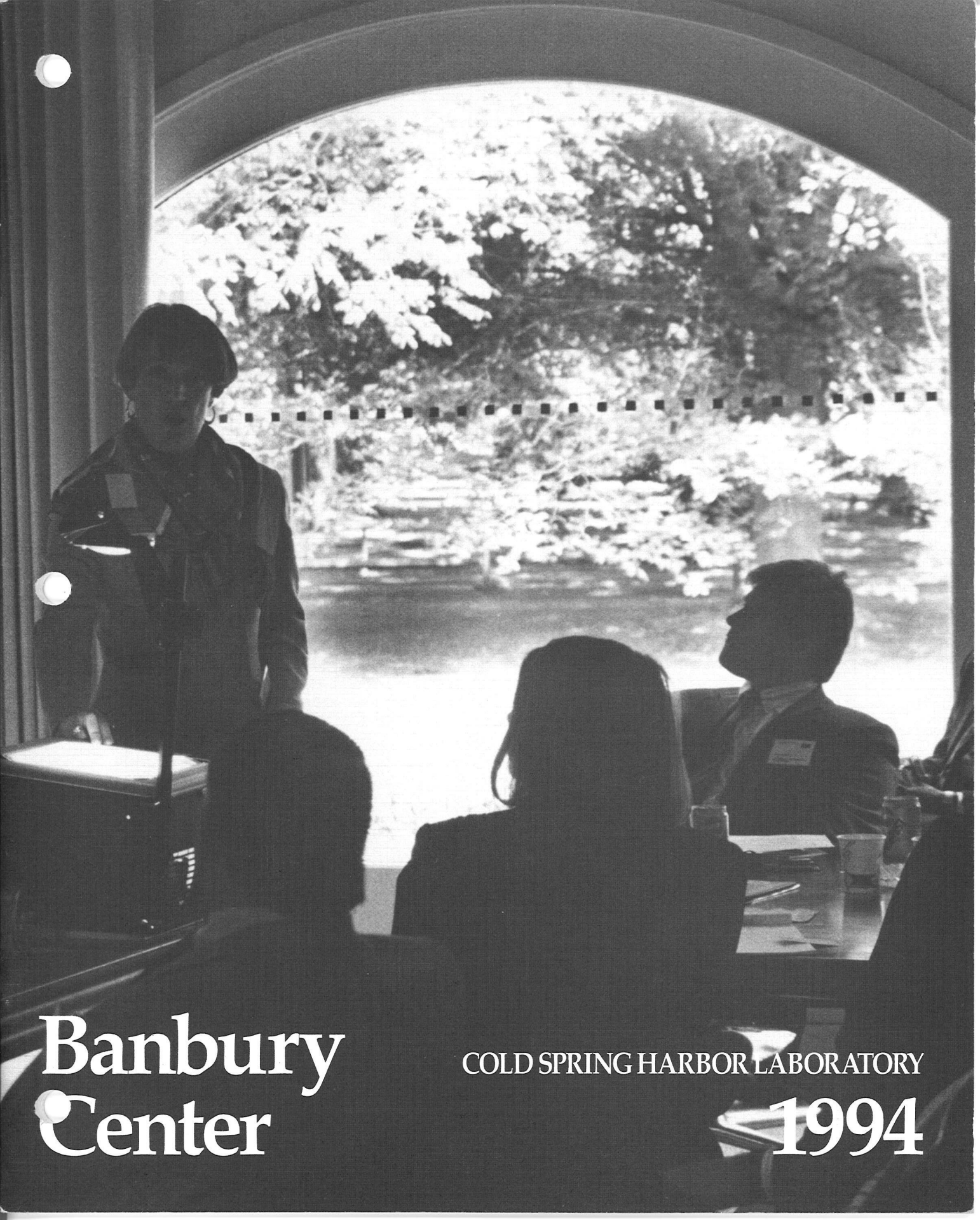


Banbury Center

COLD SPRING HARBOR LABORATORY

1994

BANBURY CENTER DIRECTOR'S REPORT

Banbury Center maintained the numbers and quality of its meetings during 1994. There were again 16 meetings at the Center, attended by 510 participants. In addition, five neurobiology courses were held over the summer months and the Center was made available to ten other groups. All told, the Center was used on 31 different occasions in 1994!

Participants

For the second year, we can give some demographic information about our participants, although these figures are approximate because some individuals come to more than one meeting each year. Of the 510 participants, 418 came from the United States. This year, New York (85) supplanted California (64) as the leading source of participants. Massachusetts (42) and Maryland (41) were third and fourth. These four states accounted for 45% of visitors to Banbury Center in 1994, the remaining U.S. participants coming from 26 other states. Ninety-two participants (18%) came from 17 foreign countries, figures very similar to those in 1993. Again most came from the United Kingdom, with equal numbers (10) from Germany and Japan. It was especially pleasing that we were able to maintain attendance by foreign participants despite increased travel costs.

Scientific Meetings

It becomes ever more difficult to categorize the diverse topics of our meetings, so this year I shall describe them in chronological order.

The year opened with an outstanding meeting, **Secretory Pathways: The Molecular Basis for Their Specificity**. This is a very exciting area of research, one that endeavors to understand the mechanisms by which proteins move from the sites of their synthesis in the cytoplasm to the places where they are needed—elsewhere in the cytoplasm or to the outside of the cell. This presents many problems to the cell, not the least of which is that it involves complex interactions between different sorts of molecules. We were honored to have Nobel laureate, George Palade, one of the founders of the field, attend and deliver the closing remarks.

Banbury Center has established a tradition for meetings dealing with both scientific and policy aspects of genome projects. In this case, a group of scientists working on the *Arabidopsis* genome came to Banbury for **The *Arabidopsis* Genome** meeting to review the scientific progress being made and to make plans for future efforts. The cross-disciplinary nature of genomic research was evident in the first session that included contributions from scientists working on yeast, nematode, fruit fly, and mouse genomes.

The third meeting of the year, **Melatonin: Mechanisms and Actions**, was unusual in that it covered a physiological subject, the role of the chemical melatonin in regulating circadian rhythms. Quite apart from the fascinating biology involved in the ways in which organisms set and maintain internal clocks, understanding this for human beings could have significant implications for the millions of people who work hours that do not coincide with the light-dark cycle of the day and for those of us who find it difficult to adapt as we cross time zones.

The final scientific meeting of the spring, **Genetics of Learning and Memory,** could not have been held even a few years ago. Here, the tools of recombinant DNA are being used to dissect the processes underlying the ways in which organisms learn from their experiences and retain those memories while discarding memories of no functional significance. Once again, it was impressive

Robertson House provides dining and housing accommodations at Banbury Center

how studies on very different organisms—fruit fly, nematode, and mouse—are being brought together through the use of genetics, and in so doing, findings on each organism are reinforced by research on the others.

Scientific meetings began again in September with a meeting, **Targets for Specific Therapies in Leukemia**. These cancers have been studied intensively for many years, and there have been significant advances in understanding their genetics and molecular pathology, and basing therapies on that knowledge. This meeting brought together the leaders in these topics to review the current standing and future directions. It was a special pleasure to have Baynard Clarkson as one of the organizers. Barney has been a devoted supporter of the Laboratory as a trustee and as chairman of the trustees; it was good to put his scientific skills to use as well!

Some topics justify having follow-up meetings because of their intrinsic interest and because of the benefits that would accrue if the topics could be advanced. **Protein Design/Folding** is an excellent example. The problem of predicting how a peptide chain will fold is a great intellectual challenge and one, if solved, would help with designing proteins with new or modified activities.

A paradox of chromosome replication is that chromosomes will become progressively shorter because of the way that DNA is made. To prevent loss of DNA from their ends, chromosomes terminate in structures called telomeres, and an enzyme complex called telomerase made of RNA and protein maintains the telomeres. It appears that telomerase may have an important role in cancer and in aging. The October meeting entitled, appropriately, **Telomeres**, was the first intensive meeting devoted to telomeres and telomerase, a meeting in which the advances of the previous years were reviewed in detail.

Genomes played a large part in the Center's activities this year. Following the example set by the ***Arabidopsis*** meeting in the Spring, **Grass Genomes** was also intended to assess the current status and potential benefits of having the complete DNA sequence of grasses available for genetic manipulation.

Banbury Center has a long tradition of promoting studies of genetic disorders. There have been several very notable examples, and the meeting **Candidate Gene Approaches to ALS** was an excellent example of what such meetings can achieve. Advances in this field have been rapid and now the Amyotrophic Lateral Sclerosis Association wanted to look forward to the next step in their research program. We brought scientists working on ALS together with scientists from other areas who have expertise and approaches that are likely to be important in the next phase of ALS research.

The next meeting also dealt with genomes but with genes and genomes in general. The genome sequencing projects are beginning to produce very large amounts of sequence data, data that should make it possible to evaluate the various ideas proposed to account for the present arrangement of genes within species and for the differences between species. **Evolution of Genes and Genomes** was designed to carry out such an evaluation. It was clear that we can expect major evolutionary insights to come from comparisons of the genome sequences of the "model" organisms being sequenced.

The major challenge facing human genetics is the analysis of so-called complex disorders where mutations in more than one gene are necessary for development of the disorder or where mutations in different genes may lead to the same disorder. The **Molecular Genetics of Diabetes** meeting provided a snapshot of the tools being developed to tackle the genetic analyses of these types of disorders.

The most successful practical applications of biomedical research have come in the area of public health, where the health of many millions of people has been improved. Vaccines exemplify this, but for reasons both technical and social, the development of new vaccines is fraught with the difficulties. **Planning for the Next Generation of Vaccines** was sweeping in its coverage of these issues, ranging from new technical advances through analyses of those factors that influence the decisions of scientists, companies, and governments to undertake and support the development of new vaccines.

Robert Wood Johnson Foundation Meeting

The Robert Wood Johnson Foundation is funding two meetings at Banbury Center to examine the role that human genetics should play in primary health care and how genetic services can be provided. The first meeting, held in August, was a **Workshop on Human Genetics and Health Care**. It was notable for including individuals involved in different areas of health care provision who are concerned that genetics is properly introduced in primary health care. As well as clinical geneticists and genetic counsellors, there were nurses, primary care physicians, social workers, nurse practitioners, and representatives of professional organizations.

JP Morgan–Cold Spring Harbor Laboratory Meeting for Executives

This meeting, sponsored by J.P. Morgan, for the senior executives of pharmaceutical, biotechnology, and venture capital companies tackled **The Biology of Human Behavior** for the ninth meeting in this series. The origins of recent interest in this subject can be traced to the work of E.O. Wilson, who established the field called sociobiology in the mid 1970s. More recently, human molecular genetics has found some evidence for the genetic basis of traits such as male homosexuality and anti-social behavior. The controversy over the claims made in the book *The Bell Curve* demonstrates how interesting and contentious such findings are, especially when it is urged that public policy be based on these findings. This was an extraordinarily interesting and exciting meeting, made especially memorable by the participation of E.O. Wilson.

Charles A. Dana Foundation Project on Manic-Depressive Illness

As part of the Cold Spring Harbor Laboratory contribution to the Charles A. Dana Foundation Consortium on the genetic basis of manic-depressive illness, we held a **Workshop on Manic-depressive Illness** in June to introduce the findings of recent research to nonscientists. The meeting was modeled on the extremely successful meetings for journalists and congressional staff that had been sponsored by the Alfred P. Sloan Foundation here at Banbury Center. This workshop brought together journalists, congressional staff, and staff of the Dana Foundation and covered the

field of manic-depressive illness from clinical studies through genetics to the economic impact of the disorder.

Human Genome and Genetic Analysis Workshops

We have held a number of **Genetics Workshops for Nonscientists** for the Health Effects & Life Sciences Division of the Department of Energy. These workshops have proved popular, and the DOE made a grant to the DNA Learning Center and the Banbury Center for a further two workshops. Previous workshops targeted teachers, Congressional staff, theologians, bioethicists, journalists, lawyers, and patient advocates. The new series is targeting a different group who also need to understand modern human genetics, namely primary care physicians. To maximize the impact of the workshop, with the help of Bernard Rosof and Andrew Packard at Huntington Hospital, we invited directors of continuing medical education in New York State hospitals to participate. The workshop went very well and we are confident that they returned to their colleagues and encouraged them to take the same course. As a consequence of this workshop, I gave a total of five lectures at Long Island Jewish and Long Island College Hospitals.

Other Meetings

The Center is a valuable resource for our community and I was pleased that several groups came here during 1994. Banbury Center hosted seminars given by the nonprofit groups in the village of Lloyd Harbor in February and March. In August, West Side School held a faculty meeting and, in September, Huntington Hospital brought its Board of Trustees here. Holiday House, which provides summer vacations for disadvantaged girls, spent a day at the Center reviewing Holiday House's activities. The New York Biotechnology Association held a 1-day discussion meeting here and the Esther A. and Joseph Klingenstein Fund held a 2-day meeting for its Neuroscience Research Fellows. The Carnegie Council for Ethical Affairs and the Uehiro Foundation on Ethics and Education held a joint discussion meeting reviewing the impact of modern human genetics. The Albert B. Sabin Vaccine Foundation held a board meeting here. In addition, two groups of scientists from Cold Spring Harbor Laboratory came from the main campus to hold group meetings here.

Funding

Once again, the generosity of the members of the Cold Spring Harbor Laboratory Corporate Sponsor Program and other companies and foundations supported our program. It is difficult to overemphasize how important this funding is in enabling us to hold timely and exciting meetings. The Corporate Sponsors provided support for six meetings in 1993: **Secretory Pathways: The Molecular Basis for Their Specificity; Arabidopsis Genome; Targets for Specific Therapies in Leukemia; Protein Design/Folding; Telomeres; Evolution of Genes and Genomes.** Support for the latter meeting was also provided by the Alfred P. Sloan Foundation, which has played a critical role in promoting research in molecular evolution and in supporting Banbury Center.

Foundations provided funds for a significant proportion of Banbury Center meetings in 1994. Four foundations supported meetings on human genetic disorders: The Amyotrophic Lateral Sclerosis Association funded the meeting on **Candidate Gene Approaches to ALS**; The William Stamps Farish Fund provided support for the third of the series of meetings on complex human genetics (**Molecular Genetics of Diabetes**); the Charles A. Dana Foundation funded two meetings related to manic-depressive illness; and the Robert Wood Johnson Foundation supported the first of two meetings on genetics and health care. The Albert B. Sabin Foundation funded the meeting on **Planning for the Next Generation of Vaccines**, the first in the series of meetings on contemporary issues in vaccine development.

The outstanding 1994 Executives' meeting, the **Biology of Human Behavior**, was generously funded by J.P. Morgan. The Office of Health and Environmental Research of the Department of Energy funded the **Genetics Workshop for Nonscientists**.

Looking Forward to 1995

The 1995 Banbury Center program promises to be even more eclectic and interesting than usual. Genetics will continue to be the dominating theme of the program, but there will also be meetings on imaging, plant molecular biology, genomics, and cell biology. It is clear that the Center's activities are going to continue to expand and that this will require close coordination with other activities at the Laboratory. I want to thank David Stewart (Meetings Office), Susan Cooper (Public Affairs), Jim Hope (Catering), and Jack Richards (Buildings and Grounds) and their staffs for their help and forbearance.

Here at the Banbury Center, Bea Toliver and Ellie Sidorenko in the Banbury Center office and Katya Davey in Robertson House continue to make running a complex operation seem easy. Danny Miller and Andy Sauer worked their magic in keeping the Banbury Center grounds beautiful, but, after 10 years here, Danny moved to the main laboratory site. We were sorry to see him go but we were pleased to welcome Chris McEvoy, whose home is here on the estate, in his place. No doubt there will be changes, but the Center will remain dedicated to providing an environment in which scientists can reflect on their research with few interruptions from outside.

Jan Witkowski

Sammis Hall

MEETINGS

Secretory Pathways: The Molecular Basis for Their Specificity

February 27–March 2

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

J.E. Rothman, Memorial Sloan-Kettering Cancer Center, New York, New York
G. Warren, Imperial Cancer Research Fund, London, United Kingdom

SESSION 1: The Synapse
Chairperson: R.H. Scheller, Howard Hughes Medical Institute, Stanford University Medical Center, California

J.E. Rothman, Memorial Sloan-Kettering Cancer Center, New York, New York: Opening remarks.
R.H. Scheller, Howard Hughes Medical Institute, Stanford University Medical Center, California: Synaptic transmission.
T.C. Sudhof, Howard Hughes Medical Institute, University of Texas Southwestern Medical Center, Dallas: Composition and regulation of the synaptic fusion complex.
P. DeCamilli, Howard Hughes Medical Institute, Yale University School of Medicine, New Haven, Connecticut: Membrane traffic at the synapse.
T. Sollner, Memorial Sloan-Kettering Cancer Center, New York, New York: Intracellular vesicle docking and fusion.
T.F.J. Martin, University of Wisconsin, Madison: Characterization of ATP-dependent and Ca^{++}-activated steps of the regulated secretory pathway.

SESSION 2: Toxins
Chairperson: G. Warren, Imperial Cancer Research Fund, London, United Kingdom

G. Schiavo, University of Padua, Padova, Italy: Tetanus and botulism neurotoxins are zinc endopeptidases specific for the neuroexocytosis apparatus.
R. Jahn, Howard Hughes Medical Institute, Yale University School of Medicine, New Haven, Connecticut: Clostridial neurotoxins as tools to study exocytosis in neurons.

SESSION 3: Mutants
Chairperson: H.F. Lodish, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts

B.J. Meyer, University of California, Berkeley: *C. elegans* mutants defective in neurotransmission.
T.L. Schwarz, Stanford University Medical Center, California: Synaptotagmin mutations in the fly.

SESSION 4: Yeast
Chairperson: H.R.B. Pelham, MRC Laboratory of Molecular Biology, Cambridge, United Kingdom

S. Ferro-Novick, Yale University School of Medicine, New Haven, Connecticut: Factors mediating the late stages of ER to Golgi transport in yeast.
R.W. Schekman, Howard Hughes Medical Institute, University of California, Berkeley: Mechanism and regulation of vesicle budding from the ER.
J.E. Gerst, Mount Sinai School of Medicine, New York, New York: Synaptobrevin-like proteins and their role in vesicle transport.
P. Novick, Yale University School of Medicine, New Haven, Connecticut: Components of the yeast secretory machinery that confer specificity to the final stage of the exocytic pathway.

J. Fernandez, J. White

SESSION 5: Rabs
Chairperson: W.E. Balch, The Scripps Clinic and Research Institute, La Jolla, California

S.R. Pfeffer, Stanford University School of Medicine, California: Functional analysis of rab 9 protein.
M. Zerial, European Molecular Biology Laboratory, Heidelberg, Germany: The GTPase molecular switch of rab proteins in the regulation of intracellular transport.

SESSION 6: Calcium
Chairperson: J.M. Fernandez, Mayo Clinic, Rochester, Minnesota

W. Almers, Max-Planck Institut für medical Forschung, Heidelberg, Germany: Fast steps in Ca-triggered exo- and endocytosis in neuroendocrine cells.
E. Neher, Max-Planck Institute for Biophysical Chemistry, Gottingen, Germany: Sources of secretory delays in neuroendocrine cells.
K.L. Wilson, Johns Hopkins University School of Medicine, Baltimore, Maryland: Calcium mobilization via IP3 receptors during nuclear vesicle fusion.

SESSION 7: Endosomes
Chairperson: J. Gruenberg, University of Geneva, Sciences II, Switzerland

P.D. Stahl, Washington University School of Medicine, St. Louis, Missouri: In vitro reconstitution of the endocytic pathway.
I. Mellman, Yale University School of Medicine, New Haven, Connecticut: Molecular sorting during intracellular transport.

SESSION 8: Hydrophobic Peptides
Chairperson: J.M. White, University of Virginia Medical Center, Charlottesville

D.M. Engelman, Yale University, New Haven, Connecticut: Peptide interactions with and within lipid environments Specificity of helix-helix interactions and the spontaneous insertion of a transmembrane helix.
F. Hughson, Harvard University, Cambridge, Massachusetts: Three-dimensional structure of the fusion-active conformation of influenza hemagglutinin.
G.E. Palade, University of California, San Diego, La Jolla: Closing remarks.

The *Arabidopsis* Genome

March 20–March 23

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

M. Bevan, John Innes Centre, Norwich, United Kingdom
J.R. Ecker, University of Pennsylvania, Philadelphia
R. Martienssen, Cold Spring Harbor Laboratory, New York

SESSION 1: Large-scale Genome Projects
Chairperson: J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

J.R. Ecker, University of Pennsylvania, Philadelphia: Introductory remarks.
S.G. Oliver, UMIST, Manchester, United Kingdom: Yeast as a subject and a tool for genome analysis.
R. Wilson, Washington University School of Medicine, St. Louis, Missouri: Sequencing *C. elegans.*
M. Palazzolo, Human Genome Center, Berkeley, California: *Drosophila* human genome project.
W. Dietrich, Whitehead Institute Genome Center, Cambridge, Massachusetts: Construction of a dense genetic linkage map of the mouse.
L. Rowen, University of Washington, Seattle: Redundancy is our friend: Large-scale sequencing of the human and mouse T-cell receptor β loci.

SESSION 2: Physical Mapping and Markers
Chairperson: M. Beven, John Innes Center, Norwich, United Kingdom

E. Meyerowitz, California Institute of Technology, Pasadena: The *Arabidopsis* genome (structure, size, contents).
E. Richards, Washington University, St. Louis, Missouri: Molecular chromosome studies in *Arabidopsis.*
P.A. Scolnik, E.I. du Pont de Nemours & Co., Wilmington, Delaware: Mapping and sequencing the *Arabidopsis* genome: New high-throughput markers for genome and mutation analysis.
M. Zabeau, Keygene n.v., Wageningen, The Netherlands: Progress in physical mapping of the *Arabidopsis* genome using AFLP markers.
F.M. Ausubel, Massachusetts General Hospital, Boston: Use of RFLP/genomic subtraction to identify large numbers of CAPS (cleaved amplified polymorphic sequences), co-dominant ecotype-specific PCR-based markers, for *Arabidopsis.*
J.R. Ecker, University of Pennsylvania, Philadelphia: Progress toward a complete map of the *Arabidopsis* genome.
R. Schmidt, John Innes Centre, Norwich, United Kingdom: Strategies for completion of the physical maps for chromosomes 4 and 5.
H.M. Goodman, Massachusetts General Hospital, Boston: Progress on the physical map and sequence of chromosome II.

E. Richards, R. Schmidt, U. Grossniklaus, V. Sundaresan, P. Scolnik, K. Feldmann

SESSION 3: Gene Identification
Chairperson: R. Martienssen, Cold Spring Harbor Laboratory, New York

C.R. Somerville, Carnegie Institution of Washington, Stanford, California: MSU *Arabidopsis* EST project.
M. Caboche, INRA Versailles Cedex, France: Present and future of *Arabidopsis* genome projects in France.
C. Gigot, IBMP-CNRS, Strasbourg Cedex, France: Expressed sequence tags obtained by partial sequencing of cDNAs from *A. thaliana*.
R.W. Davis, Stanford University School of Medicine, California: A simple genetic map and a proposal of complete cDNA sequencing for the total genome for *A. thaliana*.
J. Ryals, Ciba Biotechnology, Research Triangle Park, North Carolina: Acquired resistance in *Arabidopsis:* A genetic approach—The limitations.
K.A. Feldmann, University of Arizona, Tucson: Utility of T-DNA-generated populations of *Arabidopsis* for gene cloning and reverse genetics.
V. Sundaresan, Cold Spring Harbor Laboratory, New York: Exon trapping with transposons.

SESSION 4: Sequencing and Informatics
Chairperson: H.M. Goodman, Massachusetts General Hospital, Boston

M. Bevan, John Innes Centre, Norwich, United Kingdom: *Arabidopsis* genome sequencing—The ESSA project.
W.R. McCombie, Cold Spring Harbor Laboratory, New York: Strategies for automated sequence analysis of the genomes of model organisms.
D. Searls, University of Pennsylvania School of Medicine, Philadelphia: Computational gene prediction: Comparative studies in vertebrates, invertebrates, and plants.
C. Fields, The Institute for Genome Research, Gaithersburg, Maryland: Managing and integrating information from high-throughput genome projects.
T.G. Marr, Cold Spring Harbor Laboratory, New York: Discussion about *Arabidopsis* database.

SESSION 5: Policy
Chairperson: J.R. Ecker, University of Pennsylvania, Philadelphia

Remarks by:
J.R. Ecker, University of Pennsylvania, Philadelphia
R.J. Cook, USDA-RNI-CGP, Washington, D.C.
M.W. Dilworth, National Science Foundation, Arlington, Virginia

Melatonin: Mechanisms and Actions

April 10–April 13

ARRANGED BY

A.J. Lewy, Oregon Health Sciences University, Portland

SESSION 1: Basic Physiology and Pharmacology
Chairperson: J. Redman, Monash University, Victoria, Australia

S.M. Reppert, Massachusetts General Hospital, Boston: Molecular biology of melatonin receptors.
M.L. Dubocovich, Northwestern University Medical School, Chicago, Illinois: Melatonin receptor: Pharmacology and circadian activity; melatonin analogs.
M.H. Stetson, University of Delaware, Newark: Melatonin phase hypothesis for seasonal reproductive rhythms.
B.D. Goldman, University of Connecticut: Storrs: Melatonin duration hypothesis for seasonal reproductive rhythms.

SESSION 2: Melatonin PRCs and Effects of Melatonin in Animals
Chairperson: H. Illnerova, Czech Academy of Sciences, Prague, Czech Republic

J. Redman, Monash University, Victoria, Australia: Melatonin entrainment and PRC in rodents.
V.M. Cassone, Texas A&M University, College Station: Effects of melatonin on the avian and mammalian circadian systems.
L.P. Morin, State University of New York, Stony Brook: Effects of pinealectomy on circadian rhythmicity in rodents.
M.U. Gillette, University of Illinois, Urbana: Mechanisms of melatonin on the suprachiasmatic nucleus.

A. Lewy, T. Wehr, H. Illnerova, M. Dubocovich

SESSION 3: Light Phase Response Curves (PRCs) and Effects of Light in Humans
Chairperson: M.U. Gillette, University of Illinois, Urbana

R.E. Kronauer, Harvard University, Cambridge, Massachusetts: Type-O (amplitude suppression) phase resetting in humans.

D.G. Beersma, University of Groningen, The Netherlands: Type-1 phase resetting in humans.

K.-I. Honma, Hokkaido University School of Medicine, Sapporo, Japan: A light PRC in humans: Aftereffect of entrainment?

D.S. Minors, University of Manchester, United Kingdom: The classical light PRC in humans.

S.S. Campbell, New York Hospital–Cornell Medical Center, White Plains: Alerting/energizing effects of light.

C.I. Eastman, Rush–Presbyterian–St. Luke's Medical Center, Chicago, Illinois: Treatment of shift workers with light and dark.

M. Terman, New York State Psychiatric Institute, New York: Treatment of winter depressives with light.

H. Illnerova, Czech Academy of Science, Prague, Czech Republic: Phase resetting with one pulse of light: Entrainment of the human melatonin rhythm.

SESSION 4: Melatonin PRCs and Effects of Melatonin in Humans
Chairperson: C.I. Eastman, Rush–Presbyterian–St. Luke's Medical Center, Chicago, Illinois

A.J. Lewy, Oregon Health Sciences University, Portland: The human melatonin PRC.

R.L. Sack, Oregon Health Sciences University, Portland: Phase resetting in blind people and shift workers.

J. Arendt, University of Surrey, Guildford, United Kingdom: Phase resetting in delayed sleep phase syndrome and air travelers.

B. Claustrat, Hopital Neuro-Cardiologique, Lyon, France: Phase resetting in air travelers. Human melatonin PRC pharmacokinetcs.

SESSION 5: Side Effects and Other Consequences of Melatonin: Melatonin Analogs
Chairperson: M. Terman, New York State Psychiatric Institute, New York

O. Tzischinsky, Brown University School of Medicine, Providence, Rhode Island: Melatonin possesses a delayed hypnotic effect that is time-dependent.

I.V. Zhdanova, Massachusetts Institute of Technology, Cambridge: Soporific effects of melatonin in humans.

C. Singer, Oregon Health Sciences University, Portland: Melatonin administration and sleep in the elderly.

D. Dawson, University of Adelaide, Woodville, Australia: Melatonin and "uncoupling" the clock: A neuroendocrine cause of age-related sleep disturbances.

B. Myers, Bowling Green State University, Ohio: Hypothermic effects of melatonin in humans.

T.A. Wehr, National Institute of Mental Health, National Institutes of Health, Bethesda, Maryland: Melatonin, temperature, sleep, and seasonal changes in humans.

R.J. Reiter, University of Texas Health Science Center, San Antonio: Melatonin, EMF, and scavenging for negative ions. Intracellular melatonin: Antioxidant actions and non-enzymatic degradation.

D.E. Blask, The Mary Imogene Bassett Hospital, Cooperstown, New York: Melatonin and cancer: Mechanisms of action and potential impact of EMF.

A.J. Lewy, Oregon Health Sciences University, Portland: General discussion.

Genetics of Learning and Memory

April 17–April 20

FUNDED BY

H. Robertson Memorial Fund

ARRANGED BY

A. Silva, Cold Spring Harbor Laboratory, New York
T. Tully, Cold Spring Harbor Laboratory, New York

SESSION 1
Chairperson: J.C. Hall, Brandeis University, Waltham, Massachusetts

Part I: Genes, Physiological Mechanisms, and Behavior: What Are the Interconnections?

A. Silva, Cold Spring Harbor Laboratory, New York: Genetics of learning and memory.
R. Hen, Columbia University, New York, New York: $5HT_{1B}$ receptor knockout: Behavioral consequences.
Y. Zhong, Cold Spring Harbor Laboratory, New York: The function of neuropeptides in mushroom body neurons of *Drosophila* learning mutants.

Part II: Genetic Strategies for the Dissection of Learning and Memory: Are There Common Patterns Amongst Evolutionary Divergent Organisms?

J.M. Wehner, University of Colorado, Boulder: Multiple behavioral and genetic strategies to study hippocampal-dependent learning and memory.
C. Rankin, University of British Columbia, Vancouver, Canada: Issues in the genetic dissection of learning in *C. elegans.*

SESSION 2
Chairperson: L.C. Griffith, Brandeis University, Waltham, Massachusetts

Part I: The Interplay between Genes, Development, and Learning: Can We Alter Learning without Causing Physiological and Structural Changes?

W. Quinn, Massachusetts Institute of Technology, Cambridge: Forward and reverse genetic studies of learning in *Drosophila.*
S.G.N. Grant, Columbia University, New York, New York: Fyn mutant mice: Biochemical, physiological, and behavioral deficits.
K.-F. Fischbach, Institut für Biologie III, Freiburg, Germany: Targeted misexpression of cell adhesion molecules in *Drosophila.*
K. Kaiser, University of Glasgow, United Kingdom: *Drosophila* mushroom bodies: Covert cellular organization and in vivo manipulation.

Part II: Strategies to Circumvent the "Developmental Problem": Is It Possible to Actually Study Learning without Interfering with It?

R.F. Lathe, University of Edinburgh, United Kingdom: Redirecting gene expression in the mouse hippocampus.
R. McKay, National Institute of Neurological Disorders and Stroke, Bethesda, Maryland: Transplantation of cultured stem cells: A new method to analyze the molecular mechanisms of neuronal function in mammals.

R. Bourtchouladze

SESSION 3
Chairperson: R. Greenspan, New York University, New York

S. Tonegawa, Howard Hughes Medical Institute, Massachusetts Institute of Technology, Cambridge: Electrophysiological and behavioral analyses of mouse mutants generated by gene targeting.

Discussion: Specificity of Gene Disruptions: How Specific Do They Have To Be?
Moderator: R. Greenspan, New York University, New York

SESSION 4
Chairperson: S.F. Heinemann, The Salk Institute, San Diego, California

Part I: Neurotransmitter: Release and Receptor Function: Mechanisms of Learning?

T.C. Sudhof, Howard Hughes Medical Institute, University of Texas Southwestern Medical Center, Dallas: Genetic approaches to neurotransmitter release.
S. Nakanishi, Kyoto University Faculty of Medicine, Japan: Physiological functions of glutamate receptors in neuron plasticity and development.
P.H. Seeburg, University of Heidelberg, Germany: Genetic regulation of excitatory postsynaptic cation channels.

Part II: Functional Plasticity: What Are the Implications to Learning and Memory?

C.-F. Wu, University of Iowa, Iowa City: Physiological and developmental plasticity of neurons in *Drosophila* learning mutants.
J. Gordon, University of California, San Francisco: Using transgenic mice to dissect the mechanisms underlying ocular dominance plasticity.

SESSION 5
Chairperson: J. Roder, University of Toronto, Ontario, Canada

Part I: The Study of Plasticity in Cells, Circuits, and Behavior: Is There a Link?

T.J. O'Dell, University of California, Los Angeles, School of Medicine: Snaptic plasticity in transgenic mice expressing an α-CaMKII variant.
R. Malinow, Cold Spring Harbor Laboratory, New York: Acute expression of genes to dissect mechanisms of learning and memory.
J.O. McNamara, Duke University, Durham, North Carolina: Effect of null mutations of α-CaCMKII on epileptogenesis in transgenic mice.

C.I. Bargmann, University of California, San Francisco: Behavioral plasticity in olfactory responses of *C. elegans.*

Part II: Creating Biological Explanations of Cognitive Processes: Will Genetics Do It?

Y. Dudai, The Weizmann Institute of Science, Rehovot, Israel: Neurogenetic dissection of learning: How specific can it be?
A.M. Smith, American University in Cairo, Egypt: Genetics of learning and memory: Creating a new interdisciplinary paradigm.

SESSION 6
Chairperson: M. Stryker, University of California, San Francisco

E.R. Kandel, Howard Hughes Medical Institute, Columbia University, New York, New York: A molecular switch for long-term memory in *Aplysia* and mice.

Discussion: Developmental vs. Behavioral Plasticity: Are There Common Mechanisms and Common "Switches?"
Moderator: M. Stryker, University of California, San Francisco

SESSION 7: Issues in the Behavioral Analysis of Mutants: How Can We Integrate Data from Different Laboratories and from Different Model Systems?
Chairperson: M. Davis, Connecticut Mental Health Center, Yale University, New Haven

D. Wahlsten, University of Alberta, Edmonton, Canada: Standardizing and validating tests of mouse behavior: Genetic aspects.
M. Heisenberg, Theodor-Boveri-Institut (Biozentrum), Wurzburg, Germany: Learning in tethered flies.
B.H. Smith, The Ohio State University, Columbus: Higher-order conditioning in invertebrates; behavioral and genetic analyses.
D. Van Der Kooy, University of Toronto, Ontario, Canada: Mutations that block associative and/or nonassociative learning in *C. elegans*.
T. Tully and J. Yin, Cold Spring Harbor Laboratory, New York: Genetic dissection of memory.

Workshop on Human Molecular Genetics

April 21–April 24

FUNDED BY

Office of Health and Environmental Research, U.S. Department of Energy

ARRANGED BY

M. Bloom, DNA Learning Center, Cold Spring Harbor Laboratory, New York
D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory, New York
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

SESSION 1

D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory, New York: Mendelian view of the gene: From peas to eugenics.
J. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York: Modern view of the gene.
J. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York: PCR, RFLPs, and $(CA)_n$: What they are; what they do.

SESSION 2

S. Airhart, Oncor Science, Gaithersburg, Maryland: Cytogenetics in the age of DNA.

SESSION 3

D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory, New York: Laboratory: Using restriction enzymes to construct chromosome maps.

SESSION 4

D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory, New York: Laboratory: Construction of chromosome maps.

SESSION 5

M. Bloom, DNA Learning Center, Cold Spring Harbor Laboratory, New York: Cloning human disease genes.
P. Ward, Institute of Molecular Genetics, Baylor College of Medicine, Houston, Texas: DNA-based diagnosis for human genetic diseases.
C. Harris, Laboratory of Human Carcinogenesis, National Cancer Institute, Bethesda, Maryland: Cancer genetics: New advances, new surprises.
R. Tanzi, Neurogenetics Laboratory, Massachusetts General Hospital, Boston: Molecular genetics and biology of Alzheimer's disease.

SESSION 6

M. Bloom and D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory, New York: Laboratory: Fingerprinting your own DNA by polymerase chain reaction.

SESSION 7

M. Bloom and D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory, New York: Laboratory: Analyzing fingerprinting results.
C. Link, Human Gene Therapy Institute, Des Moines, Iowa: Human gene therapy trials.
T. Tully, Cold Spring Harbor Laboratory, New York: Genetics and behavior.
M. Saxton, Massachusetts Office on Disability, Boston: Genetics and cultural attitudes to disability.
P. Reilly, Shriver Center for Mental Retardation, Waltham, Massachusetts: Future of genetic testing and screening.

Workshop on Manic-depressive Illness

June 9–June 11

FUNDED BY

The Charles A. Dana Foundation

ARRANGED BY

K. Jamison, Johns Hopkins University Medical School, Baltimore, Maryland
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

SESSION 1

K. Jamison, Johns Hopkins University Medical School, Baltimore, Maryland: Clinical description of manic-depressive illness (MDI).
N. Rosenthal, National Institute of Mental Health, Bethesda, Maryland: Current status of treatments for MDI.
C. Gilliam, Columbia University, New York, New York: Developments in the molecular genetics of MDI.

SESSION 2

W. Drevets, Washington University, St. Louis, Missouri: Using new brain imaging techniques for studying mental disorders.

SESSION 3

M. Bloom, DNA Learning Center, Cold Spring Harbor Laboratory, New York: Laboratory: Fingerprint your own DNA using the polymerase chain reaction.

SESSION 4

T. Wehr, National Institute of Mental Health, Bethesda, Maryland: Biological rhythms and their significance in MDI.
P. Reilly, Shriver Center for Mental Retardation, Waltham, Massachusetts: Ethical and societal issues of discovering genes for human behavior.
R.D. Wyatt, National Institute of Mental Health Neuroscience Center, Washington, D.C.: Economic impact of MDI.

Workshop on Human Genetics and Health Care

August 28–August 31

FUNDED BY

The Robert Wood Johnson Foundation

ARRANGED BY

J.G. Davis, New York Hospital, Cornell University College of Medicine, New York
D.H. Lea, Foundation for Blood Research, Scarborough, Maine
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

SESSION 1: Overview of Current State of Providing Genetic Information
Chairperson: E. Thomson, National Institutes of Health, Bethesda, Maryland

P. Reilly, Shriver Center for Mental Retardation, Waltham, Massachusetts: Medical geneticists.
A.P. Walker, University of California, Irvine, Medical Center: Genetic counselors.
J.K. Williams, Iowa City, Iowa: Nurses.

SESSION 2: Current Models for Genetic Services
Chairpersons: A.P. Walker, University of California, Irvine, Medical Center
D.H. Lea, Foundation for Blood Research, Scarborough, Maine

B.R. Haas, New York Hospital–Cornell Medical Center, New York: Community outreach.
J.D. Schulman, Genetics & IVF Institute, Fairfax, Virginia: Private genetic services.
L. Djurdjinovic, Genetic Counseling Program, Binghamton, New York: Rural outreach genetic services.
N.L. Fisher, Medical Genetic Services, Seattle, Washington: Community hospital-based genetic services.
D.L. Wethers, St. Luke's-Roosevelt Hospital Center, New York, New York: Genetic services targeted to single gene disorders.
K.A. Schneider, Dana-Farber Cancer Institute, Boston, Massachusetts: Cancer genetics.
G. Cunningham, Department of Health Services-Genetic Disease Branch, Berkeley, California: State health department-initiated genetic services.
M. S. Lubinsky, Children's Hospital of Wisconsin, Milwaukee: Genetic services in an academic center.

Summary and discussion:
What can we learn from these different approaches?
Is it simplistic to think of a general model for delivering genetic services?

SESSION 3: Cultural and Consumer Issues in Providing Genetic Information
Chairperson: N.L. Fisher, Medical Genetic Services, Seattle, Washington

J. Mackta, Alliance of Genetic Support Groups, Chevy Chase, Maryland: Partnerships between consumers and healthcare professionals.
D. Punales-Morejon, Beth Israel Medical Center, New York, New York: Genetic counselling and ethno-cultural issues.
G. Wang, Chinatown Health Clinic, New York, New York: Incorporation of genetic information into primary healthcare for Asian populations.

Summary and discussion:
How to take account of different cultural backgrounds in viding genetic information?
How to ensure continuing and active interactions between consumers and genetic healthcare professionals?

SESSION 4: Genetic Services: Providers of Genetic Information
Chairpersons: N.L. Fisher, Medical Genetic Services, Seattle, Washington
J. Hanson, Office of the Assistant Secretary of Health, Washington, D.C.

R.B. Black, Columbia University School of Social Work, New York, New York: Social workers.
C. Scanlon, American Nurses Association, Washington, D.C.: Nurses and nurse practitioners.
J.G. Davis, New York Hospital, Cornell University College of Medicine, New York: Physicians.

Comments:
J.R. Allen, American Medical Association, Chicago, Illinois
W. Freeman, American Academy of Family Physicians, Albuquerque, New Mexico
A.L. Mathews, University of Colorado, Denver
M. Shannon, Health Resources and Services Administration, Rockville, Maryland
G. Anderson, New England Medical Center, Boston, Massachusetts

Summary and conclusions:
What are the current roles of different healthcare providers?
What resources and people are available to develop new routes for providing genetic information?

SESSION 5: Education of Primary Care Providers in Genetics
Chairpersons: J. Hanson, Office of the Assistant Secretary of Health, Washington, D.C.
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

N.A. Holtzman, Johns Hopkins Medical Institutes, Baltimore, Maryland: State of genetic knowledge of primary healthcare providers.
M.E. Carlin, 4 Tarrant County Hospital District, Fort Worth, Texas: Primary care physicians: A regional approach to continuing education.
A.L. Matthews, University of Colorado, Denver: Continuing education of nurses.
K. Greendale, New York State Department of Health, Albany: Genetic counselors' initiatives in providing education to other health professionals.
J.S. Lin-Fu, Maternal and Child Health Bureau, Rockville, Maryland: Maternal and Child Health initiatives in genetic education for primary care providers.
S. Feetham, National Institute of Nursing, National Institutes of Health, Bethesda, Maryland: National Institute of Nursing Research initiatives on genetic education.
D. Runkle, American Association for the Advancement of Science, Washington, D.C.: AAAS professional education outreach.

SESSION 6: Review of Recommendations: Where to Go from Here?
Chairperson: J.G. Davis, New York Hospital, Cornell University College of Medicine, New York

E.H. Thomson, National Institutes of Health, Bethesda, Maryland
D.H. Lea, Foundation for Blood Research, Scarborough, Maine
A.P. Walker, University of California, Irvine, Medical Center
N.L. Fisher, Medical Genetic Services, Seattle, Washington
J. Hanson, Office of the Assistant Secretary of Health, Washington, D.C.

Targets for Specific Therapies in Leukemia

September 11–September 14

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

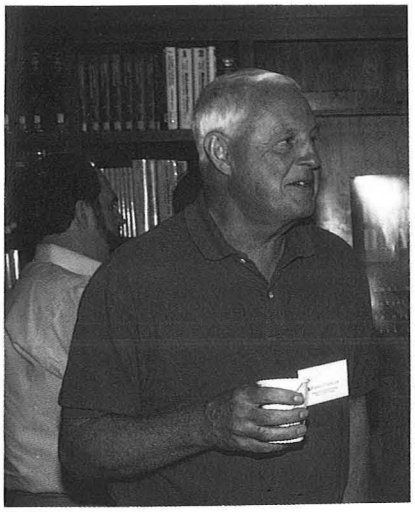
ARRANGED BY

B.A. Chabner, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
B. Clarkson, Memorial Sloan-Kettering Cancer Center, New York, New York

Introduction: B. Clarkson, Memorial Sloan-Kettering Cancer Center, New York, New York

SESSION 1: Growth Regulation of Normal and Leukemic Cells
Chairperson: R.A. Weinberg, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts

D.H. Beach, Cold Spring Harbor Laboratory, New York: The cell cycle and cancer.
C. Greider, Cold Spring Harbor Laboratory, New York: Telomeres and telomerase in cancer.
J.N. Ihle, St. Jude Children's Research Hospital, Memphis, Tennessee: Role of JAKs and STATs in cytokine receptor signal transduction.
K. Kelly, National Cancer Institute, National Institutes of



B. Clarkson

C. Greider, R. Weinberg

Health, Bethesda, Maryland: Role of two immediate early genes (*PAC1* and *GEM*) in regulating signal transduction and cell cycle advancement in hematopoietic cells.

W. Kaelin, Dana-Farber Cancer Institute, Boston, Massachusetts: The cell cycle regulatory transcription factor E2F as a target for antineoplastic drug discovery.

T.D. Tlsty, University of North Carolina, Chapel Hill: Origin of drug-resistant tumor cells.

SESSION 2: Cell Adhesion/Homing/Angiogenesis
Chairperson: T.D. Tlsty, University of North Carolina, Chapel Hill

P.W. Kincade, Oklahoma Medical Research Foundation, Oklahoma City: Sex steroids as regulators of normal lymphopoiesis.

A. Freedman, Dana-Farber Cancer Institute, Boston, Massachusetts: Adhesion of follicular lymphoma cells: Regulation of homing and activation.

M.W. Long, University of Michigan, Ann Arbor: Role of cytoadhesion in hematopoietic cell development.

C.M. Verfaillie, University of Minnesota, Minneapolis: Interferon-x may reverse abnormal circulation and proliferation in CML.

SESSION 3: Follicular Lymphomas and Hairy Cell Leukemia
Chairperson: C.M. Croce, Thomas Jefferson University, Philadelphia, Pennsylvania

E. Beutler, The Scripps Research Institute, La Jolla, California: 2-chlorodeoxyadenosine: A lympho-lytic nucleoside designed to take advantage of a cell-specific metabolic pattern.

J.C. Reed, La Jolla Cancer Research Foundation, California: BCL.2 and chemoresistance in cancer.

SESSION 4: CML
Chairperson: B. Clarkson, Memorial Sloan-Kettering Cancer Center, New York, New York

D. Afar, Howard Hughes Medical Institute, University of California, Los Angles: Activation of multiple signals by the BCR-ABL oncogene.

A.M. Pendergast, Duke University Medical Center, Durham, North Carolina: Signaling by the BCR/ABL oncogene.

E.A. Sausville, National Cancer Institute, National Institutes of Health, Bethesda, Maryland: Drugs directed at pathogenetically relevant protein kinases: Novel strategies for the treatment of leukemia and lymphoma.

R. Van Etten, Center for Blood Research, Harvard Medical School, Boston, Massachusetts: New targets for therapy of Philadelphia-positive leukemia derived from studies of c-ABL and BCR/ABL.

J.Y.J. Wang, University of California, San Diego, La Jolla: BCR-ABL, mechanism of action and target of intervention.

SESSION 5: APL
Chairperson: R.A. Weinberg, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts

H. De The, CNRS, Paris, France: Acute promyelocytic leukemia and RA.
R.P. Warrell, Jr., Memorial Sloan-Kettering Cancer Center, New York, New York: Retinoids as targeted cancer therapies: Clinical, pharmacologic, and molecular studies.

SESSION 6: New Therapies/Conclusions
Chairperson: B.A. Chabner, National Cancer Institute, National Institutes of Health, Bethesda, Maryland

D. Cheresh, The Scripps Research Institute, La Jolla, California: Cell adhesion, angiogenesis, and apoptosis.
J.R. Bertino, Memorial Sloan-Kettering Cancer Center, New York, New York: p53 and drug resistance in leukemia.
A.B. Deisseroth, University of Texas M.D. Anderson Cancer Center, Houston: Interferon inducible transcriptional regulatory factors using MDR-1 vectors and autologous bone marrow transplantation.
L. Fairbairn, Paterson Institute for Cancer Research, Manchester, United Kingdom: Gene therapy to reduce hematotoxicity and secondary hematopoietic neoplasms following antitumor treatment.
A.I. Oliff, Merck Research Laboratories, West Point, Pennsylvania: Pharmaceutically realistic targets in molecular oncology.
I.H. Pastan, DCBD, National Cancer Institute, National Institutes of Health, Bethesda, Maryland: Recombinant immunotoxins for the therapy of leukemia and lymphoma.
M. Feldman, Weizmann Institute of Science, Rehovot, Israel: Cancer metastasis: Immunotherapy via peptide and gene therapy.

Protein Design/Folding

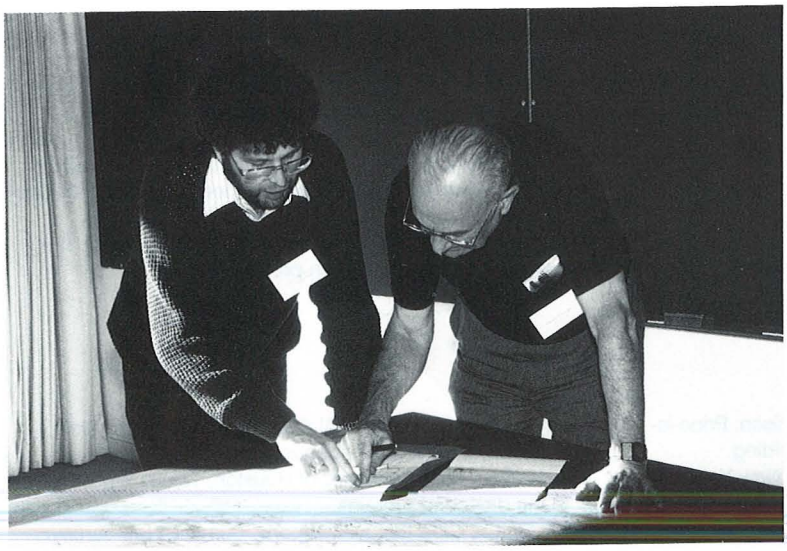
October 16–October 19

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

B. Honig, Columbia University, New York, New York
R.L. Jernigan, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
H.A. Scheraga, Cornell University, Ithaca, New York



J. Skolnick, H. Scheraga

SESSION 1

F.M. Richards, Yale University, New Haven, Connecticut: Nonpolar, solvent-accessible, surface area: Can we measure it experimentally?

C.R. Matthews, Pennsylvania State University, University Park: Size and structure in early folding intermediates of dihydrofolate reductase.

D.M. Rothwarf, Cornell University, Ithaca, New York: Folding/unfolding pathways of ribonuclease A.

J.S. Weissman, Yale University, New Haven, Connecticut: GroEl-mediated folding proceeds by multiple rounds of binding and release of nonnative polypeptides.

P.E. Wright, The Scripps Research Institute, La Jolla, California: NMR structural characterization of protein folding pathways and folding intermediates.

K.A. Sharp, University of Pennsylvania, Philadelphia: Cyclic dipeptides as models for protein folding and association energetics.

SESSION 2

G.D. Rose, Washington University, St. Louis, Missouri: Prediction of protein helices from a stereochemical code.

A.-S. Yang, Columbia University, New York, New York: Energetics of the coil-helix transition for poly-L-alanine in water.

L. Holm, EMBL, Heidelberg, Federal Republic of Germany: The slow death of the protein folding problem. (When will we know all natural protein structures?)

D. Eisenberg, University of California, Los Angeles: 3D profiles for protein folding and design.

R.L. Jernigan, DCBDC, National Cancer Institute, National Institutes of Health, Bethesda, Maryland: Coarse-grained interaction energies.

S. Rackovsky, Mount Sinai School of Medicine, New York, New York: Studies of the protein-folding code.

SESSION 3

W.L. Jorgensen, Yale University, New Haven, Connecticut: Thermal and urea-induced unfolding of proteins with molecular dynamics simulations.

R.M. Levy, Rutgers University, Piscataway, New Jersey: Thermodynamics of solvation and pKas in proteins.

D.G. Covell, PRI/NCI-FCRDC, Frederick, Maryland: Role of surface hydrophobicity in protein-protein recognition.

B. Honig, Columbia University, New York, New York: The free energy balance in protein folding.

M.R. Pincus, State University of New York Health Science Center, Brooklyn: Use of the electrostatically driven Monte Carlo. Method for exploring the conformational space around folded proteins and identification of effector domains of the *ras* p21 protein using this method.

J. Hermans, University of North Carolina at Chapel Hill: Do molecular dynamics forcefields correspond to stable proteins?

SESSION 4

E. Shaknovich, Harvard University, Cambridge, Massachusetts: Design of stable and fast-folding sequences and their mechanism.

J. Skolnick, The Scripps Clinic Research Institute, La Jolla, California: De novo simulations of globular protein folding.

A. Sali, Harvard University, Cambridge, Massachusetts: Thermodynamics and kinetics of protein folding.

C.L. Brooks, Carnegie Mellon University, Pittsburgh, Pennsylvania: Protein folding pathways and thermodynamics studied by molecular dynamics.

H.J.R. Weintraub, R.W. Johnson Pharmaceutical Research Institute, Raritan, New Jersey: The need for reasonably accurate structure predictions in drug discovery.

H. A. Scheraga, Cornell University, Ithaca, New York: The multiple-minima problem in protein folding.

SESSION 5

Z. Huang, University of California, San Francisco: Prion infectivity: A case of protein folding and refolding.

R. Friesner, Columbia University, New York, New York: Computational studies of protein folding.

A.T. Hagler, Biosym Technologies, Inc., San Diego, California: On the effect of long-range interactions on protein structure, specificity, and ligand-binding free energies.

S.C. Harvey, University of Alabama at Birmingham: New modeling methods for ribonucleoprotein complexes.

J.A. McCammon, University of Houston, Texas: Kinetic issues in the design of proteins.

W.G. Guida, Ciba-Geigy Company, Summit, New Jersey: How protein conformation has influenced the design of inhibitors of purine nucleoside phosphorylase.

Telomeres

October 23–October 26

FUNDED BY

Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

E. Blackburn, University of California, San Francisco
T. de Lange, The Rockefeller University, New York, New York
C. Greider, Cold Spring Harbor Laboratory, New York

SESSION 1: Telomerase
Chairperson: H. Cooke, Western General Hospital, Edinburgh, United Kingdom

C. Greider, Cold Spring Harbor Laboratory, New York: Telomerase, biochemistry reconstitution.
J. Lingner, University of Colorado, Boulder: Hypotrichous telomerase RNA structure and function.
D. Shippen, Texas A&M University, College Station: Differential use of the RNA template by the *Euplotes* and *Oxytricha* telomerases.
E. Blackburn, University of California, San Francisco: Telomerase, telomerase RNA, and mutant telomeres in yeast.
D. Gottschling, University of Chicago, Illinois: TLC1: The template RNA component of *S. cerevisiae* telomerase.

SESSION 2: Telomere Dynamics and Replication: Small Eukaryotes
Chairperson: E. Blackburn, University of California, San Francisco

V. Lundblad, Baylor College of Medicine, Houston, Texas: Characterization of EST-mediated pathway for telomere replication.
T.D. Petes, University of North Carolina, Chapel Hill: Mutations that affect telomeres in yeast.
V.A. Zakian, Fred Hutchinson Cancer Research Center, Seattle, Washington: Telomere replication in *Saccharomyces*.
B.J. Brewer, University of Washington, Seattle: Telomeres and other elements that delay replication origin activation.
E. Henderson, Iowa State University, Ames: Telomere length regulation in *Tetrahymena*.

B. Brewer, S. Gasser, E. Blackburn

SESSION 3: Telomere Dynamics in Human Aging and Cancer
Chairperson: T. de Lange, The Rockefeller University, New York, New York

C.B. Harley, Geron Corporation, Menlo Park, California: Telomeres and telomerase in cell aging and cancer.
J.W. Shay, University of Texas Southwestern Medical Center, Dallas: Telomerase activity in human tissues and tumors; manipulation of telomere length in immortal cells.
S. Bacchetti, McMaster University Medical Center, Ontario, Canada: Telomerase in cell immortalization and tumor progression.

SESSION 4: Telomeric Chromatin, Silencing, and Telomere Binding Proteins
Chairpersons: T.D. Petes, University of North Carolina, Chapel Hill
J. Haber, Brandeis University, Waltham, Massachusetts

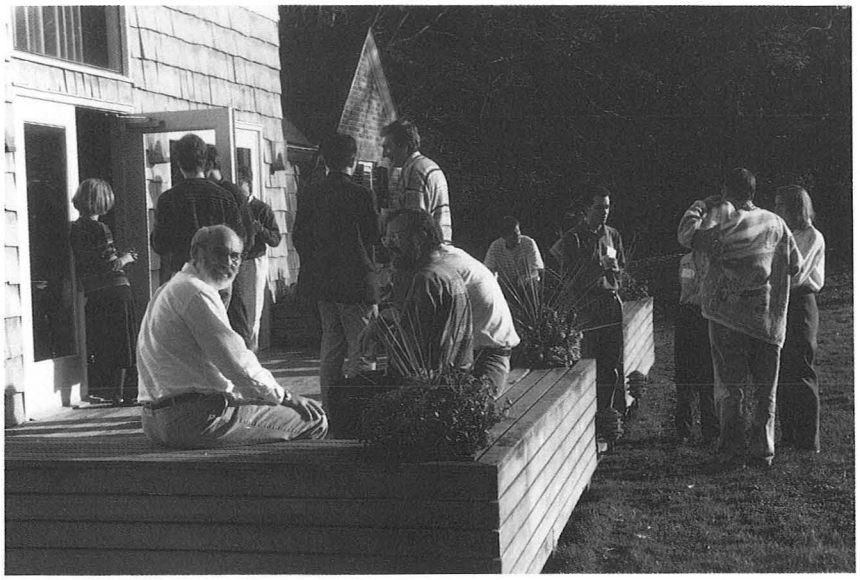
D. Gottschling, University of Chicago, Illinois: Transcriptional silencing in *S. cerevisiae.*
D.M. Shore, Columbia University College of Physicians & Surgeons, New York, New York: Regulation of transcriptional silencing at HM loci and telomeres in yeast.
A.J. Lustig, Memorial Sloan-Kettering Cancer Center, New York, New York: Mechanisms of action of the Rap1p in telomere silencing and size control.
R. Allshire, Western General Hospital, Edinburgh, United Kingdom: Fission yeast telomeres and position effect variegation.
H. Cooke, Western General Hospital, Edinburgh, United Kingdom: Position effects at mammalian telomeres.
S.M. Gasser, Swiss Institute for Experimental Cancer Research, Lausanne, Switzerland: Subnuclear organization of telomeres and repressed chromatin in yeast.
J. Berman, University of Minnesota, St. Paul, Minneapolis: Gene products involved in telomere organization in the nucleus.
T. de Lange, The Rockefeller University, New York, New York: Mammalian telomeric chromatin.
C. Price, University of Nebraska, Lincoln: The telomere protein homolog: A novel telomere replication factor?
Y. Hiraoka, Communications Research Laboratory, Kobe, Japan: Dynamics of telomeres in meiotic prophase.

SESSION 5: Dipteran Telomeres
Chairperson: V.A. Zakian, Fred Hutchinson Cancer Research Center, Seattle, Washington

R.W. Levis, Fred Hutchinson Cancer Research Center, Seattle, Washington: *Drosophila* telomeric DNA: Structure and maintenance.
M. Pardue, Massachusetts Institute of Technology, Cambridge: *Drosophila* telomeres: Transposable elements earning an honest living.
H. Biessman, University of California, Irvine: *Drosophila* telomeres: DNA organization and elongation by Het-A retrotransposition.
J.-E. Edstrom, University of Lund, Sweden: Complex repeats at chromosome ends of *C. pallidivittatus.*

SESSION 6: Chromosome Healing and Subtelomeric Recombination
Chairperson: C. Greider, Cold Spring Harbor Laboratory, New York

J. Haber, Brandeis University, Waltham, Massachusetts: Mechanism of new telomere formation to repair broken yeast chromosomes.
F. Muller, University of Fribourg, Switzerland: Nematodes as a model system for the analysis of telomere function.
W.R.A. Brown, Oxford University, United Kingdom: Dissecting mammalian chromosomes with telomeric DNA.
A. Sherf, Institut Pasteur, Paris, France: Chromosome breakage and healing in the human malaria parasite *P. falciparum.*
P. Borst, The Netherlands Cancer Institute, Amsterdam: Control of telomeric expression sites for VSG genes of trypanosomes.



Coffee Break

J.P. Morgan/Cold Spring Harbor Laboratory Executive Conference on the Biology of Human Behavior

October 28–October 30

ARRANGED BY

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

SESSION 1

E. Wilson, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts: Animal to human behavior: The evolution of complexity.

SESSION 2

S. Snyder, Johns Hopkins University School of Medicine, Baltimore, Maryland: Neural messengers and brain activity.
M. Raichle, Washington University School of Medicine, St. Louis, Missouri: Images of the mind.
L. Squire, University of California, San Diego, School of Medicine, La Jolla: Learning and memory systems of the brain.

SESSION 3

T. Tully, Cold Spring Harbor Laboratory, New York: Learning and memory in fruit flies.

A. Silva, Cold Spring Harbor Laboratory, New York: Learning and memory in mice.

SESSION 4

G. Uhl, National Institute on Drug Abuse, Baltimore, Maryland: Recent advances in molecular neurobiology and genetics.
P. McGuffin, University of Wales College of Medicine, Cardiff: Genetic approaches to psychiatric disorders.

D. Hamer, National Cancer Institute, Bethesda, Maryland: Genetics of human behaviors.
H.E. Fisher, Rutgers University, New Brunswick, New Jersey: Marriage, adultery, and divorce.

H. Fisher, H. Solomon, J.D. Watson

Grass Genomes

October 31–November 2

FUNDED BY

USDA Plant Genome Program
The Rockefeller Foundation
United Kingdom Biotechnology and Biological Sciences Research Council

ARRANGED BY

J. Bennetzen, Purdue University, West Lafayette, Indiana

SESSION 1: Presentations on Current Research Status

J. Bennetzen, Purdue University, West Lafayette, Indiana, and M. Gale, John Innes Centre, Norwich, United Kingdom: Introduction.
J. Gale, John Innes Centre, Norwich, United Kingdom: Comparative genetic maps.
S. McCouch, Cornell University, Ithaca, New York: Comparative genetic maps.
J. Bennetzen, Purdue University, West Lafayette, Indiana: Physical maps.
T. Sasaki, STAFF Institute, Tsukuba Ibaraki, Japan: Monocot cDNAs; saturation/specificity.
S. Cartinhour, USDA - NAL, Beltsville, Maryland: Database integration.

SESSION 2: Discussion Group

Expected/potential benefits of an IGGI program.
What is available (technology, resources, organization)?
What is needed (technology, resources, organization)?

SESSION 3: Discussion Group

Discussion/revision of IGGI document outline prepared from discussions and presentations on previous day.
Conclusions and designation of next steps and parties responsible.

Candidate Gene Approaches to ALS

November 2–November 5

FUNDED BY

The Amyotrophic Lateral Sclerosis Association

ARRANGED BY

R.H. Brown, Massachusetts General Hospital East, Charlestown
R.L. Nussbaum, National Center for Human Genome Research, National Institutes of Health, Bethesda, Maryland

Introduction
J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York
R.V. Abendroth, The Amyotrophic Lateral Sclerosis Association, Milwaukee, Wisconsin

SESSION 1: Genetics of ALS
Chairperson: J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory, New York

R.H. Brown, Massachusetts General Hospital East, Charlestown: Overview of inherited motor nerve diseases.
M.A. Pericak-Vance, Duke University Medical Center, Durham, North Carolina, and J.L. Haines, Massachusetts

General Hospital East, Boston: Approaches to linkage analysis in familial ALS: Present resources and strategies.

J. de Belleroche, Charing Cross & Westminster Medical School, London, United Kingdom: A survey of superoxide dismutase mutations in 100 U.K. families and exclusion studies in extensive pedigrees lacking SOD-1 mutations.

M. Devoto, Columbia University, New York, New York: Theoretical considerations in analysis of mono- and multi-genic disease loci.

SESSION 2: Pathophysiology of ALS
Chairperson: T. Siddique, Northwestern University Medical School, Chicago, Illinois

M. Chalfie, Columbia University, New York, New York: Cell death genes in nematodes.

D.W. Choi, Washington University School of Medicine, St. Louis, Missouri: Excitotoxicity and neuronal death.

D.E. Merry, University of Pennsylvania School of Medicine, Philadelphia: Bcl-2, CAG repeats, and motor neurons.

B. Demple, Harvard School of Public Health, Boston, Massachusetts: Anti-oxidant gene families.

T. Siddique, Northwestern University Medical School, Chicago, Illinois: SOD1 transgenic mice.

D.W. Cleveland, Johns Hopkins University School of Medicine, Baltimore, Maryland: SOD1 and neurofilament L transgenic mice.

D.A. Figlewicz, University of Rochester Medical Center, New York: Mutations in neurofilament H in ALS.

P.N. Leigh, Institute of Psychiatry, London, United Kingdom: Cytoskeletal pathology in ALS.

G.D. Yancopoulos, Regeneron Pharmaceuticals, Inc. Tarrytown, New York: Neurotrophic growth factors and their receptors.

SESSION 3: Open Discussion: Candidate ALS Genes
Chairperson: A. Tobin, University of California, Los Angeles

SESSION 4: Approaches to Gene Mapping, Genomic Analysis, and Mutational Screening
Chairperson: R.L. Nussbaum, National Center for Human Genome Research, National Institutes of Health, Bethesda, Maryland

D. Patterson, Eleanor Roosevelt Institute, Denver, Colorado: Development of YAC contig maps.

R.A. Gibbs, Baylor College of Medicine, Houston, Texas: Genomic sequencing for gene searching.

M. Borodovsky, Georgia Institute of Technology, Atlanta: Computational sequence analysis.

W.M. Barnes, Washington University School of Medicine, St. Louis, Missouri: Long PCR.

E.A. Rose, Perkin-Elmer Cetus Instruments, Emery-ville, California: Applications of long PCR.

P. Nisson, Life Technologies, Gaithersburg, Mary-land: Exon trapping.

V.C. Sheffield, University of Iowa Hospitals & Clinics, Iowa City: Efficient identification of disease loci and mutation detection.

Evolution of Genes and Genomes

November 9–November 12

FUNDED BY

Alfred P. Sloan Foundation
Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY

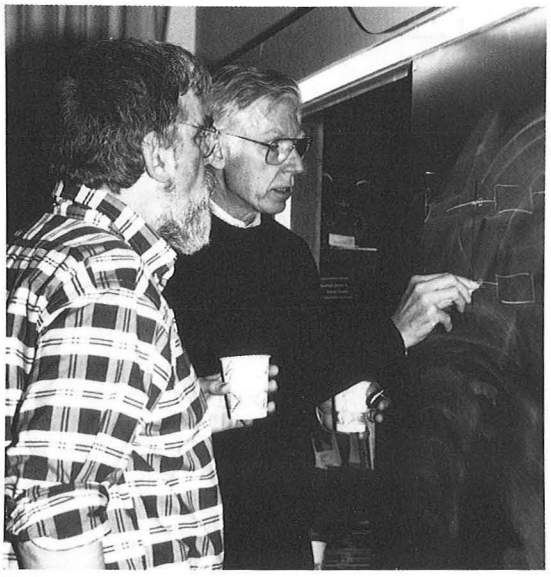
S. Brenner, University of Cambridge School of Medicine, United Kingdom
W. Gilbert, Harvard University, Cambridge, Massachusetts
J. Lake, University of California, Los Angeles
E.S. Lander, Massachusetts Institute of Technology Center for Genome Research, Cambridge

SESSION 1: Contemporary Sequences and the Past
Chairperson: J. Lake, University of California, Los Angeles

R.F. Doolittle, University of California, San Diego, La Jolla: Evolution of the earliest proteins.
P. Green, University of Washington, Seattle: Ancient conserved gene families.
M.W. Gray, Duke University, Durham, North Carolina: The organelle genome megasequencing project: Exploring mitochondrial DNA evolution.

SESSION 2: Analysis of Populations
Chairperson: D. Botstein, Stanford University School of Medicine, California

M.E. Kreitman, University of Chicago, Illinois: Role of weak selective forces on rates of molecular evolution.
J.H. Gillespie, University of California, Davis: What can be inferred about the causes of molecular evolution from species comparisons of DNA sequences?
C.H. Langley, University of California, Davis: Recombination and DNA sequence polymorphism: Distributions of transposable elements and of single nucleotide differences.
D.A. Powers, Stanford University, Pacific Grove, California: A multidisciplinary approach toward resolving the selectionist/neutralist controversy.
M.-C. King, University of California, Berkeley: Human genome diversity.
S. Paabo, University of Munich, Germany: Human population history and the mitochondrial genome.



R. Doolittle, F. Ruddle

M.-C. King

SESSION 3: Origin and Evolution of Eukaryotic Genes
Chairperson: W. Gilbert, Harvard University, Cambridge, Massachusetts

L. Hood, University of Washington, Seattle: DNA sequence of the T-cell receptor loci of humans and mice; 80 million years of molecular evolution.
J. Lake, University of California, Los Angeles: Searching for the prokaryotic origins of eukaryotes.
L. Simpson, Howard Hughes Medical Institute, University of California, Los Angeles: Evolution of RNA editing in kinetoplastid protozoa.
D. Helfman, Cold Spring Harbor Laboratory, New York: Alternative RNA splicing.

SESSION 4: Analysis of Populations
Chairperson: W. Gilbert, Harvard University, Cambridge, Massachusetts

M. Akam, University of Cambridge, United Kingdom: Evolution of *HOX* genes in arthropods.
F.H. Ruddle, Yale University, New Haven, Connecticut: Hox cluster evolution.

SESSION 5: Evolution of Genomes
Chairpersons: W. Gilbert, Harvard University, Cambridge, Massachusetts
J. Lake, University of California, Los Angeles

D. Sankoff, University of Montreal, Quebec, Canada: The mathematical inference of evolution via genome rearrangement.
P. Green, University of Washington, Seattle: Progress on sequencing the *C. elegans* genome and its analysis.
W.F. Doolittle, Dalhousie University, Halifax, Nova Scotia, Canada: Archaebacterial genomes: Why we are sequencing *Sulfolobus solfataricus?*
J.H. Miller, University of California, Los Angeles: Preliminary sequence analysis of the archaebacteria *Pyrobaculum aerofilum.*
S.J. O'Brien, National Cancer Institute, National Institutes of Health, Frederick, Maryland: Evolving genes and genomes: Lessons from the Felidae.
T. Helentjaris, University of Arizona, Tucson: Internal duplication of the maize genome and what it reveals about the evolution of genome structure.
J.E. Womack, Texas A&M University, College Station: Comparative gene mapping in cattle, mice, and humans: Contributions to understanding genome evolution.

Molecular Genetics of Diabetes

December 4–December 7

FUNDED BY

The William Stamps Farish Fund

ARRANGED BY

G.I. Bell, Howard Hughes Medical Institute, University of Chicago, Illinois
J. Todd, John Radcliffe Hospital, Oxford, United Kingdom

SESSION 1: Genetics of Diabetes and Obesity in Animal Models
Chairperson: A. Lernmark, Karolinska Hospital, Stockholm, Sweden

L.S. Wicker, Merck Research Laboratories, Rahway, New Jersey: Molecular genetics of IDDM in the NOD mouse.
E.H. Leiter, The Jackson Laboratory, Bar Harbor, Maine: Linking genotype to phenotype in mouse models of diabetes.
J.M. Friedman, The Rockefeller University, New York, New York: Genetic analysis of rodent obesity.
P. Nishina, The Jackson Laboratory, Bar Harbor, Maine: Genetics of modifying factors in NIDDM and obesity in mouse models.

SESSION 2: Genetics of Insulin-dependent (Type 1) Diabetes Mellitus (IDDM)
Chairperson: G.J. Thomson, University of California, Berkeley

J. Todd, University of Oxford, United Kingdom: Genetics of type-1 diabetes: Exclusion mapping.
L.L. Field, Health Sciences Center, Calgary, Canada: Genetics of IDDM.
E.A.M. Gale, St. Bartholomew's Hospital, London, United Kingdom: Integrated strategies for prediction of IDDM.

SESSION 3: Clinical Studies: The Diabetic Phenotype
Chairperson: C.R. Kahn, Joslin Diabetes Center, Boston, Massachusetts

L. Groop, Malmo General Hospital, Sweden: Metabolic heterogeneity of NIDDM.
P.Z. Zimmet, International Diabetes Institute, Melbourne, Australia: Latent autoimmune diabetes in adults: Genetics and autoimmunity.

SESSION 4: Genetics of Noninsulin-dependent (Type 2) Diabetes Mellitus (NIDDM)
Chairperson: G.I. Bell, Howard Hughes Medical Institute, University of Chicago, Illinois

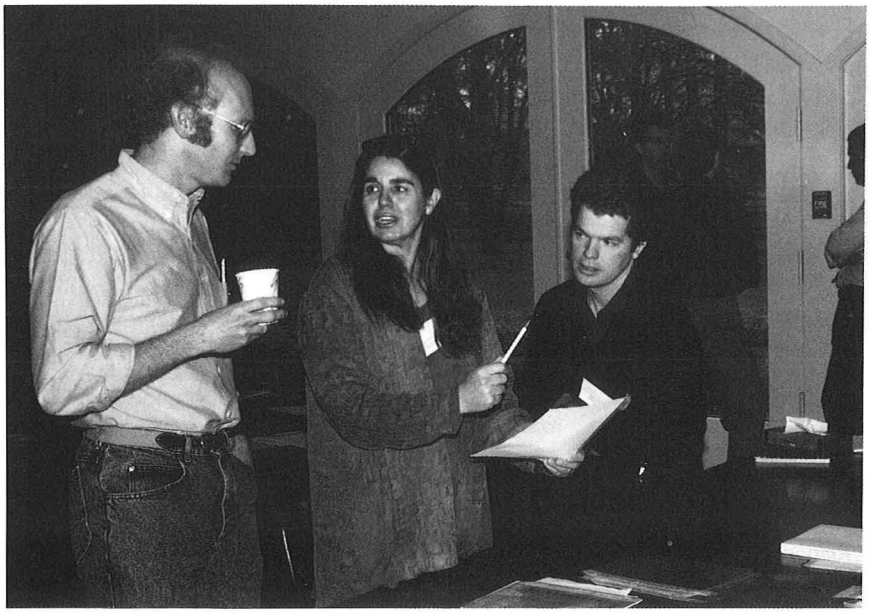
A.D. Roses, Duke University Medical Center, Durham, North Carolina: Molecular genetics of the Alzheimer diseases: A model for studies of complex genetic disorders.
P. Froguel, Human Polymorphism Study Center, Paris, France: MODY: A paradigm for genetics of NIDDM.
K.S. Polonsky, The University of Chicago, Illinois: Distinctive alterations in B-cell function associated with different genetic forms of diabetes.
F.S. Collins, National Center for Human Genome Research, National Institutes of Health, Bethesda, Maryland: Genetics of NIDDM in Finland.

SESSION 5: Genetic Studies of NIDDM In High-Risk Populations
Chairpersons: A.T. Hattersley, Queen Elizabeth Hospital, Birmingham, United Kingdom
N. Iwasaki, Tokyo Women's Medical College, Japan

C. Bogardus, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Phoenix, Arizona: NIDDM genes in Pima Indians.
M.P. Stern, University of Texas Health Science Center, San Antonio: Search for type II diabetes susceptibility genes in Mexican Americans.

SESSION 6: Candidate Genes: Genetics of Insulin Secretion and Insulin Action
Chairperson: P. Froguel, Human Polymorphism Study Center, Paris, France

M.A. Permutt, Washington University, St. Louis, Missouri: Genetics of rare inherited disorders of pancreatic B-cell function.
S.I. Taylor, National Institutes of Health, Bethesda, Maryland: Molecular genetics of insulin resistance.
G.I. Bell, Howard Hughes Medical Institute, University of Chicago, Illinois: Candidate genes and genetic studies of diabetes mellitus.



P. Concannon, G. Thomson, J. Todd

SESSION 7: Approaches for Mapping Genes for Complex Traits
Chairperson: R.S. Spielman, University of Pennsylvania, Philadelphia

N. Risch, Yale University, New Haven, Connecticut: Assessing the genetic contribution to type 1 diabetes.
J. Ott, Columbia University, New York, New York: Detecting linkage and association in the haplotype relative risk design.
M.L. Boehnke, University of Michigan, Ann Arbor: Mapping and exclusion of genes for complex traits: Application to NIDDM.
B.K. Suarez, Washington University School of Medicine, St. Louis, Missouri: Nonparametric linkage analysis and linkage disequilibrium analysis.
E.S. Lander, Whitehead Institute, Cambridge, Massachusetts: Genetic dissection of complex traits.

Planning for the Next Generation of Vaccines

December 11–December 14

FUNDED BY

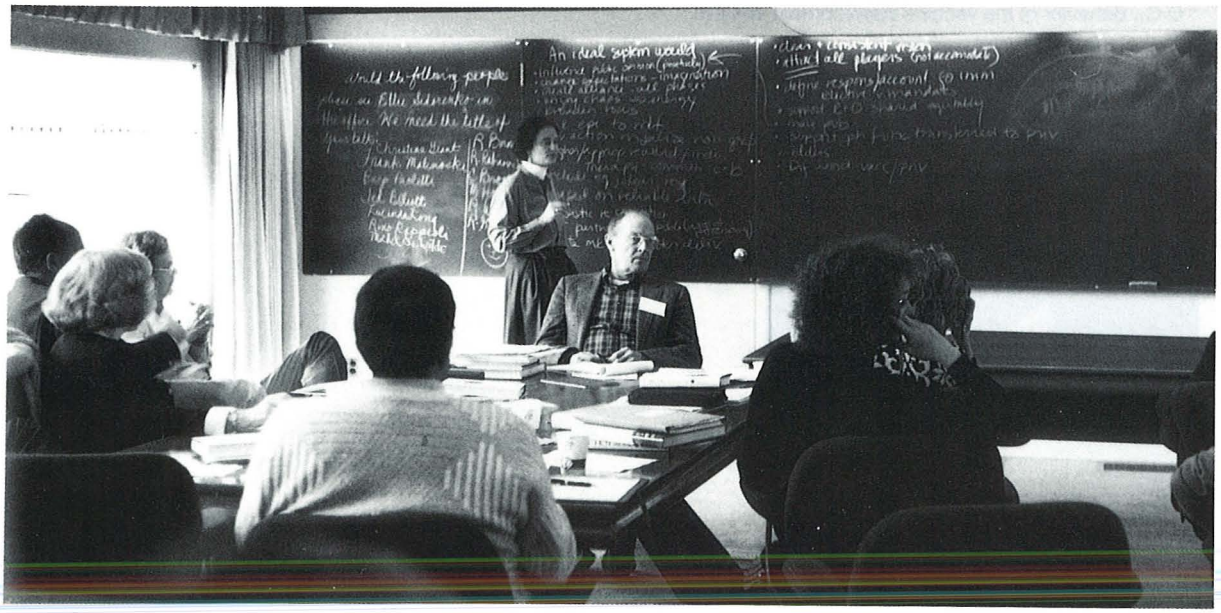
The Albert B. Sabin Vaccine Foundation

ARRANGED BY

P.K. Russell, The Johns Hopkins University, Baltimore, Maryland

SESSION 1: Future Directions in Vaccine Science
Chairperson: R. Rabinovich, NIAID, NIH, Bethesda, Maryland

F.J. Malinoski, Lederle-Praxis Biologicals, Wayne, New Jersey: Glycoconjugate technology and future combination vaccines.
M.A. Liu, Merck Research Laboratories, West Point, Pennsylvania: DNA vaccines: A new approach to vaccination.
E. Paoletti, Virogenetics Corporation, Troy, New York: Attenuated poxvirus recombinants.
S. Plotkin, Pasteur Merieux Connaught, Marnes la Coquette, France: How vaccine development of the future may affect vaccination schedules and cost.
R.W. Chesnut, Cytel Corporation, San Diego, California: Immune stimulation.
G.A. Siber, Public Health Biological Laboratories, Boston, Massachusetts: Overview and discussion.



P. Freeman, P. Russell

SESSION 2: Perspectives of the Biotechnology Industry
Chairperson: F. Cano, Aviron Corporation, Burlingame, California

T.P. Stagnaro, Univax Biologics, Inc., Rockville, Maryland: Bacterial vaccines and their role as immunizing agents.
L.C. Gordon, Ora Vax Inc., Cambridge, Massachusetts: Disease and product profile for financability of vaccine development.
T. Elliott, Prime Capital Management Company, Inc., Stamford, Connecticut: Venture capital: A partial overview.
J.L. Read, Aviron, Burlingame, California: Overview and discussion.

SESSION 3: Perspectives of the Large Vaccine Companies
Chairperson: S. Lemon, University of North Carolina, Chapel Hill

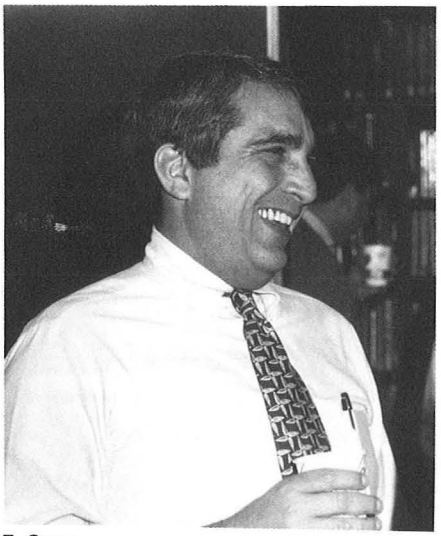
L.E. Long, Lederle-Praxis Biologicals, Wayne, New Jersey: Lederle-Praxis Biologicals perspective.
R. Rappuoli, Biocine S.p.A., Siena, Italy: Perceived vaccine value and implications on discovery and development.
M. De Wilde, SmithKline Beecham Biologicals, Rixensart, Belgium: Changes in the vaccine industry and areas for partnership with the public sector.
C.M. Grant, Connaught Laboratories, Inc., Swiftwater, Pennsylvania: Vaccine economics and the impact of globalization.
R. Ellis, Merck & Company, Inc., Rahway, New Jersey: Overview and discussion.

SESSION 4: Policy Discussions from the Public Sector
Chairperson: M.T. Osterholm, Minnesota Department of Health, Minneapolis

R. Rabinovich, NIAID/NIH, Bethesda, Maryland: Planning for the next generation of vaccines: Vaccine research and development supported by NIAID/NIH.
R. Bernier, Centers for Disease Control, Atlanta, Georgia: A status report on the childhood immunization initiative.
C. Broome, Centers for Disease Control and Prevention, Atlanta, Georgia: Surveillance opportunities for improved vaccine development.
M.C. Hardegree, Center for Biologics Evaluation and Research, FDA, Rockville, Maryland: Role of FDA in the regulation of vaccines.
A. Robbins, U.S. Public Health Service, Boston, Massachusetts: Overview and discussion.

SESSION 5: Policy Development
Chairperson: P. Freeman, University of Massachusetts, Boston

E.K. Marcuse, Children's Hospital and Medical Center, Seattle, Washington: Integrating public and private sectors to accomplish universal childhood immunization.
R. Widdus, National Vaccine Program Office, Washington, D.C.: Behavior of the vaccine development "system."
R. Goldberg, Springfield, New Jersey: Reinventing vaccine policy.
P.K. Russell, The Johns Hopkins University, Baltimore, Maryland: Overview and discussion.



F. Cano