the range of topics was broad and the quality of the meetings was high. Of the 492 scientists who came to the Center, 79 (16%) came from abroad, with scientists from the United Kingdom, Germany, and France predominating. Of the participants from the United States, most came from states with the highest concentrations of biomedical research institutions and companies, with four states (California, Maryland, Massachusetts, and New York) accounting for more than 50% of participants. Nevertheless, the geographical distribution was wide, with participants coming from 31 states. It is notable that no fewer than seven Nobel Laureates came to Banbury Center in 1996.

Another highlight of the year was, of course, the record snowfall of the 1995–1996 winter—73 inches here on Long Island—and we were fortunate to escape serious disruption to the 1996 program.

"Basic" Research

The 1996 meetings dealing with the molecular biology of the cell were outstanding in their coverage of fascinating processes. Two dealt with DNA, albeit in very different contexts. In 1995, Rich Roberts and Xiadong Cheng described the interaction of a DNA methylase enzyme with a DNA molecule and showed that the cytosine base being methylated was "flipped" out of the double helix in a totally unexpected way. The meeting, *DNA Base "Flipping": How and Why*, reviewed new evidence that "base flipping" may be not be restricted to DNA methylases and may be a more general mechanism used by other enzymes for interactions with DNA molecules.

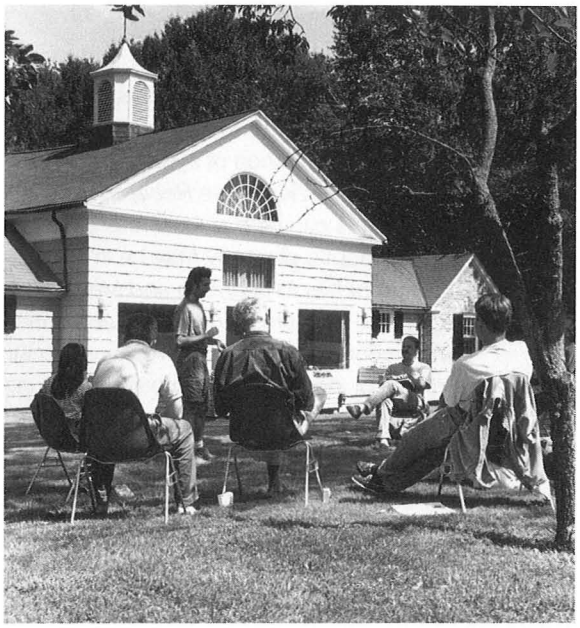
Another novel process in the cell is the means by which it replicates telomeres, the ends of the chromosomes. With the discovery of telomerase, the enzyme that makes telomeres, and data implicating telomeres in cancer and aging, this is a very "hot" area of research. *Telomeres and Telomerase* followed up on an historic Banbury Center meeting from 1994, and itself proved to have been held at just the right moment.

In contrast to telomeres and telomerase (a relatively new area of research), *Mechanisms of Transcriptional Initiation* discussed one of the oldest problems in molecular biology, namely, how RNA molecules are made from the appropriate genes and at the appropriate times. This was an extraordinary workshop, a veritable summit meeting of the world's leading researchers. The schedule was also remarkable in being developed as the meeting progressed, with speakers limited to a few minutes and a few slides. It was very effective, a tribute to the hard work of the organizers, session chairs, and participants.

The remaining two meetings dealt with cells rather than molecules. *Plant Reproductive Biology* covered a range of topics of special interest to those breeding and developing new strains of plants. The meeting was a survey of recent research including processes such as cytoplasmic male sterility, self-incompatibility, and apomixis. Animal mesenchyme cells are fascinating, being involved in many developmental processes and having many different functions. The properties and roles of these cells were examined in *Cellular and Molecular Biology of Mesenchyme*. It was a great pleasure to work with Dan Marshak, a former scientist here at the Laboratory, in his new role of Director of Research for Osiris Therapeutics, Inc.

Human Genetics

Just a few years ago, it was found that the genetic abnormality in Huntington's Disease was the presence of triplet repeats in the gene, leading to tracts of glutamines in the Huntingtin protein.



Conference Center (*Photo by J. Witkowski*)

Such mutations had never been observed before, and this remarkable finding has become even more remarkable as other disorders with the same type of mutation have been discovered, all affecting the nervous system. The *Triplet Repeats and Polyglutamine Tracts* meeting brought together an eclectic group of scientists, not all of whom work on these disorders, to try to determine how to move the research from the genetic level to the biochemical and cellular levels. We were especially pleased to have Max Perutz attend and tell us of his work on a special type of protein-protein interaction.

Manic-depressive Illness: Evolutionary and Ethical Issues combined interesting scientific questions with societal issues. The scientific questions dealt with the adaptive advantages of mutations that are highly deleterious yet relatively common and widespread. The societal issues relating to the genetics of manic-depressive illness (MDI) are complicated by the apparent social benefits derived from some individuals afflicted by the illness. The meeting discussed what is known of the individual and social costs of MDI, and how these affect ethical questions regarding diagnosis.

Vaccines

In recent years, Banbury Center has been the site of several workshops on infectious diseases and vaccines funded by the Albert B. Sabin Vaccine Foundation. The Foundation supported two further meetings in 1996. *AIDS Vaccine Initiative*, held in March, reviewed the current state of affairs on developing an effective vaccine against HIV. This is a highly complex problem, in which economics and political considerations appear to play a role at least as large as scientific research. Fortunately, the organizers and the Foundation were able to involve individuals across a broad spectrum of interests who talked candidly about the difficulties involved.

The March meeting laid the groundwork for a second meeting in November, that was supported also by the National Institute of Allergy and Infectious Diseases, on *Case Studies in Vaccine Development*. Here participants analyzed in depth examples of vaccine development and production—both successful and unsuccessful—with a view to learning what works and what is to be avoided. It was a very interesting meeting, and instructive in dealing with real-life cases rather than abstract models.

Neuroscience

Neurobiology continues to play a large part in the Banbury Center year. There are the neurobiology courses in the summer, and in the autumn of 1996 there were also two neuroscience meetings.

One meeting brought together studies of two rather different systems. On the one hand, glutamate receptors are known to play key roles in nerve and synapse development, while on the other, there is the phenomenon of synaptic plasticity in which synaptic activity produces long-lasting changes. *Plasticity of Glutamate Receptors* examined whether new data on the functioning of glutamate receptors can help in understanding the mechanisms underlying synaptic plasticity.

Synaptic plasticity may be important in learning and in the establishment of memory. *Genetic Approaches to Learning and Memory* reviewed recent advances in finding genes involved in learning and memory. In addition, participants covered some of the social issues involved in the establishment of a new field of research; in this case, the use of transgenic mice to study the genetic basis of learning and memory. These issues include developing fruitful relationships between two groups of researchers—molecular biologists and neurophysiologists—that have not interacted before, and establishing methodological standards.

Biotechnology

This year, only one Banbury Center meeting was directly concerned with a biotechnology topic. Some years ago, there was great optimism that DNA molecules could be used as therapeutic agents. But while the DNA molecule is versatile, its properties are not what the molecular biologist needs to modify gene expression in living cells. *Modified Nucleic Acids: Chemistry and Applications* examined the ways in which DNA molecules can be chemically modified so that they retain their properties but are easier to get into cells and are more stable when they are there. Participants included organic chemists—specialists at making new molecules—and molecular biologists who are trying to use these compounds.

The Executives' Conference

This series of meetings has become legendary for the variety of topics covered, and for the extraordinarily high quality of both scientist-speakers and executive-guests. This year's meeting was no exception and perhaps had an added benefit in that the topic, *Human Development*, was unfamiliar to many at the meeting. Even more so than usual, we asked the participants to go on a long intellectual journey with us: from patterning in the embryo, through human embryonic development and the development of gender differences, to the fertilization and manipulation of human embryos in vitro. I was delighted to have two long-time friends participate—Lewis Wolpert, who published the seminal paper on pattern formation in embryos, and Robert Winston, who developed preimplantation genetic testing, and who now, as Lord Winston, speaks in the House of Lords on these issues.

"Education" for Nonscientists

Banbury Center has for many years held workshops on modern biomedical research for groups of nonscientists, but this year, we did something rather special when some 20 federal and state judges came to Banbury for a 10-day workshop on *The Art of Judging: Perspectives of Science*. Funded by the Federal Judicial Center in Washington, D.C., this was a most interesting workshop, covering not just genetics, but also statistics in the courtroom, risk assessment, and the history and philosophy of science. A highlight of the meeting was a talk by Laurie Garrett based on her international best seller, *The Coming Plague*. The workshop received very high ratings from the participants and we expect that the Federal Judicial Center will return in 1997.

One of the most important and influential series of meetings ever held at Banbury Center was that funded by the Alfred P. Sloan Foundation. Over a period of 12 years, the Sloan Foundation pro-

vided funds to invite Congressional staff and science journalists to Banbury for workshops on biomedical research that has an immediate impact on the public. These workshops were very highly regarded by the participants and provided us with invaluable connections in organizations as varied as the Congressional Research Service and the National Association of Science Writers. Cold Spring Harbor Laboratory Public Affairs and Banbury Center decided that these workshops were so valuable that we should do at least one more, and so the *Science Journalists Workshop on Genetics of Human Behavior* took place in November. The entire meeting dealt with controversial issues and we were fortunate in having the leading researchers come to us, including Dean Hamer, who was the first to find an association between a genetic locus and male homosexuality.

Courses at Banbury Center

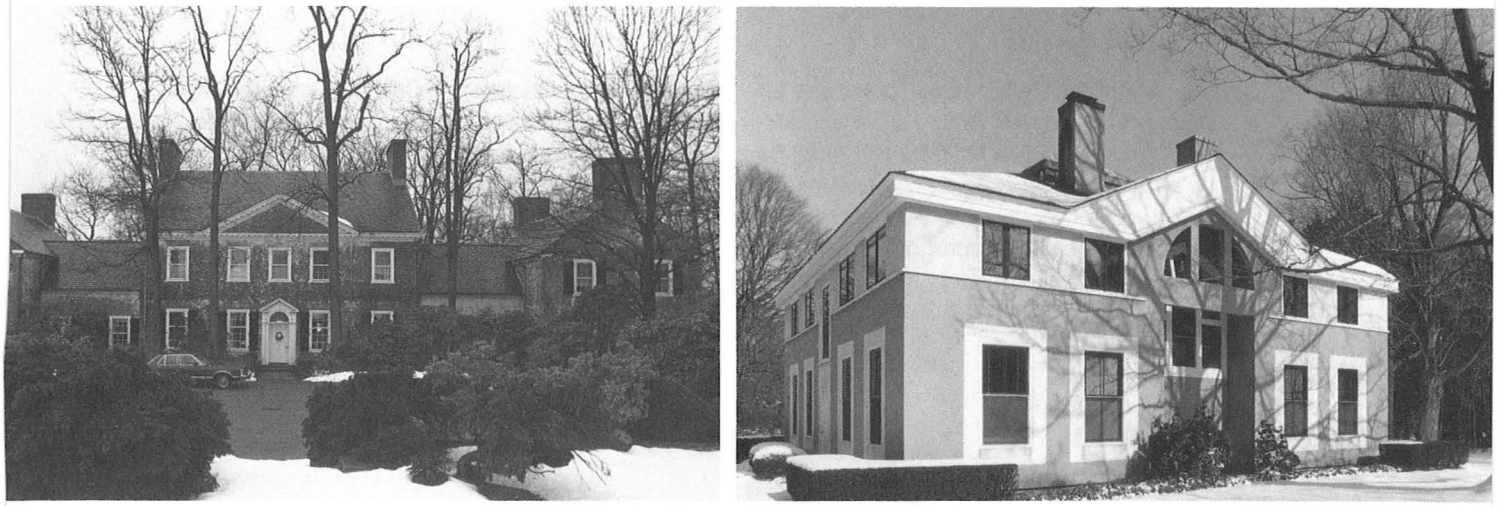
As usual, Banbury Center, during the summer months, was host to five courses, organized by the Laboratory's Meetings Office: *Genetic-Epidemiological Studies of Complex Diseases*; *Neurobiology of Human Neurological Disease*; *Computational Neuroscience: Vision*; *Neurobiology: Brain Development and Function*; and *Advanced* Drosophila *Genetics*.

Other Meetings

Banbury Center is such a wonderful facility that we are glad to make it available to the local community. In 1996, the Center was used for one-day retreats by the Lloyd Harbor Conservation Board, Cold Spring Harbor School District, Family Service League, and Huntington Hospital. In addition, Susan Cooper of Public Affairs organized a Lloyd Harbor seminar for residents of the Village.

Banbury Center on the World Wide Web

The Internet, and particularly the World Wide Web (WWW), has become an indispensable tool for all scientists, including myself. Through it, I can locate people; find out what research they do and where it has been published; and send letters and invitations via e-mail to participants in our meet-



Robertson house (*left*) and Sammis Hall (*right*) provide housing accommodations at Banbury Center.

ings. It was inevitable, then, that Banbury Center would have its own web site. Here, we publish our annual report; provide descriptions of the Center and the style of our meetings; and important information such as maps and directions on how to reach us. A link to our web pages can be found on the Laboratory's home page at www.cshl.org.

Funding

It is impossible to overstate the importance of the contributions made by members of the Cold Spring Harbor Laboratory Corporate Sponsor Program to the Banbury Center. Funds from this Program continue to be essential for a large part of the Banbury Center's activities and provide a firm basis for the rest of our program. In 1996, there were seven meetings for Corporate Sponsors, an increase due to the success of the Plant Associate Program that provided funds for a plant science meeting on *Plant Reproductive Biology*. Other Corporate Sponsor meetings were *Plasticity of Glutamate Receptors; DNA Base "Flipping": How and Why; Telomeres and Telomerase; Triplet Repeats and Polyglutamine Tracts;* and *Modified Nucleic Acids: Chemistry and Applications.*

Companies in the biotechnology world continue to be important sponsors of meetings on topics of special interest to them. All such proposals received must satisfy the same high standards of scientific interest and relevance to the Laboratory's range of research and educational interests—we do not merely rent out the Conference Center—and the meetings are organized in the same way as all our meetings. In 1996, Osiris Therapeutics funded the meeting on *Cellular and Molecular Biology of Mesenchyme*, while Geron Corporation contributed to the meeting on *Telomeres and Telomerase.*

J.P. Morgan, Inc. was again very generous in its support of the *Executive Conference on Human Development*, enabling us to invite scientists of the highest caliber and providing a wonderful ambience in which to listen to and ponder the very best of modern biomedical research.

Foundations and other nonprofit organizations made significant contributions to our year. Our long association with three Foundations led to four meetings. The Albert B. Sabin Foundation supported the two meetings relating to vaccines: *AIDS Vaccine Initiative* and *Case Studies in Vaccine Development*; the Charles A. Dana Foundation provided funds for *Manic-depressive Illness: Evolutionary and Ethical Issues*; and the Hereditary Disease Foundation contributed to the meeting *Triplet Repeats and Polyglutamine Tracts.* The meeting on *Genetic Approaches to Learning and Memory* was funded by the Marie H. Robertson Memorial Fund for Neurobiology. Finally, the Federal Judicial Center supported the fascinating meeting for federal and state judges.

Acknowledgments

The staff of the Center—Bea Toliver and Ellie Sidorenko in the Conference Center office and Katya Davey in Robertson House—did a wonderful job in making sure that all aspects of the meetings went smoothly. Chris McEvoy and Andy Sauer ensured that the Banbury Center estate continues to be a beautiful place. Art Brings and the Facilities Department, and Jim Hope and his Food Service staff were unfailingly helpful, especially as more demands are made on their staff as the Laboratory's meetings program continues to grow. And, last but not least, my thanks to the scientists at the Laboratory for their continuing support of the Center.

Jan Witkowski

MEETINGS

Cellular and Molecular Biology of Mesenchyme

February 11–February 14

FUNDED BY

Osiris Therapeutics, Inc.

ARRANGED BY

D.R. Marshak, Osiris Therapeutics, Inc., Baltimore, Maryland

SESSION 1: Skeletal
Chairperson: D.K. Heinegard, University of Lund, Sweden

A.I. Caplan, Case Western Reserve University, Cleveland, Ohio: The mesengenic process and its relationship of skeletogenesis and hematopoesis.
D.J. Prockop, Thomas Jefferson University, Philadelphia, Pennsylvania: Potential uses of marrow stromal cells for therapy of genetic diseases of bones and cartilage.
M.W. Long, University of Michigan, Ann Arbor: Bone-marrow-derived human osteoprogenitor cells.
G.A. Rodan, Merck Sharp and Dohme Research Laboratories, West Point, Pennsylvania: Osteoblast requirement for osteoblast formation in culture.
D.K. Heinegard, University of Lund, Sweden: Macromolecule markers of chondrocyte and osteoblast development.
R. St-Arnaud, Shriners Hospital, Montreal, Quebec, Canada: Abnormal bone development in mice with targeted mutations in the gene for 25-hydroxyvitamin-D-24-hydroxylase.
B. DeCrombrugghe, M.D. Anderson Cancer Center, Houston, Texas: Approaches to chodrocyte and osteoblast differential.

SESSION 2: Marrow
Chairperson: B. Torok-Storb, The Fred Hutchinson Cancer Research Center, Seattle, Washington

C.I. Civin, The Johns Hopkins Oncology Center, Baltimore, Maryland: Lessons from lymphohematopoiesis.
P.J. Quesenberry, University of Massachusetts Medical Center, Worcester: Marrow stromal and cytokine regulation of primitive marrow stem cells.
S.L. Gerson, Case Western Reserve University, Cleveland, Ohio: Mesenchymal stem cells as a gene therapy target.
M.A. Thiede, Osiris Therapeutics, Inc., Baltimore, Maryland: Reinfusion of mesenchymal stem cells for stromal reconstitution following lethal irradiation.
B. Torok-Storb, The Fred Hutchinson Cancer Research Center, Seattle, Washington: Functional components of the marrow microenvironment.

SESSION 3: Muscle
Chairperson: C. Ordahl, University of California, San Francisco

C. Ordahl, University of California, San Francisco: Early skeletal muscle development.
E.N. Olson, University of Texas Southwestern Medical Center, Dallas: bHLH factors as regulators of somatogenesis.
B. Wold, California Institute of Technology, Pasadena: Multiple pathways to skeletal muscle.
L.A. Leinwand, University of Colorado at Boulder: Specialized function or redundancy in muscle gene families.
J.M. Leiden, The University of Chicago, Illinois: The role of GATA-4 in cardiac myocyte differentiation.
H.M. Blau, Stanford University, California: Muscle-mediated gene therapy.

L.A. Leinwand, E.N. Olson, C. Ordahl

SESSION 4: Vasculature
Chairperson: W.H. Burgess, American Red Cross/Holland Laboratory, Rockville, Maryland

B. Christ, Anatomisches Institut, Freiburg, Germany: Development of the embryonic vascular system.
W.H. Burgess, American Red Cross/Holland Laboratory, Rockville Maryland: FGF-1 and mitogenic signal transduction: Targeting specificity.
D. Bowen-Pope, University of Washington, Seattle: Role PDGF in connective tissue development and function.
L. Demer, University of California, Los Angeles: Pluripotent mesenchymal cells in artery wall calcification.
R. Bucala, The Picower Institute for Medical Research, Manhasset, New York: Fibrocytes: A circulating cell population involved in tissue repair.

SESSION 5: Connective Tissue/Neural Crest/Other
Chairperson: D.R. Marshak, Osiris Therapeutics, Inc., Baltimore, Maryland

D.R. Marshak, Osiris Therapeutics, Inc., Baltimore, Maryland: Introductory remarks.
W.E. Wright, University of Texas Southwestern Medical Center, Dallas: Telomeres, aging, and the senescence of stem cells.
D.M. Noden, College of Veterinary Medicine, Cornell University, Ithaca, New York: Lineage analyses of craniofacial mesenchymal populations.
J.M. Lauder, University of North Carolina, Chapel Hill: Regulation of embryonic craniofacial mesenchyme differentiation by serotonin.
H.C. Slavkin, National Institute of Dental Research, Bethesda, Maryland: Specifications for the cell images for cartilage, bone and teeth.
M. Moos, Center for Biologics Evaluation & Research, Food & Drug Administration, Rockville, Maryland: Biologist meets bureaucrat: The interface between innovation and regulation in contemporary therapeutics.
C. Ordahl, University of California, San Francisco: Closing remarks.

Modified Nucleic Acids: Chemistry and Applications

March 17–March 20

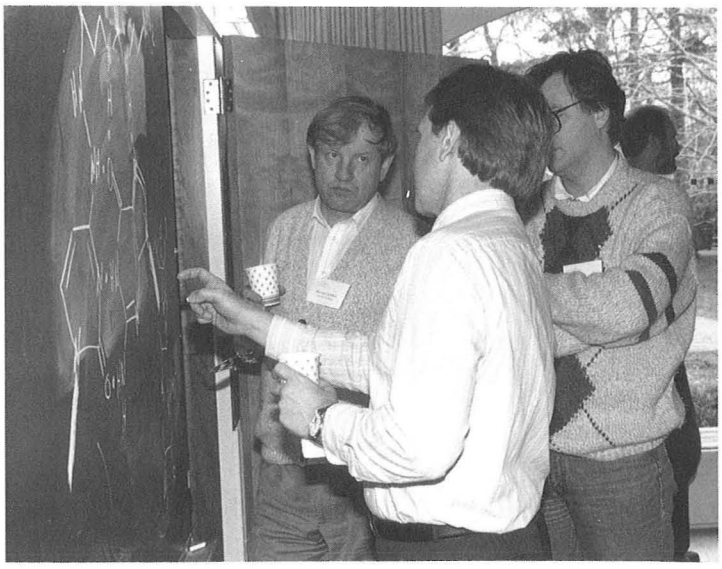
FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

M. Matteucci, Gilead Sciences, Inc., Foster City, California
P. Nelson, The Panum Institute, Copenhagen, Denmark

M.H. Caruthers, S. Gryaznov, P.P. Herdewijn



SESSION 1: Modified Backbones
Chairperson: D. Cook, ISIS Pharmaceuticals, Inc., Carlsbad, California

M.H. Caruthers, University of Colorado, Boulder: Chemical synthesis and biochemical studies with dithioate and boranephosphate DNA.
A. Eschenmoser, Laboratorium fur Organische Chemie, Zurich, Switzerland: Pyranosyl-RNA.
P.P. Herdewijn, Rega Institute, Leuven, Belgium: Backbone modifications resulting in strong hybridizing oligonucleotides.
B.R. Shaw, Duke University, Durham, North Carolina: Properties of boronated nucleic acids.
S.A. Benner, ETH-Zentrum, Zurich, Switzerland: Modified nucleobases; modified sugars; modified linkers.

SESSION 2: Novel Nucleobases
Chairperson: S. Benner, ETH-Zentrum, Zurich, Switzerland

F. Seela, Universitat Osnabruck, Germany: The control of DNA structure by modified purines.
D.E. Bergstrom, Purdue University, West Lafayette, Indiana: "Wild-card" bases: Design and synthesis.
E.T. Kool, University of Rochester, New York: Altering the functional properties of DNA without modifying the backbone.
T.S. Widlanski, Indiana University, Bloomington: Expanding the genetic backbone; synthesis of sulfonate-modified nucleic acids and their interactions with polymerases.
M. Matteucci, Gilead Sciences, Inc., Foster City, California: Covalent and noncovalent conformational restriction of oligonucleotides.
M. Waring, University of Cambridge, United Kingdom: Moving the purine 2-amino group around: Effects on sequence recognition and ligand binding.

SESSION 3: Functional Oligos
Chairperson: A. Eschenmoser, ETH-Zentrum, Zurich, Switzerland

R.L. Letsinger, Northwestern University, Evanston, Illinois: Controlling properties of oliogonucleotides by chemical modifications.
R.B. Meyer, Epoch Pharmaceuticals, Bothell, Washington: Specific modification of genomic DNA with reactive oligonucleotides.
J. Sun, INSERM, CNRS, Paris, France: Oligonucleotide-directed triple helix formation: Stabilization and extension of recognition sequences of triple helices.
M. Frank-Kamenetskii, Boston University, Massachusetts: Sequence-specific targeting of duplex DNA with peptide nucleic acid (PNA).
D.H. Turner, University of Rochester, New York: Binding of oligonucleotides to the catalytic site of a group I ribozyme.
O.D. Scharer, Harvard University, Cambridge, Massachusetts: The use of modified nucleic acids to study DNA repair enzymes.

SESSION 4: Physical Chemistry and Structure
Chairperson: R. Letsinger, Northwestern University, Evanston, Illinois

K.J. Breslauer, Rutgers University, Piscataway, New Jersey: Nucleic acid hybridization, stability, and ligand-binding properties: A thermodynamic perspective.
A. Graslund, Arrhenius Labs, Stockholm, Sweden: Stability and dynamics of PNA/DNA complexes.
S.R. Jordan, Glaxo Wellcome, Research Triangle Park, North Carolina: Crystal structure of PNA_2: DNA triplex.
J. Feigon, University of California, Los Angeles: Solution structures of DNA triplexes containing modified nucleotides.
S.M. Freier, ISIS Pharmaceuticals, Inc., Carlsbad, California: Modified antisense oligonucleotides: Hybridization pharmacokinetics and pharmacology.

SESSION 5: Gene Therapeutic Leads
Chairperson: J. Feigon, University of California, Los Angeles

J. Summerton, Antivirals Inc., Corvallis, Oregon: Design, preparation, and properties of morpholino antisense oligos.
S. Gryaznov, Lynx Therapeutics, Inc., Hayward, California: Synthesis and physicochemical properties of oligonucleotide phosphoramidates.
P.E. Nielsen, The Panum Institute, Copenhagen, Denmark: PNA (peptide nucleic acids). What have we learned and where does it lead?
P.D. Cook, ISIS Pharmaceuticals, Inc. Carlsbad, California: Making drugs out of oligonucleotides.
S. Agrawal, Hybridon, Inc., Worcester, Massachusetts: Antisense properties of oligonucleotide analogs.
H.E. Moser, Ciba-Geigy Ltd., Basel, Switzerland: Modified antisense oligonucleotides: From structure to biological activity in animals.

AIDS Vaccine Initiative: The Sabin Foundation's Role

March 24–March 26

FUNDED BY

Albert B. Sabin Vaccine Foundation

ARRANGED BY

M.R. Hilleman, Merck Research Institute, West Point, Pennsylvania
M.L. Clements, The Johns Hopkins University, Baltimore, Maryland

SESSION 1: Challenges
Chairperson: M.R. Hilleman, Merck Research Institute, West Point, Pennsylvania

M. R. Hilleman, Merck Research Institute, West Point, Pennsylvania: AIDS Vaccine Initiative: Challenges and directions in targeted research.
R. Kurth, Paul-Ehrlich-Institut, Langen, Germany: Perspective of the European community.

SESSION 2: Identifying Obstacles and Opportunities in Research on HIV Vaccines
Facilitator: L.A. Miller, Intermedica, Inc., Norwalk, Connecticut

SESSION 3: Federal and Foundation Initiatives
Chairperson: D. Bolognesi, Duke University Medical Center, Durham, North Carolina

J. Killen, NIAID, National Institutes of Health, Bethesda, Maryland: Perspective of NIAID.
D. Bolognesi, Duke University Medical Center, Durham, North Carolina: The problems that confront the evolution of the Vaccine Initiative as seen from the OAR deliberations.
H.R. Shepherd, Albert B. Sabin Vaccine Foundation, New Canaan, Connecticut and S.M. Shapero, Beverly Hills, California: The role of foundations in the AIDS Vaccine Initiative.

Panel and General Discussion: Future Roles of Government and Foundations
Moderator: L.A. Miller, Intermedica, Inc., Norwalk, Connecticut

D. Henderson, Johns Hopkins University, Baltimore, Maryland
K.I. Shine, National Academy of Sciences, Washington, D.C.
J. Lederberg, The Rockefeller University, New York, New York

SESSION 4: How Can the Sabin Foundation Best Organize Its Efforts to Increase the Probability of Developing an Effective HIV Vaccine?
Chairperson: M.L. Clements, Johns Hopkins University School of Public Health, Baltimore, Maryland

H.R. Shepherd, Albert B. Sabin Vaccine Foundation, New Canaan, Connecticut: The resources of the Sabin Foundation over the next three years.

Building a Consensus: Parts 1 and 2
Facilitator: L.A. Miller, Intermedica, Inc., Norwalk, Connecticut

M.L. Clements, Johns Hopkins University School of Public Health, Baltimore, Maryland: Conclusions: Drawing up a list of goals.

DNA Base "Flipping": How and Why

April 7–April 10

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

X. Cheng, Cold Spring Harbor Laboratory
R.S. Lloyd, University of Texas Medical Branch, Galveston, Texas

SESSION 1: Biophysical Considerations of Base Flipping
Chairperson: D.J. Patel, Memorial Sloan-Kettering Cancer Center, New York, New York

R.J. Roberts, New England BioLabs, Inc., Beverly, Massachusetts: The origin of base flipping.
D.J. Patel, Memorial Sloan-Kettering Cancer Center, New York, New York: Bulge and loop conformations in RNA.
M. Weiss, University of Chicago, Illinois: Florescence studies of DNA bending.
D.G. Gorenstein, University of Texas Medical Branch, Galveston: NMR structure of a dG base flipping in a benzo(a)pyrene diol epoxide duplex adduct.
M. Goodman, University of Southern California, Los Angeles: Evidence for the occurrence of ionized base mispairs during DNA synthesis.
L.S. Beese, Duke University Medical Center, Durham, North Carolina: Structure of DNA polymerase-DNA complexes.

SESSION 2: DNA Methyltransferases
Chairperson: X. Cheng, Cold Spring Harbor Laboratory

G. Schluckebier, Freie Universitat Berlin, Germany: Three-dimensional structure of adenine specific DNA-methyltransferases from *Thermus aquaticus.*
G.I. Verdine, Harvard University, Cambridge, Massachusetts: Keepers of the code: Studies on proteins that decorate and mend the genome.
X. Cheng, Cold Spring Harbor Laboratory: *Hha*I methyltransferase.
S. Klimasauskas, Institute of Biotechnology, Vilnius, Lithuania: Stopped-flow fluorescence studies of methyltransferase-induced base-flipping in DNA.
E. Weinhold, Max-Planck-Institut fuer Molekulare Physiologie, Dortmund, Germany: Evidence for a base flipping mechanism by the adenine-specific DNA methyl-transferase from *Thermus aquaticus.*

H.H Thorp, R.J. Roberts

SESSION 3: DNA Repair Enzymes
Chairperson: R.S. Lloyd, University of Texas Medical Branch, Galveston

S. Wallace, University of Vermont, Burlington: Processing of oxidative DNA base lesions.
J.A. Tainer, The Scripps Research Institute, La Jolla, California: Crystal structures and mutational analysis of DNA base-excision repair enzymes: Structural basis for specificity and catalysis.
R.P. Cunningham, State University of New York, Albany: Novel motifs for substrate recognition by the repair enzyme endonuclease III.
K. Morikawa, Protein Engineering Research Institute, Osaka, Japan: Crystal structure of pyrimidine dimer excision-repair enzyme complexed with DNA: A novel flipping-out mechanism.
H.-W. Park, Duke University Medical Center, Durham, North Carolina: The structure of DNA photolyase: Insights into substrate binding mode.
R.S. Lloyd, University of Texas Medical Branch, Galveston: Mechanism of endonuclease V.
L. Grossman, The Johns Hopkins University, Baltimore, Maryland: DNA structures induced by RNAP as "start" sets for DNA repairs.

SESSION 4: DNA Repair Enzymes
Chairperson: R.J. Roberts, New England BioLabs, Inc., Beverly, Massachusetts

R. Savva, University College London, United Kingdom: Further investigations of the mode of action of uracil-DNA glycosylase.
D.W. Mosbaugh, Oregon State University, Corvallis: Structure, function, and interaction of *E. coli* uracil-DNA glycosylase with the Ugi protein.
B. Demple, Harvard University School of Public Health, Boston, Massachusetts: Is there a role for base flipping in AP endonucleases?
A.-L. Lu-Chang, University of Maryland, Baltimore: Interaction of mismatch-containing DNA with *E. coli* MutY and mammalian MutY homologs.
T. Ellenberger, Harvard Medical School, Boston, Massachusetts: Crystal structure of *E. coli*.

SESSION 5: DNA *Trans*-actions
Chairperson: S.M. Linn, University of California, Berkeley

S.M. Linn, University of California, Berkeley: Other DNA repair processes that might relate to base flipping.
H.H. Thorp, The University of North Carolina at Chapel Hill: Detecting single base mismatches: Consequences of base flipping.
P.C.E. Moody, University of Leicester, United Kingdom: Why should O6-MeG-DNA methyltransferases flip?
D.B. Wigley, University of Oxford, United Kingdom: "Base flipping" in DNA ligases.
P.S. Freemont, Imperial Cancer Research Fund, London, United Kingdom: A DNA glucosyltransferase from T4 phage: Structure and function.
B.L. Bass, HHMI, University of Utah, Salt Lake City: Double-stranded RNA adenosine deaminase.

Plant Reproductive Biology

April 21–April 24

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

R. Pruitt, Harvard University, Cambridge, Massachusetts

SESSION 1: Male Reproductive Development I
Chairperson: P.S. Schnable, Iowa State University, Ames

R. Pruitt, Harvard University, Cambridge, Massachusetts: Genetic analysis of reproduction in *Arabidopsis*.
M.C. Albertsen, Pioneer Hi-Bred International, Inc., Johnston, Iowa: Cloning and characterizing male fertility genes in maize.
S. McCormick, Plant Gene Expression Center, Albany, California: Cell division mutations in *Arabidopsis* pollen development.
D. Twell, University of Leicester, United Kingdom: Gene regulation and cell determination in male gametophyte development.
W.Z. Cande, University of California, Berkeley: Chromosome behavior during meiotic prophase in maize meiocytes.
S.H. Strauss, Oregon State University, Corvallis: Floral homeotic genes as tools for engineering complete reproductive sterility in Populus and other forest trees.

SESSION 2: Male Reproductive Development II
Chairperson: M. Albertsen, Pioneer Hi-Bred International, Johnston, Iowa

D. Preuss, University of Chicago, Illinois: An *Arabidopsis* mutant defective in pollen tube guidance exhibits self-sterility.
C.S. Levings III, North Carolina State University, Raleigh: The Texas male-sterile cytoplasm of maize.
P.S. Schnable, Iowa State University, Ames: Fertility restoration of cytoplasmic male sterility: Molecular analysis of the *rf2* restorer of cmsT maize.
S. Mackenzie, Purdue University, West Lafayette, Indiana: Tissue-specific expression of a mitochondrial sequence influences pollen development in cms bean.
M. Hanson, Cornell University, Ithaca, New York: Cytoplasmic male sterility in Petunia.

S.H. Strauss

SESSION 3: Female Reproductive Development
Chairperson: H. Dickinson, University of Oxford, United Kingdom

J.L. Bowman, University of California, Davis: Molecular genetics of carpel development.
J.A. Verbeke, University of Arizona, Tucson: Fusion events during gynoecium development.
C.S. Gasser, University of California, Davis: Genetic analysis of ovule development.
U. Grossniklaus, Cold Spring Harbor Laboratory: Enhancer detection as a tool to study reproductive development in *Arabidopsis*.
J.M. Herr, Jr., University of South Carolina, Columbia: A new perspective of ovule and female gametophyte evolution.
A. Ray, University of Rochester, New York: Floral initiation and ovule development.
R. Fischer, University of California, Berkeley: Control of ovule development in *Arabidopsis*.

SESSION 4: Evolution of Reproductive Systems
Chairperson: U. Grossniklaus, Cold Spring Harbor Laboratory

C.F. Crane, Texas A&M University, College Station: Developmental implications of apomixis.
R. Bicknell, Crop & Food Research Ltd., Christchurch, New Zealand: Development of *Hieracium* as a model system to study apomixis.
A.M. Chaudhury, CSIRO Division of Plant Industry, Australia: Fertilization-independent seed development.
S.C. De Vries, Agricultural University Wageningen, The Netherlands: Signal transduction in the early plant embryo.
U. Goodenough, Washington University, St. Louis, Missouri: Why and how have sex genes evolved?
J.A. Banks, Purdue University, West Lafayette, Indiana: Mechanisms of sex determination in homosporous ferns; alternation of generations.
E. Lord, University of California, Riverside: Pollination as a case of cell adhesion and cell movement.

SESSION 5: Self-incompatibility/Fertilization
Chairperson: A.M. Chaudhury, CSIRO, Canberra City, Australia

H. Dickson, University of Oxford, United Kingdom: Defensin-like proteins in the pollen coating of *Brassica*.
J.B. Nasrallah, Cornell University, Ithaca, New York: Self-incompatibility in *Brassica*.
F.C.H. Franklin, University of Birmingham, United Kingdom: Self-incompatibility in *Papauer rhoeas*: Progress toward elucidation of the molecular basis of pollen-pistil recognition.
T.-H. Kao, Pennsylvania State University, University Park: Role of Petunia receptor kinase PRK1 in pollen and embryo sac development.
W.E. Friedman, University of Colorado, Boulder: Comparative and phylogenetic approaches to reconstructing the evolution of plant reproductive patterns.
S.D. Russell, University of Oklahoma, Norman: Structural considerations in angiosperm fertilization.
C. Dumas, Ecole Normale Superieure, Lyon, France: How to investigate fertilization in flowering plants.

Triplet Repeats and Polyglutamine Tracts

May 5–May 8

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program and the Hereditary Disease Foundation

ARRANGED BY

D. Housman, Massachusetts Institute of Technology, Cambridge
D. Nelson, Baylor College of Medicine, Houston, Texas
A. Tobin, University of California, Los Angeles
N.S. Wexler, College of Physicians & Surgeons of Columbia University, New York, New York

SESSION 1: Clinical Presentation

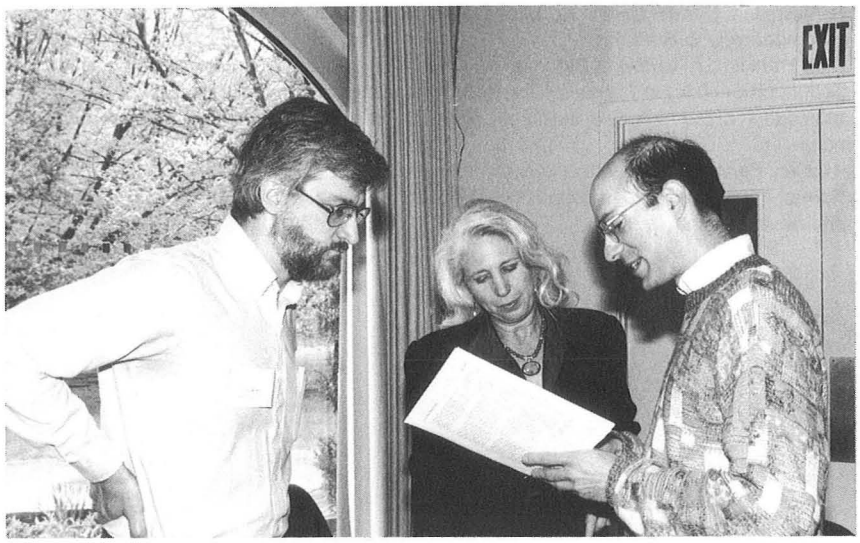
N.S. Wexler, College of Physicians & Surgeons of Columbia University, New York, New York

SESSION 2: Triplet Repeat Diseases

A.B. Young, Massachusetts General Hospital, Boston: Interaction of polyglutamines with mitochondrial import proteins or leader sequences.
J.F. Gusella, Massachusetts General Hospital, Charlestown: Huntington's disease.
C. Ross, The Johns Hopkins University, Baltimore, Maryland: HD, DRPLA.
J.M. Vance, Duke University Medical Center, Durham, North Carolina: Similarities of the GAG trinculeotides and the uniqueness of the nervous system in neurogenetics.
D.L. Nelson, Baylor College of Medicine, Houston, Texas: Fragile X syndrome update.
P. Patel, Baylor College of Medicine, Houston, Texas: The Friedreich's ataxia intronic GAA expansion: What does it do?
K. Taneja, University of Massachusetts Medical Center, Worcester: Detection of triplet repeats by in situ hybridization.
Discussion: Triplet repeat disorders.

SESSION 3: Polyglutamine Tracts

M. Perutz, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom: Incorporation of glutamine repeats in a small protein causes irreversible association into oligomers.
K. Stott, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom: The oligomerization mechanism of a model protein with engineered glutamine repeats.
C.T. Caskey, Merck Research Laboratories, Merck & Co., Inc., West Point, Pennsylvania: New date on triplet binding proteins.



C. Ross, N.S. Wexler, S. Fields

SESSION 4: Protein-Protein Interactions

S. Fields, University of Washington, Seattle: Yeast hybrid methods to analyze protein-protein and RNA-protein interactions.
T. Dawson, Johns Hopkins University School of Medicine, Baltimore, Maryland: Expansion of polyglutamine repeat in Huntington leads to abnormal proteins interactions involving calmodulin.
J.R. Burke, Duke University Medical Center, Durham, North Carolina: Possible roles for GAPDH in polyglutamine repeat diseases.
B. Koshy, Baylor College of Medicine, Houston, Texas: Characterization of ataxia-1 and its interactions with GAPDH.
R. Brent, Massachusetts General Hospital, Boston: Assigning functions to proteins by mapping connections.
Discussion: Where next in studying protein-protein interactions?

SESSION 6: Cell Death

N. Heintz, HHMI, Rockefeller University, New York, New York: Cell death and the cell cycle.
S. Lowe, Cold Spring Harbor Laboratory: Modulation of apoptosis in tumor development and cancer therapy.
M. Hengartner, Cold Spring Harbor Laboratory: Programmed cell death in *C. elegans* nervous system.
H. Dudek, Children's Hospital, Boston, Massachusetts: Signal transduction pathways and the regulation of neuronal survival and death.
Discussion: What do cell death studies offer research on triplet repeat diseases?

SESSION 5: Mouse Models

J.-L. Mandel, IGBMC, Illkirch, France: Progress in construction of cellular or mouse models of Huntington's disease.
G. Bates, Guy's Hospital, London, United Kingdom: Transgenic models. Phenotype observed in mice transgenic for the Huntington's disease mutation.
M.E. MacDonald, Massachusetts General Hospital, Charlestown: Making models of the unstable Huntington's disease CAG repeat in the mouse.
D.E. Merry, University of Pennsylvania School of Medicine, Philadelphia: Androgen receptor transgenic mice: Attempts at creating a mouse model for spinal and bulbar muscular atrophy.
Discussion: Future developments using transgenic models.

SESSION 7: Looking for Therapies

G.D. Yancopoulos, Regeneron Pharmaceuticals, Inc., Tarrytown, New York: Neurotrophic factors and neurogenerative disease.
A. Tobin, University of California, Los Angeles: Round Table Discussion: How to move from "basic" research to "therapeutic" research?
N.S. Wexler, College of Physicians & Surgeons of Columbia University, New York, New York
L.J. DeGennaro, Wyeth-Ayerst Research, Princeton, New Jersey
C.T. Caskey, Merck Research Laboratories, Merck & Co., Inc., West Point, Pennsylvania
G.D. Yancopoulos, Regeneron Pharmaceuticals, Inc., Tarrytown, New York

Plasticity of Glutamate Receptors: Cellular and Molecular Mechanisms

October 6–October 9

FUNDED BY

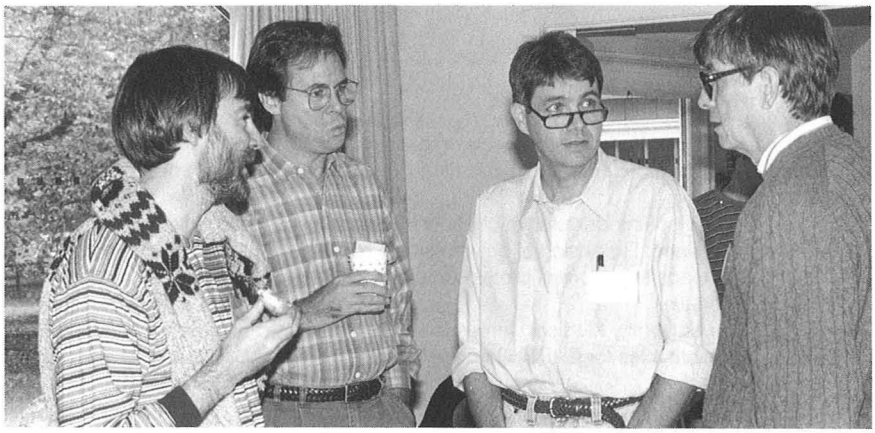
Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

R. Malinow, Cold Spring Harbor Laboratory
R.L. Huganir, HHMI, Johns Hopkins University School of Medicine, Baltimore, Maryland

SESSION 1: Formation of a Model Synapse: The Neuromuscular Junction
Chairperson: R.L. Huganir, HHMI, Johns Hopkins University School of Medicine, Baltimore, Maryland

S.C. Froehner, University of North Carolina School of Medicine, Chapel Hill: Syntrophins: Modular adaptor proteins in synaptic signaling.
J.R. Fallon, Brown University, Providence, Rhode Island: Regulation of synaptic structure.



M.L. Mayer, R.L. Huganir,
G.L. Westbrook, R.A. Nicoli

SESSION 2: Structure and Function of Glutamate Receptors
Chairperson: R. Malinow, Cold Spring Harbor Laboratory

R.W. Gereau, The Salk Institute for Biological Studies, San Diego, California: Mechanism of desensitization of mGluR5.
P.H. Seeburg, University of Heidelberg, Germany: Genetic regulation of glutamate receptor properties.
M. Mishina, University of Tokyo, Japan: Synaptic plasticity in mutant mice lacking glutamate receptor channels.
S. Nakanishi, Kyoto University Faculty of Medicine, Japan: Distinct signaling calcium of different metabotropic receptor subtypes.
M. Hollmann, Max Planck Institute for Experimental Medicine, Gottingen, Germany: Functional domains and topology of glutamate receptors.

SESSION 3: Physiological Properties of Glutamate Receptors
Chairperson: R.A. Nicoll, University of California, San Francisco

S.G. Cull-Candy, University College London, United Kingdom: Single-channel diversity and dependence on subunit composition in the cerebellum.
M.L. Mayer, LCMN, NICHD, National Institutes of Health, Bethesda, Maryland: Permeation and block in GluR channels.
R.W. Tsien, Stanford University School of Medicine, California: Understanding the quantal response at glutamater-gic synapses between hippocampal neurons.
G.L. Westbrook, Vollum Institute, Oregon Health Sciences University, Portland: Intracellular regulation of NMDA receptors.
C.E. Jahr, Vollum Institute, Oregon Health Sciences University, Portland: Regulation of glutamate channel activation at synapses.

SESSION 4: Regulation of Glutamate Receptor Function
Chairperson: R.C. Malenka, University of California, San Francisco

R.L. Huganir, HHMI, Johns Hopkins University School of Medicine, Baltimore, Maryland: Regulation of glutamate receptors by protein phosphorylation.
M.W. Salter, Hospital for Sick Children, Toronto, Canada: NMDA receptor for regulation by tyrosine phosphorylation.
T.R. Soderling, Vollum Institute, Oregon Health Sciences University, Portland: Regulation of glutamate receptors by Cam-Kinase II.

SESSION 5: Synaptic Structure and Localization of Glutamate Receptors
Chairperson: P.H. Seeburg, University of Heidelberg, Germany

P. Somogyi, Oxford University, United Kingdom: Location of glutamate receptors in relation to transmitter release sites.
R.J. Wenthold, NIDCD, National Institutes of Health, Bethesda, Maryland: Distribution and targeting at glutamate receptors in neurons.
K.M. Harris, Children's Hospital, Boston, Massachusetts: Structural diversity of hippocampal glutamatergic synapses.
M.H. Sheng, HHMI, Massachusetts General Hospital, Boston: Molecular organization of glutamatergic synapses.

SESSION 6: Plasticity at Excitatory Synapses I
Chairperson: S.G. Cull-Candy, University College London, United Kingdom

G.L. Collingridge, University of Bristol School of Medical Sciences, United Kingdom: Glutamate receptors and LTP in the hippocampus.
D.M. Kullmann, Institute of Neurology, London, United Kingdom: Long-term potentiation of AMPA and NMDA receptor-mediated signals in the hippocampus.
R. Malinow, Cold Spring Harbor Laboratory: Silent synapses: Electrophysiological and cell biological studies.
H. Cline, Cold Spring Harbor Laboratory: Parallel mechanisms underlying "development" and "plasticity" of synaptic connections.
R.C. Malenka, University of California, San Francisco: Bidirectional control of synaptic strength.
D.W. Choi, Washington University School of Medicine, St. Louis, Missouri: mGluR modulation of excitotoxic neuronal death.

SESSION 7: Plasticity of Excitatory Synapses II
Chairperson: S.C. Froehner, University of North Carolina School of Medicine, Chapel Hill

R.A. Nicoll, University of California, San Francisco: The role of metabotropic glutamate receptors in hippocampal mossy fiber transmission.
T. Takahashi, Brain Research Institute, Tokyo, Japan: Mechanisms underlying short-term and long-term synaptic modulation induced by presynaptic glutamate receptors.
D.J. Linden, Johns Hopkins University School of Medicine, Baltimore, Maryland: A protein-synthesis-dependent late phase of cerebella long-term depression.

SESSION 8: Global Mechanisms
Chairperson: M.L. Mayer, LCMN, NICHD, National Institutes of Health, Bethesda, Maryland

M.F. Bear, HHMI, Brown University, Providence, Rhode Island: Bidirectional synaptic plasticity and its regulation in the cerebral cortex.
J.E. Lisman, Brandeis University, Waltham, Massachusetts: A new role for NMDA channels in memory recall.

The Art of Judging: Perspectives of Science

October 10–October 15

FUNDED BY

The Judiciary Leadership Development Council, The Federal Judicial Center, 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

J.D. Watson, Cold Spring Harbor Laboratory: Frontiers of genetic research.

SESSION 2

P. Galison, Harvard University, Cambridge, Massachusetts: Science in the 20th century.
R. Meserve, Covington & Burling, Washington, D.C.: Science issues in the courtroom.

SESSION 3

P. Reilly, Shriver Center for Mental Retardation, Waltham, Massachusetts: Special policy issues involving DNA and genetic engineering.
D. Hull, Northwestern University, Chicago, Illinois: The process of science: The system of rewards.

SESSION 4

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: DNA and the Human Genome Project.
D. Wilkinson, Princeton University, New Jersey: Evidence, errors, and proof in science: Cosmology as a paradigm.

SESSION 5

D. Micklos and Mark Bloom, DNA Learning Center, Cold Spring Harbor Laboratory: Visit to Cold Spring Harbor Laboratory and personal DNA experiments.

SESSION 6

L. Moses, Stanford University Medical School, California: Statistics and probability in science.
M. Weinberg, The Weinberg Group, Washington, D.C.: Issues of science and industry.
S.A. Schaffer, New York University, New York: Research integrity and scientific misconduct.

SESSION 7

D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory: Eugenics.
J. Foran, Risk Science Institute, Washington, D.C.: Causation and risk assessment in science.

SESSION 8

M. Gallo, Robert Wood Johnson Medical School, Piscataway, New Jersey: Toxicology and the environment.
L. Garrett, Newsday, Melville, New York: Viruses and plagues.

SESSION 9

J.W. Hicks, Alabama Department of Forensic Sciences, Birmingham: Science and criminal investigations.
P.M. Eisenberger, Princeton University, New Jersey: Role of universities in science and technology in 21st century.

Manic-depressive Illness: Evolutionary and Ethical Issues

October 20–October 23

FUNDED BY

Charles A. Dana Foundation

ARRANGED BY

K.R. Jamison, The Johns Hopkins School of Medicine, Baltimore, Maryland
R. Cook-Deegan, National Academy of Science, Washington, D.C.
L.L. Hall, National Alliance for the Mentally Ill, Arlington, Virginia
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory

SESSION 1: Overview of Manic-depressive Illness; Status of Genetic Studies; Individual and Social Costs of Manic-depressive Illness

Co-Chairpersons: P.C. Whybrow, University of Pennsylvania, Philadelphia, and
L.L. Hall, National Alliance for the Mentally Ill, Arlington, Virginia

K.R. Jamison, The Johns Hopkins School of Medicine, Baltimore, Maryland: Overiew of manic-depressive illness: Its cost and benefits.

R.J. DePaulo, The Johns Hopkins School of Medicine, Baltimore, Maryland: Status of genetic studies.

T. Ricke, National Depressive and Manic-Depressive Association, Chicago, Illinois: Family costs.

R.J. Wyatt, National Institute of Mental Health, Washington, D.C.: Economic costs.

L. Andrews, Chicago-Kent College of Law, Illinois: Risks and benefits of genetic information (to individuals and their families).

SESSION 2: Adaptive Value of Manic-depressive Illness
Chairperson: S.H. Barondes, University of California, San Francisco

R. Richards, University of California, San Francisco: Creativity in manic-depressives and their first-degree relatives.

D.R. Wilson, University of Cincinnati, Ohio: Evolutionary advantages of mood instability.

P. Gilbert, Kingsway Hospital, Derby, United Kingdom: Evolutionary perspectives on depression.

SESSION 3: Evolutionary Biology: Perspectives from Other Conditions
Chairperson: R. Cook-Deegan, National Academy of Science, Washington, D.C.

R.M. Neese, University of Michigan Medical School, Ann Arbor: Disease in general, including sickle cell, thalassemia-malaria, and CF-cholera.

D. Hamer, National Cancer Institute, National Institutes of Health, Bethesda, Maryland: Homosexuality: The findings.

C. Burr, Atlantic Monthly, Washington, D.C.: Homosexuality: The implications.

L.M. Silver, Princeton University, New Jersey: Genetics of complex behavioral traits (in mouse).

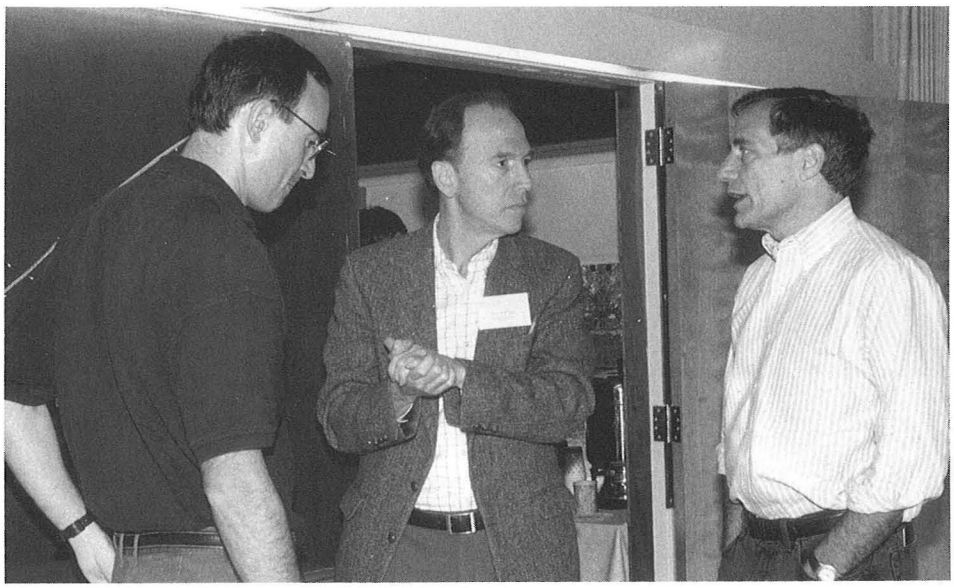
SESSION 4: Evolutionary Perspectives on Manic-depressive Illness: Implications
Chairperson: J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory

Focused discussion: What's at stake?
Leaders: P.C. Whybrow, University of Pennsylvania, Philadelphia, and
L.L. Hall, National Alliance for the Mentally Ill, Arlington, Virginia

Focused discussion: Does manic-depression have adaptive value?
Leader: S.H. Barondes, University of California, San Francisco

Focused discussion: Is there a tradeoff between social benefit and individual harm?

SESSION 5: Development of Consensus Statement
Co-Chairpersons: R. Cook-Deegan, National Academy of Sciences, Washington, D.C., and **K.R. Jamison,** The Johns Hopkins School of Medicine, Baltimore, Maryland



C. Burr, R.J. DePaulo
D. Hamer

J.P. Morgan & Co. Incorporated/Cold Spring Harbor Laboratory Executive Conference on Human Development

October 25–October 27

ARRANGED BY

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

SESSION 1

L. Wolpert, University College and Middlesex Hospital Medical School, London, United Kingdom: How embryos develop.

SESSION 2

B. Hogan, Vanderbilt University Medical School, Nashville, Tennessee: Human development from conception to birth.
D. Page, Whitehead Institute, Massachusetts Institute of Technology, Cambridge: Genes and sex.
J. Hall, University of British Columbia, Vancouver, Canada: When development goes awry.

SESSION 3

R. Rosenfeld, Oregon Health Sciences University, Portland: Human growth and maturation: Significance, biology, and therapeutic interventions.

SESSION 4

A. Silva, Cold Spring Harbor Laboratory: Studying learning and memory.
T. Marr, Cold Spring Harbor Laboratory: Genetics and manic-depressive illness.

SESSION 5

M. Hines, University of California, Los Angeles: Developmental differences between the sexes.
R. Winston, Royal Postgraduate Medical School, London, United Kingdom: Controlling human development: Ethical issues.

D. Page, G. Milne

Telomeres and Telomerase

November 3–November 6

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program with additional support from Geron Corporation

ARRANGED BY

T. de Lange, The Rockefeller University, New York, New York
C. Greider, Cold Spring Harbor Laboratory

SESSION 1: Telomere Length Regulation I
Chairperson: C. Greider, Cold Spring Harbor Laboratory

E.H. Blackburn, University of California, San Francisco: Yeast and other telomerases.
T.R. Cech, HHMI, University of Colorado, Boulder: Purification of Euplotes telomerase.
V. Lundblad, Baylor College of Medicine: EST1, EST2, EST3, and EST4/CDC13: In vivo regulators of yeast telomerase.
V.A. Zakian, Princeton University, New Jersey: Telomere maintenance in *Saccharomyces.*
A.J. Lustig, Tulane Medical Center, New Orleans, Louisiana: A novel mechanism for telomere size control in yeast.
D.M. Shore, University of Geneva, Switzerland: Telomere length regulation by Rap1 protein in yeast.

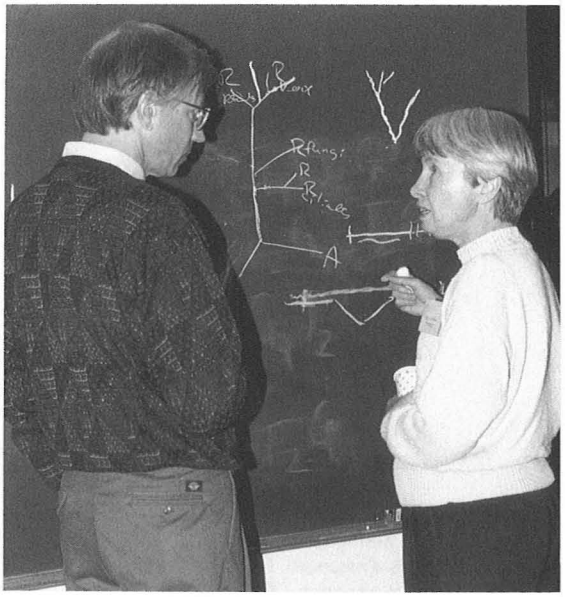
SESSION 2: Telomere Length Regulation II
Chairperson: T.R. Cech, HHMI, University of Colorado, Boulder

R. Wellinger, University of Sherbrooke, Canada: Studies on the terminal DNA structure of eukaryotic telomeres.
K.W. Runge, Cleveland Clinic Foundation Research Institute, Ohio: Telomere length regulation in *Saccharo-myces cerevisiae.*
C. Price, University of Nebraska, Lincoln: Coordination of G and C strand synthesis during de novo telomere addition.
T. de Lange, Rockefeller University, New York, New York: Mammalian telomeric proteins and telomere length control.

SESSION 3: Telomerase
Chairperson: E.H. Blackburn, University of California, San Francisco

K. Collins, University of California, Berkeley: Architecture of the telomerase RNP.
D.E. Shippen, Texas A&M University, College Station: DNA recognition and synthesis by ciliate and plant telomerases.
D. Romero, University of Minnesota, Minneapolis: The fidelity of *Paramecium* telomerase in vivo.
F. Muller, University of Fribourg, Switzerland: Telomeres in nematodes.
F. Ishikawa, Tokyo Institute of Technology, Yokohama, Japan: Cloning of a mammalian telomerase component gene.

T.R. Cech, M.-L. Pardue



SESSION 4: *Drosophila* Telomeres
Chairperson: C.S. Newlon, UMDNJ-New Jersey Medical School, Newark

M.-L. Pardue, Massachusetts Institute of Technology, Cambridge: The *Drosophila* telomere: The relationship between telomeres and transposable elements.
H. Biessmann, University of California, Irvine: *Drosophila* and mosquito telomeres.

SESSION 5: Telomeric Chromatin
Chairperson: T.D. Petes, University of North Carolina, Chapel Hill

D. Rhodes, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom: The crystal structure of the DNA-binding domain of yeast Rap1 in complex with telomeric DNA.
S. Schultz, University of Colorado, Boulder: Structure of the *O. nova* telomere binding protein complexed with ssDNA.
J.P. Langmore, Biophysics Research Division, University of Michigan, Ann Arbor: Functional studies of vertebrate model telomeres in vitro, and determination of the covalent terminal structure of telomeres from mortal and immortal human cells.
D. Gottschling, Fred Hutchinson Cancer Research Center, Seattle: Waiting 'til the end: Silent chromatin regulates the time of telomeric DNA replication.
C.S. Newlon, UMDNJ-New Jersey Medical School, Newark: Telomeric inactivation of a yeast chromosomal DNA replication origin.
J. Berman, University of Minnesota, St. Paul: The organization of telomeres and telomere-associated proteins in yeast nuclei.

SESSION 6: Telomeres and Telomerase in Cancer and Aging
Chairperson: V.A. Zakian, Princeton University, New Jersey

C. Greider, Cold Spring Harbor Laboratory: Telomerase in mouse models.
R.R. Reddel, Children's Medical Research Institute, Wentworthville, Australia: Lengthening of telomeres in human cell lines without detectable telomerase activity.
J.W. Shay, University of Texas Southwestern Medical Center, Dallas: Telomerase and cancer: Diagnostic, prognostic, and therapeutic implications.
J.K. McDougall, Fred Hutchinson Cancer Research Center, Seattle, Washington: Viral gene expression and telomerase activation.
C.B. Harley, Geron Corporation, Menlo Park, California: Telomere loss and cell aging.
S. Bacchetti, McMaster University, Hamilton, Ontario, Canada: Reprogramming of telomerase and alteration of telomeres in human cells by mutated telomerase RNA templates.
W.E. Wright, University of Texas Southwestern Medical Center, Dallas: G-rich overhang in human telomeres.

Science Journalists Workshop on Genetics of Human Behavior

November 7–November 9

FUNDED BY

Cold Spring Harbor Laboratory

ARRANGED BY

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

SESSION 1: Human Behavior

M.G. McInnis, Johns Hopkins Hospital, Baltimore, Maryland: Psychiatric disorders as aberrant behavior.
D. Goldman, NIAAA, National Institutes of Health, Rockville, Maryland: Biological and genetic approaches to understanding alcoholism.
M. Linnoila, NIAAA, National Institutes of Health, Bethesda, Maryland: Biological and genetic approaches to understanding aggressive behavior.
D. Hamer, National Cancer Institute, National Institutes of Health, Bethesda, Maryland: Genetic analyses of homosexuality.
T. Tully, Cold Spring Harbor Laboratory: Genetic studies of learning and memory.
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: The new human genetics.

D. Goldman, M. Linnoila

SESSION 2: DNA Experiment

D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory: DNA fingerprinting using PCR.

Case Studies in Vaccine Development

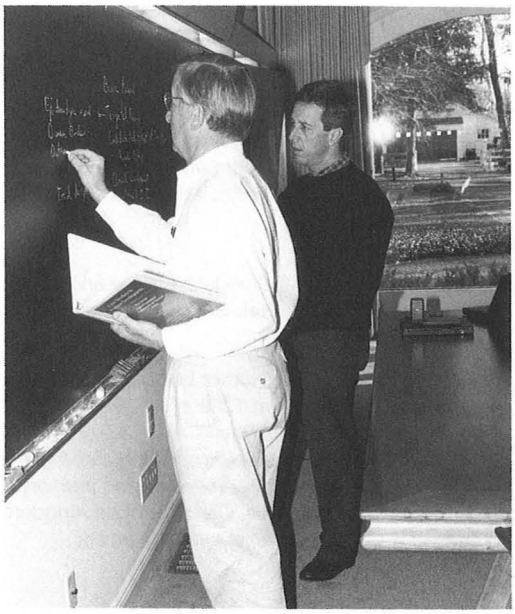
November 17–November 20

FUNDED BY

Albert B. Sabin Vaccine Foundation and the National Institute of Allergy and Infectious Diseases

ARRANGED BY

R.G. Douglas, Merck & Co., Inc., Whitehouse Station, New Jersey
B. Gellin, NIAID, National Institutes of Health, Bethesda, Maryland



R.G. Douglas, B. Gellin

SESSION 1: Orientation and Objectives

R.G. Douglas, Merck & Co., Inc., Whitehouse Station, New Jersey and E.K. Marcuse, University of Washington, Seattle: NVAC and the Future Vaccine Subcommittee: Mandate and mission.
B.G. Gellin, National Institutes of Health, Bethesda, Maryland: Case studies in vaccine development: Concept and goal of the workshop.
R.G. Douglas, Merck & Co., Inc., Whitehouse Station, New Jersey: The vaccine R&D "system."
L. Galambos and J.E. Sewell, The Johns Hopkins University, Baltimore, Maryland: Perspectives on networks: Lessons learned from other industries.

SESSION 2: Case Studies in Vaccine Development I

Ty21a
Introduction: M.M. Levine, University of Maryland, Baltimore

SESSION 3: Case Studies in Vaccine Development II

Rotavirus vaccine
Introduction: S. Plotkin, Pasteur Merieux Connaught, Marnes la Coquette, France (via teleconference)

Varicella vaccine
Introduction: A. Gershon, College of Physicians & Surgeons of Columbia University, New York, New York

SESSION 4: Case Studies in Vaccine Development III

RSV vaccine
Introduction: C. Heilman, National Institutes of Health, Bethesda, Maryland

Hib vaccine
Introduction: J.I. Ward, UCLA Center for Vaccine Research, Torrance, California

SESSION 5: Case Studies in Vaccine Development IV

Hepatitis vaccines
Introduction: M.R. Hilleman, Merck Research Laboratories, West Point, Pennsylvania

Cold-adapted influenza vaccine
Introduction: P.F. Wright, Vanderbilt Medical Center, Nashville, Tennessee

SESSION 6

The vaccine R&D fabric: Common and uncommon threads
Discussion Leader: R.G.Douglas, Merck & Co., Inc., Whitehouse Station, New Jersey

The vaccine R&D fabric: A view from the outside
Discussion Leaders: L. Galambos and J.E. Sewell, The Johns Hopkins University, Baltimore, Maryland

SESSION 7

Lessons learned and lessons taught: Strengthening the vaccine R&D system
Discussion Leaders: B.G. Gellin and R. Rabinovich, National Institutes of Health, Bethesda, Maryland, and **P.K. Russell,** The Johns Hopkins University, Baltimore, Maryland

R.G. Douglas, Merck & Co., Inc., Whitehouse Station, New Jersey: Closing remarks.

Genetic Approaches to Learning and Memory

December 8–December 11

FUNDED BY

Marie H. Robertson Memorial Fund for Neurobiology

ARRANGED BY

E.R. Kandel, College of Physicians & Surgeons of Columbia University, New York, New York
A. Silva, Cold Spring Harbor Laboratory
S. Tonegawa, Massachusetts Institute of Technology, Cambridge

SESSION 1: Calcium Calmodulin Kinase and Plasticity
Chairperson: E.R. Kandel, College of Physicians & Surgeons of Columbia University, New York, New York

K.P. Giese, Cold Spring Harbor Laboratory: The role of the autophosphorylation at T286 of α-CaMKII.
M.R. Mayford, College of Physicians & Surgeons of Columbia University, New York, New York: Regulated genetic control of synoptic plasticity, learning, and memory.
K. Fox, University of Wales, Cardiff, United Kingdom: The role of α-CaMKII in barrel cortex plasticity.
M.P. Stryker, University of California, San Francisco: Plasticity mechanisms responsible for cortical development: Comparison of findings in vivo and in vitro in mouse visual cortex.
J.O. McNamara, Duke University Medical Center, Durham, North Carolina: Kindling: An NMDA receptor-dependent plasticity of mammalian nervous system.

SESSION 2: Genetics, Synapses, and Learning
Chairperson: S. Nakanishi, Kyoto University Faculty of Medicine, Japan

T.C. Sudhof, University of Texas Southwestern Medical Center at Dallas: Mechanisms of neurotransmitter release.
H. Thoenen, Max Planck Institute for Psychiatry, Martinsried, Germany: Gene targeting and virus-medicate gene transfer in the analysis of neuronal plasticity.
H.-S. Shin, Pohang University of Science and Technology, Pohang, Republic of Korea: IP3 Kinase mutation, LTP, and learning.
P.F. Chapman, University of Wales, Cardiff, United Kingdom: Behavioral and physiological analyses of a transgenic model of Alzheimer's disease.
J.S. Takahashi, Northwestern University, Evanston, Illinois: Forward genetic approaches to learning and memory in the mouse.
H.-P. Lipp, University of Zurich, Switzerland: Biological relevance of behavioral effects observed in knockout mice: Natural selection studies.
S. Tonegawa, Massachusetts Institute of Technology, Cambridge: NMDA receptor-dependent synoptic plasticity is needed for spatial memory study with CAI-restricted knockout mice.
M.A. Wilson, Massachusetts Institute of Technology, Cambridge: Dissecting the role of hippocampal plasticity in spatial representations using region-specific genetic knockouts.

Round Table Discussion: Genetics and cognition: What will we need to make the connection?
Introduced by: M.P. Stryker, University of California, San Francisco

SESSION 3: LTP and Beyond
Chairperson: S. Tonegawa, Massachusetts Institute of Technology, Cambridge

A. Silva, Cold Spring Harbor Laboratory: Plasticity, spikes, and learning.
R. Morris, UMDS Guy's Hospital, London, United Kingdom: Selective inhibition of LTP in the dentate gyrus in vivo does not affect spatial learning in mice lacking Thy-1.
E.G. Abel, College of Physicians & Surgeons of Columbia University, New York: Genes important for long-term memory.
D.R. Storm, University of Washington, Seattle: Role of the adenylyl cyclases and cAMP for learning and memory.
T.J. O'Dell, University of California, Los Angeles: The role of protein kinase A and modulatory neurotransmitters in low frequency stimulation-induced LTP.

SESSION 4: Neuronal Mechanisms and Behavior
Chairperson: S.F. Heinemann, The Salk Institute, San Diego, California

S. Nakanishi, Kyoto University, Japan: Glutamate receptor function in neuronal plasticity.
S.G.N. Grant, University of Edinburgh, United Kingdom: Postsynaptic tyrosine kinase signaling.
R.F. Lathe, University of Edinburgh, United Kingdom: Genes selectively expressed in hippocampus.
S. Itohara, Kyoto University, Japan: Astrocytes and neuronal plasticity.
M. Picciotto, Yale University School of Medicine, New Haven, Connecticut: Pharmacological and behavioral effects of a mutation in the high-affinity receptor for nicotine.
E.R. Kandel, College of Physicians & Surgeons of Columbia University, New York, New York: Genes, synapses, and long-term memory.

Round Table Discussion: Genetic background and the study of behavior.
Introduced by: T. Tully, Cold Spring Harbor Laboratory

R.F. Lathe, S. Tonegawa

SESSION 5: Ion Channels and Learning
Chairperson: H. Thoenen, Max Planck Institute for Psychiatry, Martinsreid, Germany

P.A. Slesinger, University of California, San Francisco: Genetic manipulations of G protein-gated inwardly rectifying potassium channels.
S.F. Heinemann, The Salk Institute, San Diego, California: Mutations in glutamate receptor genes.
J. Roder, Samuel Lunenfeld Research Institute, Toronto, Canada: Behavioral LTP analysis of various GluR knockouts.

Round Table Discussion: Genetic background of ES cells.
Introduced by: The Jackson Laboratory, Bar Harbor, Maine

Mechanisms of Transcriptional Initiation

December 14–December 17

FUNDED BY

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ARRANGED BY

W. Herr, Cold Spring Harbor Laboratory
R. Kingston, Massachusetts General Hospital, Boston
K. Yamamoto, University of California, San Francisco

TOPIC: What are the functional targets of activators?

SESSION 1: Activator Targets: GTFs and Holoenzyme I
Chairpersons: R. Losick, Harvard University, Cambridge, Massachusetts and
T. Maniatis, Harvard University, Cambridge, Massachusetts

SESSION 2: Activator Targets: TAFs
Chairpersons: C. Gross, University of California, San Francisco and
B. Stillman, Cold Spring Harbor Laboratory

TOPIC: What is the mechanism of activator function? I

SESSION 3: Chromatin: Transcriptional Activation and Modification
Chairpersons: E. O'Shea, University of California, San Francisco and
R. Treisman, Imperial Cancer Research Fund, London, United Kingdom

SESSION 4: Stabilization and Isomerization of the Preinitiation Complex
Chairpersons: S. Adhya, National Cancer Institute, Bethesda, Maryland and
A. Hochschild, Harvard Medical School, Boston, Massachusetts

TOPIC: What is the mechanism of activator function? II

SESSION 5: Promoter Clearance, Elongation, and Phosphorylation
Chairperson: K. Yamamoto, University of California, San Francisco

SUMMARY AND OVERVIEW
T. Maniatis, Harvard University, Cambridge, Massachusetts
Introduced by: E. Simpson, The Jackson Laboratory, Bar Harbor, Maine

M. Ptashne