Banburý Center

COLD SPRING HARBOR LABORATORY



The Banbury Center program continues to be as eclectic and exciting as ever. The year was filled with more meetings than ever before—a record 23 of them! Laboratory scientists used the Center for seven in-house meetings, and local community groups came here on eight occasions. Together with the five neurobiology courses, there was hardly a week when the Center was not in use.

Not surprisingly, 1999 was also a record year for the number of visitors to Banbury Center: 667 participants attended the 23 meetings. The demographics of our participants remain much the same: 25% of visitors to Banbury Center came from abroad, with the United Kingdom, Germany, and Canada leading the way. Of the American scientists, those from New York, Massachusetts, and California together accounted for more than 32% of the total. However, participants were drawn from no fewer than 42 states.

This is the first year that we have been able to use the Meier House to accommodate participants, which proved to be wonderful. Now the number of participants that we can house on the Banbury estate matches the number we can have in the Conference Room—we do not have to transport people between the Center and the main campus.

Biological and biomedical research is becoming ever more interdisciplinary, and as it does so, it also becomes ever more difficult to categorize the topics of Banbury Center meetings. A meeting may deal with the same phenomenon in a range of organisms, or many different strategies may be used to study one phenomenon in a single species. Nevertheless, the meetings followed the general themes for Banbury Center meetings—molecular biology, genetics, neurobiology, science policy, and education—and, as always, the topics were important and, on occasion, controversial.



Meier House provides accommodations for meeting participants at Banbury Center.

Human Genetic Disorders

Banbury Center has a long-standing interest in human genetics, and our meetings have helped promote research on many disorders. We have developed close relationships with a number of the foundations supporting such research, and scientists from three of these came to the Center in 1999.

The first meeting on neurofibromatosis was held at Banbury in 1990, and we have followed the significant advances in the field as researchers supported by the National Neurofibromatosis Foundation have returned for other meetings. This year, the Foundation turned to the painful and disfiguring nerve sheath tumors—plexiform neurofibromas—that grow along the length of nerves. They are an important target for trials of potential therapeutic agents, but first, a reliable scheme must be developed for assessing the size and growth rate of these tumors. A project is just beginning to do this, and the meeting *Natural History of Plexiform Neurofibromas in NF1*, organized by Bruce R. Korf (Children's Hospital, Boston) and funded by the U.S. Army Medical Research, was held to advance planning. It brought together all the principal investigators for each section of the project as well as representatives from each center that is recruiting patients for the study. The main goal of the meeting was to work out the final arrangements for recruitment of study subjects, to make any necessary modifications of the protocol, and to present some of the pilot data already being collected.

The Ehlers-Danlos syndrome (EDS) is a genetically heterogeneous group of disorders affecting connective tissue. Although the molecular basis of some forms of EDS is known, the pathogenesis of the disorders is largely unknown. This makes diagnosis and differentiating among the forms of EDS difficult, and it delays the search for treatments. Our meeting, *The Clinical and Biological Basis of the Ehlers-Danlos Syndrome*, organized by Peter Byers (University of Washington) and Petros Tsipouras (University of Connecticut) was funded by the Ehlers-Danlos Foundation. It addressed the diagnostic difficulties by reviewing what is known of the natural history of the various forms of EDS and discussing molecular mechanisms. In addition, participants presented data on the molecules that make up the extracellular matrix and that might be candidate molecules for the differing types of EDS.

The DNA-repair disorder ataxia telangectasia has reached a stage that is both a great advance and a great challenge. It is known now that the protein involved is a protein kinase called ATM, and the challenge is to discover precisely what this protein does and capitalize on this to develop treatments. *The Molecular Neurobiology of ATM* meeting, organized by Stephen Elledge (Baylor College of Medicine), Nathaniel Heintz (Rockefeller University), and Eugene Johnson (Washington University Medical School) and funded by the A-T Children's Project, was designed to tackle this challenge. Participants reviewed data on the structure of the ATM protein and the proteins with which it interacts, as well as its localization and possible function in neurons. One session was devoted to discussing gene therapy and stem cell therapy in ATM.

Strategies for Inactivation of Mutant Genes was also devoted to moving from knowledge of the fundamental molecular pathogenesis of a disorder to therapies. The meeting resulted from a collaboration between the two foundations that funded it: the Amyotrophic Lateral Sclerosis Association and the Hereditary Diseases Foundation. Organized by Robert Brown (Massachusetts General Hospital), Robert Nussbaum (National Human Genome Research Institute), Ethan Signer (Massachusetts Institute of Technology), and Nancy Wexler (Columbia University), the meeting was devoted to examining whether interventions might be possible at the nucleic acid level rather than at the protein level. This far-sighted approach involved participants using a variety of tools that modify gene expression, including antisense, ribozymes, RNA interference, DNA excision, and peptide nucleic acids.

It has been extraordinarily difficult to determine the factors, genetic and otherwise, that contribute to the pathogenesis of schizophrenia. The first Banbury Center meeting on the genetics of schizophrenia was held in 1988, and 11 years later, Arthur Pardee (Dana-Farber Cancer Institute) and Ann Goodman (The Nathan S. Kline Institute for Psychiatric Research) organized the meeting *Molecular Neurobiological Mechanisms in Schizophrenia*—Seeking a Synthesis. It was an ambitious program seeking to bring together studies ranging from diagnosis, through genetics and cell biology, to potential leads for therapies.

Genomics

In 1999, there were only two meetings concerned with the technical aspects of genomics, which is unusual for Banbury Center. Sequence data are being generated at an extraordinary rate and sequencing itself is no longer the bottleneck in genomics. Rather, making sense of all the sequences—finding genes and understanding what they do—has become the limiting step in using the data. Finley Austin (Merck Genome Research Institute) and Robert Strausberg (National Cancer Institute) organized the meeting *Functional Genomics: Technology Development and Research Applications* to examine this problem. Funded by the Merck Genome Research Institute and the National Cancer Institute, participants, drawn from technological as well as biological fields, assessed the current state-of-the-art strategies in functional genomics both in their own and other areas. We hoped that the meeting would promote interactions among investigators who use different approaches in different research fields.

The second genomics meeting, *Comparative Plant Genomics*, was organized by Ben Burr (Brookhaven National Laboratory), John Doebley (University of Minnesota), and Rob Martienssen (Cold Spring Harbor Laboratory). "Model" plant species are being sequenced in the hope and expectation that gene discovery and functional analysis in these species will speed the application of genomics to economically important plants. The first complete sequence of a plant—*Arabidopsis thaliana*—will be finished in late 2000, and it seemed the right time to think more carefully about the assumptions implicit in the "model" genome approach. This meeting reviewed critically the question of the usefulness of plant model genomes; e.g., the extent to which syntenic relationships will be useful in identifying genes and quantitative trait loci, and whether comparative analysis of the genes involved in common pathways will reveal functional relationships.

Using Biological Knowledge

The common theme to this set of otherwise disparate topics was the use of biological knowledge to help solve biomedical problems.

The conference *What Are Stem Cells? From Embryo to Adult Tissues* brought together scientists studying multipotent cells of the embryo and adult tissues, including hematopoietic, mesenchymal, neural, pancreatic, endothelial, hepatic, and germline systems. The organizers were Dan Marshak (Osiris Pharmaceuticals Inc.), Roland Scollay (Systemix Inc.), and Irv Weissman (Stanford University). The meeting was funded by Osiris Pharmaceuticals and Systemix. Participants were chosen so that a whole range of interesting questions relating to stem cell biology could be explored, including the biological definition of a stem cell, what constitutes clonality, how stem cells retain lineage commitment and proliferative capacity, and how differentiation is initiated.

Xenotransplantation: A Scientific Basis for Risk Assessment dealt with some fascinating biology and a topic of medical importance that is also highly controversial. There are great hopes that transplants of organs from animals might help overcome the acute shortage of human organs for transplantation. However, these hopes are tempered by fear that such transplants might lead to the transmission of viruses from animals to human beings. This workshop, organized by John Coffin (Tufts University), Mark Hanson (Hastings Center), Frederick Murphy (University of California, Davis), and Robin Weiss (Institute of Cancer Research), brought virologists from the academic and biotechnology worlds together with individuals concerned about public health issues of xenotransplantation. They reviewed what is known of the biological basis of the transmission of viruses from one species to another and of the consequences of such cross-species infections. These reviews formed the basis for a discussion of the public policy and ethical issues raised by uncertainties in understanding the risks in the application of xenotransplantation. The meeting was funded by the William Stamps Farish Fund and by the Hastings Center, which is dedicated to considering the societal and ethical issues relating to modern biomedical research. The involvement of the Hastings Center added a particularly valuable element to the meeting.

Viruses featured largely in the meeting on *Microbial Targets for Small Molecules*, organized by Peter Howley (Harvard Medical School), Arnold Levine (Rockefeller University), and Gregory Verdine (Harvard University) and funded by the Laboratory's Corporate Sponsor Program. Participants came from diverse backgrounds and included chemists, structural biologists, cell biologists, and microbiologists. The meeting provided an opportunity for the participants to meet for an informal exchange of ideas and information relevant to potential novel drug targets for bacteria, viruses, or fungi, with a specific emphasis on the development of new strategies for identifying novel small-molecule inhibitors.

Infectious agents of quite a different kind were the focus of the meeting *Physical and Structural Chemistry of Prion Protein and Prion-like Phenomena*. Organized by Byron Caughey (NIAID, NIH) and Kurt Wuthrich (Institut für Molekularbiologie und Biophysik, Zurich), participants discussed the self-propagating protein-protein interactions that result in the accumulation of abnormal conformers and/or polymers of a host protein. These produce pathogenic conditions such as scrapie in sheep, bovine spongiform encephalopathy (BSE) in cows, and Creutzfeld-Jacob disease in human beings. However, there is considerable controversy over the mechanisms by which a protein conformational change can be imposed by an abnormal form of a protein on a normal form. The aim of the meeting was to consider the latest insights into the structural basis of prion-like phenomena and other disease states that involve the insidious spread of aberrant protein.

When thinking about infectious diseases, our tendency is to concentrate on the infectious agent, but it is clear that the host plays an important part in determining whether an infection is established. *Host Pathogens Interactions*, organized by Barry R. Bloom (Harvard University), Sally Blower (University of California, San Francisco), and Nelson B. Freimer (University of California, San Francisco), was funded by the Corporate Sponsor Program. It tried to redress the concentration on infectious agents by reviewing what is known about the role of host genetic variation in relation to susceptibility to infection. The goal of the meeting was to examine interactions between host and pathogen that are influenced by genetics from the perspective of evolutionary biology—in particular, from population genetics and infectious-disease-modeling approaches.

Biological Studies

This group of meetings dealt with what might be called basic research, although even here the research is not far from application.





Much research on the regulation of gene expression has concentrated on the sets of proteins—transcription factors—that bind to transcription start sites. Less attention has been paid to the role played by structural changes in the DNA molecule. *The Role of DNA Topology, Conformation and Associated Factors in Gene Expression*, organized by David Levens (National Cancer Institute) and Lucia Rothman-Denes (University of Chicago) and funded by the Corporate Sponsor Program, explored the extent to which topological changes in a DNA molecule act directly on the transcription machinery. Participants reported research on the physics of strained DNA, the topology of DNA molecules—single-stranded regions, hairpins, bends, super colls—and how these changes are brought about by topolsomerases and the transcription apparatus.

Pigmentation is a fascinating biological phenomenon and one that has been the subject of recent advances. The meeting on the *Biology of Pigmentation* organized by Greg Barsh (Stanford University School of Medicine) and Dorothy C. Bennett (St. George's Hospital Medical School, United Kingdom) reviewed a number of longstanding questions in pigmentary cell biology, development, genetics, and evolution in relation to these advances. Participants discussed research on model organisms and systems that may lead to a deeper understanding of human eye, hair, and skin color and of the genetic and evolutionary forces that have contributed to the tremendous variation in human pigmentary phenotypes.

Studies of cell death in plants have been somewhat overshadowed by research on apoptosis in animal cells, especially in relation to cancer. But cell death occurs during many processes of normal plant growth and development, and its regulation is especially important for organisms where dead cells cannot be removed—their cell walls remain. Cell death occurs in response, for example, to pathogens as well as through the developmental regulation of genes whose activities lead to death. Jeffrey Dangl and Alan Jones (University of North Carolina) and Christopher J. Lamb (The University of Edinburgh) invited cell biologists, genetics, and plant pathologists to Banbury for a meeting on *Cell Death in Plants: Functions and Mechanisms*. Participants discussed recent progress toward understanding why cell death occurs in plants and whether common mechanisms lead to cell death.

Neuroscience

Neuroscience plays an increasingly large part in the research of the Laboratory, and this interest is reflected in the increasing number of Banbury Center meetings in this area. *The Functional Organization of the Thalamus and the Cortex and Their Interactions* organized by Paul R. Adams (State University of New York, Stony Brook), Christof Koch (California Institute of Technology), Karel Svoboda (Cold Spring Harbor Laboratory), and S. Murray Sherman (State University of New York, Stony Brook) was one such meeting. Many new advances have occurred in this area, and this meeting, funded by The Swartz Foundation, provided a forum for bringing together experts to discuss issues of emerging importance. Participants included an interesting mixture of experimentalists and theoreticians whose research spanned different levels of description (synaptic, cellular, network, and system).

One of the seemingly inescapable consequences of growing older is the loss of memory, a natural process but one that may be deeply worrisome, especially if it is thought to be the onset of Alzheimer's disease. *Old Memories*, organized by John D, Gabrieli (Stanford University), Michela Gallagher (Johns Hopkins University), and Tim Tully (Cold Spring Harbor Laboratory), was funded by the John Hartford Foundation to review the effects of aging on working memory, long-term memory storage, and recall. In particular, participants examined the question of what constitutes normal versus abnormal age-related memory loss, and how the former is distinguished from the onset of Alzheimer's disease and other disorders that affect memory. Participants also reviewed whether there is any evidence that age-related memory loss is heritable and what therapies exist or might be developed to restore memory in old age.

Science and Public Health Policy

Banbury Center has a long history of meetings that examine issues of public health policy in relation to biomedical research. Examples include the series of early meetings on risk assessment and environmental carcinogenesis. But none has the potential impact of the meeting on *Vaccines for Developing*. Economies, Who Will Pay?, organized by Philip Russell (Albert B. Sabin Vaccine Institute) and Stanley Lemon (University of Texas Medical Branch, Galveston), with Jeffrey Sachs (Center for International Development, Harvard University) and Peter Hotez (Yale University) as co-chairs. The meeting was funded by the Albert B. Sabin Vaccine Institute, Inc., which was established to promote the development and use of vaccines. Participants included scientists, economists, vaccine producers, representatives of international bodies such as the World Health Organization and the World Bank, and individuals from foundations. They came to Banbury to deliberate on how to provide vaccines to those most in need of them.

The Executives' Meeting

We are extremely grateful to Sandy Warner and David Deming of J.P. Morgan, who each year make possible a wonderful meeting. This year, we returned to genomics, the topic of the 1986 meeting, the first in this series. Then, the usefulness of embarking on a human genome project was still being hotly debated, in marked contrast to the 1999 meeting, *Genes and Genomes: Sequences to Proteins*. Now Leroy Hood, who spoke at the first meeting in 1986, was able to review the extraordinary advances that have led to the sequencing of the complete genomes of bacteria, yeast, and the nematode worm *Caenorhabditis elegans*. Richard Gibbs described what it is like to do large-scale sequencing, and David Botstein (who also spoke at the 1986 meeting), Gerald Rubin, John Todd, and Michael Bevan described how genome sequences are being used. The meeting closed with a fascinating and illuminating presentation by Maria Freiere on the patenting of DNA sequences.

Basic Issues of Science

For the third year, the Federal Judicial Center and Cold Spring Harbor Laboratory combined to provide federal and state judges with some insights into the way scientific research is carried out and into the ways that scientists think. The presentations at the meeting ranged from the history of eugenics and experimental biology, through human genetics and its societal implications, to environmental hazards and risk assessment. It was a pleasure to have Rich Roberts come back to Cold Spring Harbor Laboratory to recount his experiences as a scientific expert witness taking part in criminal and patent cases.

Eugenics on the Web

This project, funded by the National Human Genome Research Institute, is progressing very well. On two occasions during 1999, our Editorial Advisory Board came to Banbury Center to review what we had done, offer suggestions, and work at improving the site by writing essays and captions. We are well on target for completing the project on time, and the final meeting of this funding period will take place in January of 2000.

Acknowledgments

It would be impossible for Banbury Center to function at this level of activity without the help of many people: Bea Toliver and Ellie Sidorenko ensure that meetings run smoothly, Katya Davey looks after Robertson House, and Chris McEvoy and Andy Sauer maintain the Banbury grounds. All work very hard to keep the Center running. Outside the Center, special mention must be made of other units of the Laboratory that contributed significantly to the success of our program: The Meetings Office helped with late requests for extra accommodations, the AV team handled the increasingly complex computerized slide and overhead projectors, Blackford responded to late changes in catering requests, and Housekeeping coped with rapid changes between meetings.

Natural History of Plexiform Neurofibromas in NF-1

February 6-9

FUNDED BY U.S. Army Medical Research, with additional support from the National Neurofibromatosis Foundation

ARRANGED BY B.R. Korf, Children's Hospital, Boston, Massachusetts

SESSION 1: Overview

- B.R. Korf, Children's Hospital, Boston, Massachusetts: Overview of project.
- W. Slattery, House Ear Institute, Los Angeles, California: Overview of NF2 project.
- S. Huson, The Churchill Hospital, Oxford, United Kingdom: Patterns of plexiform neurofibromas in different anatomical locations.
- B.R. Korf, Children's Hospital, Boston, Massachusetts: Subject acquisition protocols.
- B.R. Korf, Children's Hospital, Boston, Massachusetts: Reimbursement and administration.

SESSION 2: MRI Protocol

- D. Jaramillo, Children's Hospital, Boston, Massachusetts: MRI of peripheral plexiform neurofibromas (including protocol).
- T. Young Poussaint, Children's Hospital, Boston, Massachusetts: MRI of cranial and spinal plexiform neurofibromas (including protocol).
- J, Tsuruda, University of Utah, Salt Lake City: MR neurography and advanced image processing.
- J.B. Zimmerman, WorldCare, Inc., Cambridge, Massachusetts: WorldCare MRI protocol.
- J. DiCanzio, Children's Hospital, Boston, Massachusetts: Statistical analysis of radiological data.

SESSION 3: Clinical and Pathological Data

- J.M. Friedman, University of British Columbia, Vancouver, Canada: Clinical database.
- B.R. Korf, Children's Hospital, Boston, Massachusetts: Patient questionnaire.
- D. Wolfe, Mt. Sinai Medical Center, New York: Histopathologic correlates of growth in plexiform neurofibroma.
- D. Wolfe, Mt. Sinai Medical Center, New York, and B.R. Korf, Children's Hospital, Boston, Massachusetts: Pathology review facility.

SESSION 4: Tissue Bank and Cell Biology: Studies of Cell Biology

- L. Rutkowski, Abramson Center, Philadelphia, Pennsylvania: Understanding biological defects in neurofibroma-derived Schwann cells. Part 1: Resolving obstacles.
- N. Ratner, University of Cincinnati College of Medicine, Ohio: Neurofibroma-derived Schwann cells are invasive and show high Ras-GTP.
- D. Viskochil, University of Utah, Salt Lake City: Somatic DNA alterations in peripheral nerve sheath tumors.
- D.H. Gutmann, Washington University School of Medicine, St. Louis, Missouri: Administration of tissue bank and mechanisms.

SESSION 5: Logistical Issues

B.R. Korf: Children's Hospital, Boston, Massachusetts: Time Line; Publication of Policy; Finance; Consent.



J. Tsuruda, T. Poussaint, D. Jaramillo, J. Zimmerman

What Are Stem Cells? From Embryo to Adult Tissues

February 21–24

FUNDED BY Osiris Therapeutics, Inc., and SySter	nix, Inc.
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ARRANGED BY D.R. Marshak, Osiris Therapeutics, Inc., Baltimore, Maryland R.G. Scollay, SyStemix, Inc., Palo Alto, California I.L. Weissman, Stanford University School of Medicine, California

SESSION 1

Chairperson: I.L. Weissman, Stanford University School of Medicine, California

- R.L. Gardner, University of Oxford, United Kingdom: Stem cells in the preimplantation mouse conceptus.
- A.L. Spradling, Howard Hughes Medical Institute, Carnegie Institution of Washington, Baltimore, Maryland: Regulation of Drosophila germ line stem cells by short-range extracellular signals.
- M.T. Fuller, Stanford University School of Medicine, California:

Genetic control of stem cell self-renewal, proliferation, and differentiation in the male germ line.

- B.L.M. Hogan, Howard Hughes Medical Institute, Vanderbilt University Medical Center, Nashville, Tennessee: Primordial germ cells.
- J.A. Thomson, University of Wisconsin, Madison: Human embryonic stem cells.

General Discussion—Nomenclature

Moderator: I.L. Weissman, Stanford University School of Medicine, California:

SESSION 2

Chairperson: R.G. Scollay, SyStemix, Inc., Palo Alto, California

I.L. Weissman, Stanford University School of Medicine, California: Hematopoietic stem cells,

- I.R. Lemischka, Princeton University, New Jersey: The molecular biology of hematopoietic stem cells and their microenvi-
- ronment; Do unique gene expression patterns reflect unique biological properties?
- P.J. Quesenberry, University of Massachusetts Medical School, Worcester: Phenotype of hematopoietic stem cells.



R. Gardner, D. Anderson, M. Fuller

- L.I. Zon, Howard Hughes Medical Institute, Children's Hospital, Boston, Massachusetts: Genes that specify hemangioblasts during vertebrate development.
- J.M. Isner, St. Elizabeth's Medical Center of Boston,

SESSION 3

- Chairperson: R.L. Gardner, University of Oxford, United Kingdom
- P.G. Robey, National Institute of Dental and Craniofacial Research, NIH, Bethesda, Maryland: The biological significance of marrow stromal in health and disease.
- D.R. Marshak, Osiris Therapeutics, Inc., Baltimore, Maryland: Mesenchymal stem cells.
- R. Cancedda, Istituto Nazionale per la Ricerca sul Cancro, Genoa, Italy: Bone marrow stromal cells from healthy donors

Massachusetts: Mobilization of bone-marrow derived progenitor cells and incorporation into neovascular foci.

H.M. Blau, Stanford University School of Medicine, California: Stem cells—Angioblasts.

and from bone-marrow-transplant recipients.

- A.B. Moseley, Osiris Therapeutics, Inc., Baltimore, Maryland; Therapeutic implications for MSCs in transplantation.
- D.J. Prockop, MCP Hahnemann University, Philadelphia, Pennsylvania: Marrow stromal cells as vectors for diseases of the central nervous system.

SESSION 4

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

- D.J. Anderson, Howard Hughes Medical Institute, Californía Institute of Technology, Pasadena: Neural stem cells in the peripheral nervous system.
- F.H. Gage, The Salk Institute, La Jolla, California: Multipotent stem cells from the adult central nervous system.
- R. McKay, National Institute of Neurological Disorders and
- Stroke, NIH, Bethesda, Maryland: A CNS stem cell is as good as the neurons it makes.
- C.Q. Doe, University of Oregon, Eugene: Neural stem cell division in *Drosophila*.
- Y.-N. Jan, Howard Hughes Medical Institute, University of California, San Francisco: The control of neuronal progenitor cell fate.

SESSION 5

Chairperson: B.L.M. Hogan, Howard Hughes Medical Institute, Vanderbilt University Medical Center, Nashville, Tennessee

- F.M. Watt, Imperial Cancer Research Fund, London, United Kingdom: Role of cell adhesion in regulating stem cell rate in human epidermis.
- M. Grompe, Oregon Health Sciences University, Portland: Therapeutic liver repopulation: Are stem cells needed?
- N. Sarvetnick, The Scripps Research Institute, La Jolla, California: Pancreas growth and regeneration.
- D.E. Harrison, Jackson Laboratory, Bar Harbor, Maine: Genetic regulation of hemopoietic stem cell aging.
- H.R. Bode, University of California, Irvine: Evolution of stem cells.

Comparative Plant Genomics

February 28-March 3

FUNDED BY Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY B. Burr, Brookhaven National Laboratory, Upton, New York J. Doebley, University of Minnesota, St. Paul B. Martienssen, Cold Spring Harbor Laboratory

Introduction:

- J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory
- B. Burr, Brookhaven National Laboratory, Upton, New York
- J. Doebley, University of Minnesota, St. Paul
- R. Martienssen, Cold Spring Harbor Laboratory

SESSION 1: Sequence Polymorphism and Evolutionary Change Chairperson: J. Messing, Rutgers University, Piscataway, New Jersey

- M.T. Clegg, University of California, Riverside: Dynamics of plant gene family evolution: Duplication and divergence in flavonoid biosynthesis genes.
- J. Doebley, University of Minnesota, St. Paul: Insights into maize evolution from the analysis of nucleotide diversity in teosinte branched 1.

SESSION 2: Syntenic Relationships I Chairperson: J. Doebley, University of Minnesota, St. Paul

- R. Schmidt, Max-Delbruck-Laboratorium, Köln, Germany: Comparative genome analysis in cruciferous plants.
- G. Moore, John Innes Centre, Norwich, United Kingdom: To pair or not to pair: The *Ph1* locus 40 years on.

- S. Tingey, DuPont Company, Wilmington, Delaware: EST programs for gene discovery in maize, soybean, wheat, and rice.
- O. Savolainen, University of California, Davis: From Arabidopsis to pine trees: Genetics of natural populations.
- W.R. McCombie, Cold Spring Harbor Laboratory: Sequence analysis of the rice and *Arabidopsis* genomes.
 R. Martienssen, Cold Spring Harbor Laboratory: Stripping repeated DNA from the maize genomic sequence.



S. Tingey, D. Zamir, J. Messing, X. Wong

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SESSION 3: Syntenic Relationships II

Chairperson: R. Martienssen, Cold Spring Harbor Laboratory

- L.D. Stein, Cold Spring Harbor Laboratory: Comparative genomics of animals, mapping, and sequencing.
- J. Messing, Rutgers University, Piscataway, New Jersey: Cereal genomics to study chromosome expansion.
- P. San Miguel, Purdue University, West Lafayette, Indiana:

SESSION 4: Common Pathways Chairperson: M.T. Clegg, University of California, Riverside

- R.J. Schmidt, University of California, San Diego: Arabidopsis to maize.
- J.B. Nasrallah, Cornell University, Ithaca, New York: Evolution of mating systems in the Brassicaceae.
- T.C. Osborn, University of Wisconsin, Madison:

SESSION 5: Useful Genes From Wild Relatives Chairperson: S. Tingey, DuPont Company, Wilmington, Delaware

- T. Mitchell-Olds, Max-Planck Institute for Chemical Ecology, Jena, Germany: Wild relatives of *Arabidopsis:* Phylogenetic relationships and comparative genomics.
- S.J. Knapp, Oregon State University, Corvallis: Genomics in newly domesticated, neglected, and underutilized oilseed crops.
- L.M. Pollak, U.S. Department of Agriculture-Agricultural

Plant genome colinearity as modeled by Adh1 and sh2/a1 regions in maize, sorghum, rice, and Arabidopsis.

- R. Tarchini, DuPont Genomics Group, Newark, Delaware: Genome structure and organization around the *Adh1/Adh2* region of rice and rice-maize microsynteny.
 - Comparison of *Brassica* and *Arabidopsis* flowering time genes.
- B. Burr, Brookhaven National Laboratory, Upton, New York: Genes controlling leaf trichome development may be involved in cotton fiber formation.

Research Service, Iowa State University, Ames: Improving corn germplasm for yield and value-added traits by introgression of genes from exotic varieties and *Tripsacum dactyloides*.

D. Zamir, Hebrew University of Jerusalem, Rehovot, Israel: Tomato introgression lines: Applications for synteny, evolution, and Qtl mapping.



Meeting participants take a coffee break

Role of DNA Topology, Conformation, and Associated Factors in Gene Expression

March 14-17

FUNDED BY Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY D.L. Levens, National Cancer Institute, NIH, Bethesda, Maryland L.B. Rothman-Denes, University of Chicago, Illinois

Introduction:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory D.L. Levens, National Cancer Institute, NIH, Bethesda, Maryland

SESSION 1: Conformational/Topological Changes at Transcription Sites Chairperson: N. Hernandez, Cold Spring Harbor Laboratory

- M. Timmers, Utrecht University, The Netherlands: Promoter opening and transcription initiation by RNA polymerase II.
- J.A. Goodrich, University of Colorado, Boulder: Promoter escape by DNA polymerase II on negatively supercoiled DNA.
- M. Meisterernst, Ludwig-Maximilians-Universitat München, Germany: Structure-function analysis of PCY—A transcrip-

SESSION 2: Propagation of Stress to Remote Sites Chairperson: S. Adhya, National Cancer Institute, Bethesda, Maryland

- J.F. Marko, University of Illinois at Chicago: Altered states of DNA.
- P. Droge, University of Cologne, Germany: The role of DNA topology, conformation, and associated factors in gene expression.
- G.W. Hatfield, University of California, Irvine, College of Medicine: DNA supercoiling-dependent, protein-mediated activation of transcription from the ilvp_g promoter of *Escherichia coli*.
- H.-Y. Wu, Wayne State University School of Medicine, Detroit, Michigan: Leu0, a new transcription regulator.
- R.R. Sinden, Texas A&M University, Houston: Transcriptional state of the mouse mammary tumor virus promoter can affect topological domain size in vivo.
- M. Dunaway, University of California, Berkeley: Insulators, enhancers, and the DNA path.

tion cofactor with unique DNA-binding properties.

- L.F. Liu, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey: Suppression of R-loops by DNA topoisomerases.
- S. Adhya, National Cancer Institute, NIH, Bethesda, Maryland: DNA strand separation during isomerization: Rate limiting steps.



S. Adhya

SESSION 3: Stress-induced Conformational Changes Chairperson: A. Rich, Massachusetts Institute of Technology, Cambridge

- P. Nelson, University of Pennsylvania, Philadelphia: Torsional directed walks, entropic elasticity, and DNA twist stiffness.
- S.M. Mirkin, University of Illinois at Chicago: DNA structures generated by transcription.
- L.B., Rothman-Denes, University of Chicago, Illinois: DNA structural transitions and single-stranded DNA binding pro-

SESSION 4: Role of Single-stranded DNA-binding Transcription Factors Chairperson: D. Reinberg, Howard Hughes Medical Institute, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

- D.L. Levens, National Cancer Institute, NIH, Bethesda, Maryland: Regulating c-myc expression with the FUSE binding protein.
- P.D. Gardner, University of Texas Health Science Center, San Antonio: Transcriptional regulation of neuronal nicotinic acetylcholine receptors by single-stranded DNA-binding proteins.
- J. Ting, University of North Carolina, Chapel Hill: Regulation of

SESSION 5: Diverse Roles for Stressed-DNA and Associated Factors Chairperson: L.F. Liu, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey

- C.J. Benham, Mt. Sinal School of Medicine, New York: Structural transitions in superhelical DNA.
- A. Rich and T. Schwartz, Massachusetts Institute of Technology, Cambridge: Structural basis of the interaction between Z-DNA and the mRNA editing enzyme dsRNA adenosine deaminase.
- E.M. Johnson, Mt. Sinai School of Medicine, New York: Activation of Initiation of DNA replication at the JC viral origin

teins in transcription activation.

- C.T. McMurray, Mayo Clinic, Rochester, Minnesota: Duplex to cruciform switching in the enkephalin enhancer controls expression of the human pronekephalin gene.
- P. Sassone-Corsi, CNRS, Illikirch-Strasbourg, France: Transcriptional repression by DAX-1 via binding to hairpin structures.

a topologically constrained promoter (class II MHC) by genespecific coactivator, double-stranded, and single-stranded DNA-binding proteins.

L.D. Kohn, National Institutes of Health, Bethesda, Maryland, Regulation of TSH receptor and MHC gene expression by single-stranded binding proteins and Sox-4; Relevance to autoimmunity.

by the HIV-1 protein TAT, dependent on cellular sequencespecific single-stranded DNA-binding protein, puro.

- A.P. Wolffe, National Institute of Child Health and Human Development, NIH, Bethesda, Maryland: Chromatin, DNA topology, and transcription.
- T. Kohwi-Shigematsu, Lawrence Berkeley Laboratory, California: Base-unpairing regions (BURs): Their roles in higher-order chromatin structure, gene regulation, and apoptosis.

Biology of Pigmentation

March 21-23

FUNDED BY Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY G. Barsh, Stanford University School of Medicine, California D.C. Bennett, St. George's Hospital Medical School, London, United Kingdom

Introduction and Goals of the Conference:

G. Barsh, Stanford University School of Medicine, California J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory

SESSION 1: Biochemistry of Melanins and Melanogenesis Chairperson: V.J. Hearing, National Institutes of Health, Bethesda, Maryland

- S.J. Orlow, New York University School of Medicine: Melanins, cells, and tissues: From molecules to phenotypes.
- P.A. Riley, Windeyer Institute of Medical Science, London, United Kingdom: The biochemistry of melanogenesis: The

SESSION 2: Cell Biology of Pigmentation

Chairperson: S.J. Orlow, New York University School of Medicine, New York

- R.A. Spritz, University of Colorado Health Sciences Center, Denver: Genetics and functional analysis of Hermansky-Pudlak syndrome.
- M.H. Brilliant, University of Arizona Health Sciences Center, Tucson; Aberrant pH of melanosomes in pink-eyed dilution (p) mutant melanocytes.
- M. Robinson, University of Cambridge, United Kingdom: The role of the AP-3 complex in the trafficking of proteins to melanosomes.
- S. Hoening, University of Gottingen, Germany: Sorting of melanosomal and lysosomal membrane proteins: Implications for the biogenesis of melanosomes.
- J. Hammer, National Heart, Lung, and Blood Institute, NIH, Bethesda, Maryland: Myosin V, microtubular motors, and melanosome dynamics in murine melanocytes.
- R. Yip, National Cancer Institute–Frederick Cancer Research Center, Maryland: Positional cloning of the mouse coat color mutation ashen.

General Discussion

Moderator: Seth J. Orlow, New York University School of Medicine, New York generation and significance of DOPA (3,4-dihydroxyphenylalamine) in phase | melanogenesis.

T.P. Dooley, Altruis, LLC & IntegriDerm, Vestavia Hills, Alabama: Pharmacologic inhibitors of pigmentation.



P. Riley, V. Hearing

SESSION 3: Extrapigmentary Functions of the Melanocortin System Chairperson: M.E. Hadley, University of Arizona, Tucson

- S. MacNeil, Northern General Hospital, Sheffield, United
- Kingdom: MSH, oxidative stress, immunomodulation, and (only when all else fails) pigmentation.
- J. Tatro, New England Medical Center, Boston, Massachusetts: The CNS melanocortin system in the coordinated

General Discussion:

Moderator: M.E. Hadley, University of Arizona, Tucson

SESSION 4: Development

Chairperson: C.R. Goding, Marie Curie Research Institute, Surrey, United Kingdom

- H. Arnheiter, National Institute of Neurological Disorders and Stroke, NIH, Bethesda, Maryland: The role of microphthalmia in eye and neural crest development.
- D.C. Bennett, St. George's Hospital Medical School, London, United Kingdom: Immortalization and molecular characterization of melanoblasts and pluripotent neural crest-like cells.
- M.K. Shin, Princeton University, New Jersey: Determining the spatial/temporal requirement for endothelin receptor B

SESSION 5: Cell Signaling

Chairperson: D.C. Bennett, St. George's Hospital Medical School, London, United Kingdom

- G. Barsh, Howard Hughes Medical Institute, Stanford University School of Medicine, California: Identification and characterization of the *mahogany* gene.
- V. Hearing, National Institutes of Health, Bethesda, Maryland: Biochemical and molecular regulation of melanin biosynthesis.
- G. Imokawa, Tokyo Women's Medical University, Japan: Intracellular signaling mechanisms leading to the synergistic effect on melanocyte proliferation of cultured human melanocytes between endothelin-1 and stem cell factor.
- E.R. Price, Dana-Farber Cancer Institute, Boston,

General Discussion:

Moderator: D.C. Bennett, St. George's Hospital Medical School, London, United Kingdom

SESSION 6: Genetics

- Chairperson: G. Barsh, Howard Hughes Medical Institute, Stanford University School of Medicine, California
- A.H. Robins, University of Cape Town, South Africa: The evolution of human skin color.
- A. Chakravarti, Case Western Reserve University, Cleveland, Ohio: Human genetic variation in pigmentation genes.
- R.N. Kelsh, University of Bath, United Kingdom: Zebrafish pigmentation mutations, colorless embryos, and a model for human Waardenburg-Shah syndrome.
- J. L. Rees, University of Newcastle Medical School,

General Discussion:

Moderator: G. Barsh, Howard Hughes Medical Institute, Stanford University School of Medicine, California

response to microbial toxins.

R.A. Adan, Utrecht University, The Netherlands: Roles of the melanocortin system in nerve regeneration, stress, and grooming behavior.

(Ednrb) by a tetracycline-inducible system.

- I.J. Jackson, Western General Hospital, Edinburgh, United Kingdom: Survival, proliferation, and migration of melanoblasts in vivo and in organ culture.
- H. Yoshida, Kyoto University, Japan: Role of Steel factor in survival of melanocytes in different environments.
- D.M. Parichy, Washington University School of Medicine, St. Louis, Missouri: Evolutionary genetics of *Danio* pigment pattern development.

Massachusetts: Microphthalmia: Central regulator in melanocyte development.

- R. Ballotti, Institut National de la Sante et de la Recherche Medicale, Nice, France: Role of microphthalmia-associated transcription factor (MITF) in the regulation of melanogenic enzyme expression.
- E.E. Medrano, Baylor College of Medicine, Houston, Texas: Regulation of MITF protein levels by association with the ubiquitin-conjugating enzyme hUBC9.
- C.R. Goding, Marie Curie Research Institute, Surrey, United Kingdom: Transcription regulation in melanocytes.

Newcastle-upon-Tyne, United Kingdom: Genetics of the human MC1-R: Genotype and phenotype.

- R.A. Sturm, University of Queensland, Australia: Genetic analysis of human pigmentation gene polymorphisms in twins.
- W.J. Pavan, National Human Genome Research Institute, NIH, Bethesda, Maryland: A combined informatic expression array approach to dissect the transcriptional regulation of melanocyte development/function.

Functional Organization of Thalamus and Cortex and Their Interactions

April 5-9

FUNDED BY The Swartz Fund for Computational Neuroscience

ARRANGED BY P.R. Adams, State University of New York, Stony Brook K. Svoboda, Cold Spring Harbor Laboratory S.M. Sherman, State University of New York, Stony Brook

Introduction:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory
P.R. Adams, State University of New York, Stony Brook
K. Svoboda, Cold Spring Harbor Laboratory
S.M. Sherman, State University of New York, Stony Brook

SESSION 1: Neurons and Synapses

Chairperson and Discussion Leader: D.L. Ferster, Northwestern University, Evanston, Illinois

- B.W. Connors, Brown University, Providence, Rhode Island: An electrically coupled network of interneurons mediates feed-forward inhibition from thalamus to cortex.
- A. Destexhe, Laval University, Quebec, Canada: Modeling dendritic integration in thalamic and neocortical neurons in vivo.
- Y. Amitai, Ben Gurion University, Beer-Sheva, Israel: Thalamocortical and intracortical pathways in the barrel cortex: Distinctive synaptic properties and functional organization.

A.M. Thomson, Royal Free Hospital School of Medicine, London, United Kingdom: Synaptic specialization and frequency filtering (in cortical circuits).



K. Cox, K.-P. Hoffmann

SESSION 2: Thalamocortical I

Chairperson and Discussion Leader: R.M. Shapley, New York University, New York

- R C. Reid, Harvard Medical School, Boston, Massachusetts: Thalamocortical relations in the visual system: The role of synchronous input.
- E.G. Jones, University of California, Davis: The core and matrix of thalamic organization,
- M.J. Berry, Harvard University, Cambridge, Massachusetts:

SESSION 3: Thalamocortical II

Chairperson and Discussion Leader: T. Sejnowski, The Salk Institute for Biological Studies, San Diego, California

- D.L. Ferster, Northwestern University, Evanston, Illinois: The role of neuronal conductance and threshold in orientation selectivity.
- K.D. Miller, University of California, San Francisco: Circuitry underlying orientation and temporal frequency selecting in cat visual cortex.

SESSION 4: Cortical Circuitry

Chairperson and Discussion Leader: K.D. Miller, University of California, San Francisco

- L. Borg-Graham, IAF CNRS, Gif-Sur-Yvette, France: Silent shunting--tts not nothing: Synaptic dynamics in visual cortex.
- E.M. Callaway, The Salk Institute for Biological Studies, La Jolla, California: Local circuits in visual cortex.
- R.M. Shapley, New York University, New York: The dynamics of visual responses in macaque striate cortex.

- Anticipation of moving stimuli by the retina.
- P R. Adams, State University of New York, Stony Brook: Correlation measurement and plasticity control by layer 6 cells.
- T. Sejnowski, The Salk Institute for Biological Studies, San Diego, California: Predictive learning of temporal sequences in recurrent neocortical circuits.
- D.A. McCormick, Yale University School of Medicine, New Haven, Connecticut: Dynamic properties of thalamocortical interactions in normal and abnormal (epileptic) function.
- T. Elliott, University of Nottingham, United Kingdom: A neurotrophic model of synaptic competition in the developing visual cortex.
- M. Nicolelis, Duke University Medical Center, Durham, North Carolina; Thalamocortical interactions in the somatosensory system.
- A. Pouget, University of Rochester, New York: Information transfer in population codes: Implications for theories of cortical computation.
- SESSION 5: Cortico-cortico and Cortico-thalamo-cortical Chairpersons and Discussion Leaders: P.R. Adams and S.M. Sherman, State University of New York, Stony Brook
- J. Bullier, Faculte de Medecine de Rangueil, Toulouse, France: Role of feedback connections in the visual cortex—Spatial and temporal aspects.
- R.W. Guillery, University of Wisconsin School of Medicine, Madison: Corticothalamic pathways: Classification and orga-

SESSION 6: Cognitive

Chairperson and Discussion Leader: H.S. Seung, Massachusetts Institute of Technology, Cambridge

- J.L. McClelland, Carnegie-Mellon University, Pittsburgh, Pennsylvania: Complementary learning systems, Hebbian learning, and human amnesia.
- J.L. Gallant, University of California, Berkeley: The function of the nonclassical receptive field in natural vision,

nization.

- H.S. Seung, Massachusetts Institute of Technology, Cambridge: Cellular and circuit mechanisms of short-term memory.
- D.H. Ballard, University of Rochester, New York: Synchronous models in predictive coding.
- K.-P. Hoffmann, Ruhr-University, Bochum, Germany: Synchronization of neuronal activity in extrastriate cortical areas during movement perception.
- S. Treue, University of Tübingen, Germany: The role of attention in visual information processing.

Molecular Neurobiological Mechanisms in Schizophrenia: Seeking a Synthesis

April 11-14

FUNDED BY

The Charles A. Dana Foundation, with additional support from The Nathan S. Kline Institute for Psychiatric Research and Merck KGaA

ARRANGED BY A.B. Pardee, Dana-Farber Cancer Institute, Boston, Massachusetts A.B. Goodman, The Nathan S. Kline Institute for Psychiatric Research, Orangeburg, New York

Introduction and Goals of Conference:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory A.B. Pardee, Dana-Farber Cancer Institute, Boston, Massachusetts

SESSION 1: Fundamental Questions

Chairperson: A.B. Pardee, Dana-Farber Cancer Institute, Boston, Massachusetts

- N.C. Andreasen, University of Iowa Hospitals and Clinics, Iowa City: Schizophrenia: Fundamental questions.
- J.F. Nash, Princeton University, New Jersey: Case history.

SESSION 2: Characteristics, Genetics, Animal Models Chairperson: R. Cancro, The Nathan S. Kline Institute for Psychiatric Research, Orangeburg, New York: Opening remarks

- L.J. Ingraham, George Washington University, Washington, D.C.: Clinical and subclinical correlates of schizophrenia.
- P.S. Holzman, Harvard University, Belmont, Massachusetts: Schizophrenia and area MT.
- P. McGuffin, The Maudsley Institute of Psychiatry, London, United Kingdom: Gene mapping and positional cloning.
- J.L. Kennedy, Clarke Institute for Psychiatry, Toronto, Canada:



L. Ingraham, J. Nash

Neurodevelopment genes and unstable DNA in schizophrenia. R.E. Straub, Virginia Commonwealth University, Richmond;

- Linkage results in schizophrenia—Disappointing only to those with unjustified expectations?
- D.R. Weinberger, NIMH Neurosciences Center at St. Elizabeth's Hospital, Washington, D.C.: Schizophrenia, candidate genes, and candidate phenotypes.



A. Pardee, J. Kennedy, M. Tsuang

SESSION 3: Brain Structure, General Brain Models

Chairperson: F.M. Benes, McLean Hospital, Belmont, Massachusetts: Opening Remarks

- F.M. Benes, McLean Hospital, Belmont, Massachusetts: The role of stress and dopamine-GABA interactions in the development of schizophrenia.
- P.S. Goldman-Rakic, Yale University School of Medicine, New Haven, Connecticut: The prefrontal model of schizophrenia.
- S. Akbarian, Whitehead Institute, Massachusetts Institute of Technology, Cambridge: Altered gene expression in prefrontal cortex of schizophrenics—A perspective from postmortem studies.

SESSION 4: Neuromolecular Biology

Chairperson: J.E. Dowling, Harvard University, Cambridge, Massachusetts: Opening remarks

- J.W. Olney, Washington University School of Medicine, St. Louis, Missouri: NMDA receptor hypofunction model of schizophrenia.
- J.T. Coyle, Massachusetts General Hospital, Boston: NMDA receptor hypofunction and the pathophysiology of schizophrenia—Clinical evidence.
- B.S. McEwen, Rockefeller University, New York: Stress, sex, and the hippocampus: From animal models to clinical application.

SESSION 5: Molecular Signaling and Transcription Chairperson: J. Maddox, London, United Kingdom: Opening remarks.

- E.J. Nestler, Yale University, New Haven, Connecticut: Regulation of gene expression in striatum: ΔFosB: A molecular mediator of long-term neural plasticity.
- L.L. Iversen, University of Oxford, United Kingdom: Neuropharmacology— Dopamine and 5-hydroxytryptomine.
- K.S. Kristensson, Karolinska Institut, Stockholm, Sweden: Targeting of viruses and African trypanosomes in the nervous system.

SESSION 6: Treatment Strategies

- Chairperson: A.B. Pardee, Dana-Farber Cancer Institute, Boston, Massachusetts: Opening remarks
- M.T. Tsuang, Harvard Institute of Psychiatric Epidemiology and Genetics, Boston, Massachusetts: "Schizotaxia": Prevention strategies for schizophrenia.
- T.H. McGlashan, Yale University School of Medicine, New Haven, Connecticut: Can current treatments prevent the dementing process of dementia praecox?
- R.A. Heyman, Ligand Pharmaceuticals, Inc., San Diego, California: A pharmacological dissection of RXR signaling

General Discussion

Chairperson: J.D. Watson, Cold Spring Harbor Laboratory

- A.B. Goodman, The Nathan S. Kline Institute for Psychiatric Research, Orangeburg, New York: Chromosomal colocalization (CC) at genetic loci linked to schizophrenia.
- A.-S. La Mantia, University of North Carolina at Chapel Hill: Induction, retinoids, and the initial development of the forebrain.
- B.T. Woods, Central Texas Veterans Health Care System, Temple: Discord in the developmental symphony: Can persistently active genetically determined abnormalities of apoptosis or neuritic pruning explain schizophrenia?
- U.C. Drager, E. Kennedy Shriver Center, Waltham, Massachusetts: Retinaldehyde dehydrogenases create patterns of retinoic acid in the central nervous system.
- G. Eichele, Baylor College of Medicine, Houston, Texas: Gene expression analysis in the brain: A meaningful approach to mental disorders?
- P. Greengard, Rockefeller Institute, New York: Beyond the dopamine receptor: The DARPP-32/protein phosphatase 1 cascade.
- E. Borrelli, CNRS-INSERM, Strasbourg, France: Role of dopa-mine receptors in schizophrenia and other neuropathologies.
- T. Perlmann, Karolinska Institut, Stockholm, Sweden: Role of NURR1 in developing and mature dopamine cells.
- B.M. Spiegelman, Dana-Farber Cancer Institute, Boston, Massachusetts: Control of oxidative metabolism and thermogenesis through a regulated transcriptional coactivator.

pathways with rexinoids.

- G. Bartoszyk, Merck KGaA, Darmstadt, Germany: Classification of atypical neuroleptics: Catalepsy versus anticatalepsy.
- Y. Ohno, Sumitomo Pharmaceuticals Research Center, Osaka, Japan: Recent advances in antipsychotic development: The role of 5-HT₂ receptor antagonism in schizophrenia treatment.
- C. Mondadori, Hoechst Marion Roussel, Bridgewater, New Jersey: The difficulty of selecting the right target.

Image Archive on the American Eugenics Movement Editorial Advisory Panel Workshop

April 15-17

FUNDED BY National Human Genome Research Institute, NIH

ARRANGED BY D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory

SESSION 1

- J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: Introduction.
- D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory: New panel members, workshop objectives, site narrative structure.
- S. Lauter, DNA Learning Center, Cold Spring Harbor Laboratory: Introduction to site interface.

Computer Work I: Site Interface. Computer Critique I: Site Interface.

Discussion of Theme Essays I

- G.E. Allen, Washington University, St. Louis, Missouri: Social origins of the movement.
- E.A. Carlson, State University of New York, Stony Brook: Scientific origins of the movement.
- S. Selden, University of Maryland, College Park: Eugenics popularization.

SESSION 2

Introduction to Site Editing Shell

M. Christensen, DNA Learning Center, Cold Spring Harbor Laboratory: Caption writing/editing, series, emerging style.

Computer Work II: Captioning. Computer Critique II: Captioning.

Discussion of Theme Essays II

P. Lombardo, University of Virginia, Charlottesville: Eugenics and social policy I: Anti-miscegenation; Eugenics and social policy II: Reproductive restriction and sterilization;

Eugenics and social policy III: Immigration restriction. E.A. Carlson, State University of New York, Stony Brook: The

end of transformation of eugenics.

SESSION 3

Discussion of Theme Essays III: Review.

Computer Work III: Revisit Site Interface and Editing Shell. Computer Critique III: Additional Problems and Challenges. Wrap-up, Future Tasks, and Meetings.



T. Shearer, S. Selden

Clinical and Biological Basis of the Ehlers-Danlos Syndrome

April 18-21

 FUNDED BY
 Ehlers-Danlos National Foundation and the March of Dimes

 ARRANGED BY
 P.H. Byers, University of Washington School of Medicine, Seattle

 P. Tsipouras, University of Connecticut Health Center, Farmington

Introduction and Goals of Conference:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory P. Tsipouras, University of Connecticut Health Center, Farmington

SESSION 1: Molecular Basis of the Ehlers-Danlos Syndrome Chairperson: P.H. Byers, University of Washington School of Medicine, Seattle

- A. De Paepe, University Hospital Ghent, Belgium: Collagen gene mutations in the classical type.
- U. Schwarze, University of Washington, Seattle: Collagen V gene mutations in the classical type.
- R. Wenstrup, Children's Hospital Research Foundation, Cincinnati, Ohio: Collagen V gene mutations in the classical type.

Discussion: Collagen V gene mutations.

U. Schwarze, University of Washington, Seattle: Collagen III

gene mutations in the vascular type.

- B. Steinmann, University Children's Hospital, Zurich, Switzerland: Collagen I gene mutations in the arthochalasia type.
- A. Nicholls, University of Cambridge, United Kingdom: Collagen I gene mutations in the classical type.

Discussion: Collagen I gene mutations.

A. Colige, Tour de Pathologie, Liege, Belgium: Procollagen *N*-peptidase gene mutations in the derematosparaxis type.



SESSION 2: Molecular Basis/Pathogenesis

Chairperson: R. Wenstrup, Children's Hospital Research Foundation, Cincinnati, Ohio

L. Ala-Kokko, University of Oulu, Finland: PLOD gene.

H.N. Yeowell, Duke University Medical Center, Durham, North Carolina: *PLOD* gene mutations in the kyphoscoliosis type.

- I. Hausser, Universitats-Hautklinik, Heidelberg, Germany:
- SESSION 3: Matrix Biology Chairperson: D.R. Eyre, University of Washington, Seattle
- L.Y. Sakai, Shriners Hospitals for Children, Portland, Oregon: Extracellular matrix molecules I.

R.E. Burgeson, Massachusetts General Hospital/Harvard, Charlestown, Massachusetts: Extracellular matrix molecules II.

D.R. Eyre, University of Washington, Seattle: Collagen

Histopathological observations.

P.H. Byers, University of Washington School of Medicine, Seattle: Abnormalities in the Intracellular processing of collagen.

interactions.

- J. Rosenbloom, University of Pennsylvania, Philadelphia: Elastin and microfibrils.
- K. Kadler, University of Manchester School of Biological Sciences, United Kingdom: Effects of mutations on collagen fibrillogenesis.

SESSION 4: Natural History

- Chairperson: C.A. Francomano, National Human Genome Research Institute, NIH, Bethesda, Maryland
- F.M. Pope, University of Wales College of Medicine, Cardiff, United Kingdom: Overview of the natural history of the Ehlers-Danlos syndrome.
- M. Pepin, University of Washington, Seattle: Natural history of the vascular type.
- B. Steinmann, University Children's Hospital, Zurich, Switzerland: Natural history of the kyphoscoliosis and arthrochalasia types.
- N. Schechter, Saint Francis Hospital and Medical Center, Hartford, Connecticut: Musculoskeletal pain.

SESSION 5: Management and Future Directions

Chairperson: P. Tsipouras, University of Connecticut Health Center, Farmington

- P.G. Danias, Beth Israel Deaconess Medical Center, Boston, Massachusetts: Noninvasive assessment of the elastic properties of modicum size arteries,
- B.T. Baxter, University of Nebraska Medical Center, Omaha:

Panel Discussion: Future directions.

- R.K. Portenoy, Beth Israel Medical Center, New York: Pain and Ehlers-Danlos syndrome.
- M. Geraghty, Johns Hopkins Hospital, Baltimore, Maryland: Physiological and psychological management of individuals affected with Ehlers-Danlos syndrome.
- C.A. Francomano, National Human Genome Research Institute, NIH, Bethesda, Maryland: Longitudinal studies.
- S. Rodeo, Hospital for Special Surgery, New York: Orthopedic treatment of patients with joint laxity.

Management of arterial aneurysms/rupture in the vascular type.

G.F. Whalen, University of Connecticut Health Center, Farmington: Management of bowel rupture.

Functional Genomics: Technology Development and Research Applications

April 25-28

FUNDED BY	Merck Genome Research Institute and National Cancer Institute	
ARRANGED BY	M.J.F. Austin, Brigham and Women's Hospital, Boston, Massachusetts R.L. Strausberg, National Cancer Institute, NIH, Bethesda, Marvland	

Introduction:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory M.J.F. Austin, Brigham and Women's Hospital, Boston Massachusetts R.L. Strausberg, National Cancer Institute, NIH, Bethesda, Maryland

SESSION 1

Chairperson: M. Boguski, National Library of Medicine, NIH, Bethesda, Maryland

- J. Pollack, Howard Hughes Medical Institute, Stanford University Medical School, California: Microarray analysis of gene expression and DNA copy number in breast cancer.
- V.G. Cheung, Children's Hospital of Philadelphia, Pennsylvania: Whole-genome microarray— A tool for gene mapping.
- D. Pinkel, University of California, San Francisco: Issues in DNA copy number analysis by array CGH.
- D. Nickerson, University of Washington, Seattle: Genome sequence variation.
- D.C. Muddiman, Virginia Commonwealth University, Richmond: Rapid and accurate characterization of VNTRs, SNPs, and DNA-drug interactions through development of electrospray lionization Fourier transform ion cyclotron resonance mass spectrometry.

SESSION 2

Chairperson: G.M. Church, Harvard Medical School, Cambridge, Massachusetts

- K. Gunsalus, Rutgers University, Piscataway, New Jersey; Structure-based functional genomics.
- J. Skolnick, The Scripps Clinic Research Institute, La Jolla, California: Structure-based approaches to the prediction of protein function.
- M. Yaffe, Harvard Institute of Medicine, Boston, Massachusetts: Placing proteins into pathways: An interactive World Wide Web protein signature motif database using peptide library information.
- P. Andrews, University of Michigan, Ann Arbor: Approaches to high-throughput proteome analysis and visualization.
- R. Aebersold, University of Washington, Seattle: The proteome: Analysis and utility.
- P.H. Uetz, University of Washington, Seattle: Large-scale twohybrid analysis of the yeast proteome.



G. Church

SESSION 3

Chairperson: D. Nickerson, University of Washington, Seattle

- E.A. Golemis, Fox Chase Cancer Center, Philadelphia, Pennsylvania: Interaction technology interactions with organismal biology.
- M. Vidal, Massachusetts General Hospital Cancer Center, Charlestown: The C. elegans protein interaction map project.
- G.M. Church, Harvard Medical School, Cambridge,
- Massachusetts: Integrating measurements, motifs, and models for comprehensive molecular quantitations of cell populations.
- J. Green, National Cancer Institute, NIH, Bethesda, Maryland: Insights from the C3(1)/Tag transgenic models of prostate and mammary cancer.

SESSION 4

Chairperson: L.M. Staudt, National Cancer Institute, NIH, Bethesda, Maryland

- G.A. Churchill, The Jackson Laboratory, Bar Harbor, Maine: Sources of variation in large-scale gene-expression experiments.
- G. Eichele, Baylor College of Medicine, Houston, Texas: Methods and Instrumentation for gene-expression analysis by in situ hybridization.
- X. Gao, University of Houston, Texas: A novel method for onchip parallel syntheses of molecular microarrays using pho-

SESSION 5

Chairpersons: R.L. Strausberg, National Cancer Institute, NIH, Bethesda, Maryland and M.J. F. Austin, Brigham and Women's Hospital, Boston, Massachusetts

- L.M. Staudt, National Cancer Institute, NIH, Bethesda, Maryland: Genomic-scale analysis of gene expression in human lymphomas and leukemias using the Lymphochip cDNA microarray.
- M.R. Emmert-Buck, National Cancer Institute, NIH, Bethesda, Maryland; An integrated approach to the analysis of human prostate cancer.

togenerated reagents.

- H.R. Garner, University of Texas Southwestern Medical Center, Dallas: Hardware and software for array-based expression profiling and re-sequencing.
- U. Alon, Princeton University, New Jersey: Analysis of gene expression patterns.
- S.R. Gullans, Brigham and Women's Hospital, Boston, Massachusetts: Profiling gene expression using DNA microarrays.

- G.J. Riggins, Duke University Medical Center, Durham, North Carolina: The Public CGAP/SAGE database as one model for collaborative expression genomics.
- P. Spellman, Stanford University School of Medicine, California: Analysis of genome expression data.
- M. Boguski, National Library of Medicine, NIH, Bethesda, Maryland: Reflections.

Strategies for Inactivation of Mutant Genes

May 2-5

FUNDED BY	Amyotrophic Lateral Sclerosis Association and Hereditary Disease Foundation
ARRANGED BY	R.H. Brown, Massachusetts General Hospital, Charlestown E.R. Signer, Massachusetts Institute of Technology, Cambridge N.S. Wexler, Columbia University, New York

Introduction and Goals of Conference:

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

- R.H. Brown, Massachusetts General Hospital, Charlestown
- E.R. Signer, Massachusetts Institute of Technology, Cambridge
- N.S. Wexler, Columbia University, New York

SESSION 1

Chairperson: N.S. Wexler, Columbia University, New York

- A. Lieberman, National Institute of Neurological Disorders and Stroke, NIH, Bethesda, Maryland: Androgen effects on motor neuron gene expression.
- R.H. Brown, Massachusetts General Hospital, Charlestown: Mechanisms of neuronal cell death in SOD1-associated motor neuron disease.
- S.O. Zeitlin, College of Physicians & Surgeons, Columbia University, New York: Conditional inactivation of the mouse *HD* gene.

H.J. Federoff, University of Rochester, New York: Somatic gene transfer of cre recombinase to alter brain function.

SESSION 2

Chairperson: E.R. Signer, Massachusetts Institute of Technology, Cambridge

- E.B. Kmiec, Jefferson Center for Biomedical Research, Doylestown, Pennsylvania: Targeted mutagenesis using chimeric oligonucleotides: Mechanism of action and applications to functional genomics and gene therapeutics.
- C.J. Steer, University of Minnesota Medical School,
- Minneapolis: The use of RNA/DNA oligonucleotides to rewrite genome sequence.
- D.M. Turnbull, University of Newcastle-upon-Tyne, United Kingdom: Inhibition of mitochondrial DNA replication by peptide nucleic acids: Potential in the treatment of human disease.



E. Signer, N. Wexler, J. Witkowski

SESSION 3

Chairperson: A. Tobin, University of California, Los Angeles

- P.S. Fishman, University of Maryland School of Medicine, Baltimore: Protein delivery to neurons using bacterial toxin-based vectors.
- J.W. Engels, Johann Wolfgang Goethe-Universität, Frankfurt am Main, Germany: Hammerhead ribozymes: Chemotherapy

SESSION 4:

Chairperson: R.H. Brown, Massachusetts General Hospital, Charlestown

- J.J. Rossi, City of Hope National Medical Center, Duarte, California: Ribozymes: Intracellular strategies for genomic studies and therapeutics.
- B. Sullenger, Duke University Medical Center, Durham, North

SESSION 5

- Chairpersons: E.R. Signer, Massachusetts Institute of Technology, Cambridge, and A. Tobin, University of California, Los Angeles
- N. Muzyczka, University of Florida, Gainesville: Use of viral vectors to study gene function in the central nervous system.
 S. Kochanek, University of Cologne, Germany: Gene transfer

with "gutless" adenoviral vectors.

D.J. Fink, University of Pittsburgh School of Medicine, Pennsylvania: Novel applications of genomic herpes vectors.



Coffee break between meeting sessions.

- r, Duarte, or genomic urham, North Carolina: Ribozyme-mediated repair of mutant RNAs. L.-H. Yen, Yale University School of Medicine, New Haven, Connecticut: Sequence-specific cleavage of Huntington mRNA by catalytic nucleotides.
- contra gene therapy. W.W. Hauswirth, University of Florida College of Medicine, Gainesville: Ribozyme approaches to therapy and gene discovery in the retina.

Xenotransplantation: A Scientific Basis for Risk Assessment

May 9-12

FUNDED BYThe Hastings Center and William Stamps Farish FundARRANGED BYJ.M. Coffin, Tufts University School of Medicine, Boston, Massachusetts
M. Hanson, The Hastings Center, Garrison, New York
F. Murphy, University of California, Davis
R.A. Weiss, University of London, United Kingdom

Welcome and Introduction:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory J.M. Coffin, Tufts University School of Medicine, Boston, Massachusetts M. Hanson, The Hastings Center, Garrison, New York R.A. Weiss, Institute of Cancer Research, London, United Kingdom

SESSION 1

Chairperson: R.A. Weiss, Institute of Cancer Research, London, United Kingdom

J.L. Platt, Mayo Clinic, Rochester, Minnesota: Potential applications and challenges of xenotransplantation.

- H.Y. Vanderpool, University of Texas Medical Branch, Galveston: Risk assessments in the 1996 reports of the Institute of Medicine (USA) and the Nuffield Council on Bioethics (UK).
- C.R. McCarthy, Georgetown University, Richmond, Virginia:

Risk benefit from the perspective of the IRB, the IACUC, and the subject.

- D.R. Salomon, The Scripps Research Institute, La Jolla, California: Clinical trials in xenotransplantation— Why a moratorium based on risk concerns is bad medicine, bad science.
- N. Daniels, Tufts University, Medford, Massachusetts: Public accountability for risks and the rationale for a moratorium.



S. Donnelley, F. Bach, N. Daniels

SESSION 2

Chairperson: N. Daniels, Tufts University, Medford, Massachusetts

- D.K.C. Cooper, Massachusetts General Hospital, Charlestown: Efforts to induce tolerance in the pig-to-baboon model.
- M.A. Michaels, Children's Hospital of Pittsburgh, Pennsylvania: Cytomegalovirus Infections after xenotransplantation.

SESSION 3

- Chairperson: M.A. Martin, National Institute of Allergy and Infectious Diseases, NIH, Bethesda, Maryland
- S.S. Morse, Joseph L. Mailman School of Health, Columbia University, New York: Strategies for assessing and reducing the infectious disease risk.
- M.J. Buchmeier, The Scripps Research Institute, La Jolla, California: Biology and pathogenesis of rodent-borne emerging viruses.
- S.J. O'Brien, National Cancer Institute-Frederick Cancer

- D.E. Onions, Q-One Biotech Ltd., Glasgow, United Kingdom. Control of virological risks associated with porcine xenotransplantation.
- C. Patience, BioTransplant Inc., Charlestown, Massachusetts: The biology of PERV in an inbred herd of miniature swine,

Research Center, Maryland: Endogenous retroviral genomes: Relics of ancient plaques.

- J.S. Allan, Southwest Foundation for Biomedical Research, San Antonio, Texas: Simian viruses in baboons: Risks to humans in the transplant setting.
- C.R. Parrish, Cornell University, Ithaca, New York: Host range adaptation and evolution.

SESSION 4

- Chairperson: J. Stoye, National Institute for Medical Research, London, United Kingdom
- E. Fleissner, Columbia University, New York: Retrovirus-host interactions: Why are germ line viruses xenotropic, except in the laboratory?
- W. Heneine, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia: Surveillance of xenogeneic retroviral infections in xenograft recipients.
- C. Wilson, Food and Drug Administration, Bethesda, Maryland: Studies in cross-species infectivity of porcine endogenous retrovirus: Implications for pig-to-human xenotransplantation.
 G. Langford, Imutran Ltd., Cambridge, United Kingdom:
- Analysis of samples from primates transplanted with hDAF transgenic organs for evidence of cross species transmission of PoERVs.

SESSION 5

Chairperson: M. Hanson, The Hastings Center, Garrison, New York

- J.A. Bradbury, Pacific Northwest National Laboratory, Washington, D.C.: Addressing public concerns about risk: Some insights from U.S. Department of Energy and Army programs concerning the disposal of radioactive waste and chemical weapons.
- F.H. Bach, Beth Israel-Deaconess, Boston, Massachusetts: Xenotransplantation: Where are we and what needs to be

done?

- S. Donnelley, The Hastings Center, Garrison, New York: The moral landscape of xenotransplantations.
- L. Chapman, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia: Development of U.S. PHS policy on infectious disease issues in xenotransplantation.

Image Archive on the American Eugenics Movement Editorial Advisory Panel Workshop

October 1-3

 FUNDED BY
 National Human Genome Research Institute

 ARRANGED BY
 D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory

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

SESSION 1

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: Welcome, general instructions and hospitality.

- D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory: Workshop objectives and summary of April meeting transcripts.
- S. Lauter, DNA Learning Center, Cold Spring Harbor Laboratory: Features of the modified user interface.

Computer Work I: Site Interface.

Computer Critique I: Site Interface.

Discussion of New Theme Essays.

- D. Micklos, DNA Learning Center, Cold Spring Harbor Laboratory: Eugenics research methods.
- J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: Traits and conditions studied.
- G.E. Allen, Washington University, St. Louis, Missouri: Flaws in eugenics research.

SESSION 2

Caption Style

M. Christensen, DNA Learning Center, Cold Spring Harbor Laboratory: Features of the modified editor interface.

Computer Work II: Captioning and essay illustration

SESSION 3

Computer Work III: Revisit Site Interface and Editing Shell.

Presentation of Revised Work.

Future Tasks and Meetings.



P. Ryan, P. Colbert-Cormier

Physical and Structural Chemistry of Prion Protein and Prion-like Phenomena

October 3-6

FUNDED BY Cold Spring Harbor Corporate Sponsor Program

ARRANGED BY B. Caughey, Rocky Mountain Laboratories, National Institute of Allergy and Infectious Diseases, NIH, Hamilton, Montana K. Wuthrich, Institüt für Molekularbiologie und Biophysik, Zurich, Switzerland

Welcome and Opening Remarks:

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

- B. Caughey, Rocky Mountain Laboratories, NIAID, NIH, Hamilton, Montana
- K. Wuthrich, Institut für Molekularbiologie und Biophysik, Zurich, Switzerland

SESSION 1: PrP: NMR Structure and Folding Chairperson: B. Caughey, Rocky Mountain Laboratories, NIAID, NIH, Hamilton, Montana

- K. Wuthrich, Institut f
 ür Molekularbiologie und Biophysik, Zurich, Switzerland: Outlook to the molecular structure of PrP in PrP^{sc}.
- H.J. Dyson, The Scripps Research Institute, La Jolla, California: Copper binding to the prion protein.
- R. Glockshuber, Institüt für Molekularbiologie und Biophysik, Zurich, Switzerland: Folding of the cellular prion protein.
- W.K. Surewicz, Case Western Reserve University, Cleveland, Ohio: Folding intermediates and in vitro aggregation/fibrillization of the recombinant human prior protein.
- Roundtable Discussion: Immune responses to PrP and 3-D structures of PrP in vivo and in vitro
- Moderator: A. Horwich, Howard Hughes Medical Institute, Yale University School of Medicine, New Haven, Connecticut

Participants:

- C. Weissmann, Imperial College School of Medicine at St. Mary's, London, United Kingdom
- K. Wuthrich, Institüt für Molekularbiologie und Biophysik, Zurich, Switzerland
- J. Collinge, Imperial College School of Medicine at St. Mary's, London, United Kingdom
- J. Hope, Institute for Animal Health, Berkshire, United Kingdom
- R. Rubenstein, New York State Office of Mental Retardation and Development, Staten Island





W. Surewicz, D. Eisenberg

SESSION 2: Prion Propagating Proteins in Yeast

Chairperson: K. Wuthrich, Institüt für Molekularbiologie und Biophysik, Zurich, Switzerland

- R.B. Wickner, National Institutes of Health, Bethesda,
- Maryland: Generation and propagation of the (URE3) prion of S. cerevisiae: Ure2p domains, curing and involvement of new factors.
- S.L. Lindquist, Howard Hughes Medical Institute, University of Chicago, Illinois: The yeast (PSI*) factor.
- M.D. Ter-Avanesyan, Institute of Experimental Cardiology, Moscow, Russia: Artificial yeast prions.
- Y.O. Chernoff, Georgia Institute of Technology, Atlanta: Host proteins influencing formation, propagation, and toxicity of

SESSION 3: PrP and Disease I

Chairperson: J. Hope, Institute for Animal Health, Berkshire, United Kingdom

- S.B. Prusiner, University of California, San Francisco: Therapeutic approaches to prion diseases.
- C. Weissmann, Imperial College School of Medicine at St. Mary's, London, United Kingdom: The role of the lymphoreticular system in experimental mouse scrapie.
- J. Collinge, Imperial College School of Medicine at St. Mary's, London, United Kingdom: Molecular studies of prion propagation and strain diversity.
- B: Caughey, Rocky Mountain Laboratories, NIAID, NIH, Hamilton, Montana: Interactions between normal and abnormal forms of PrP.
- D.A. Harris, Washington University School of Medicine, St. Louis, Missouri: Transgenic models of familial prion disease membrane topology of PrP. Interactions of PrP and copper at the cellular level.

SESSION 4: PrP and Disease II

Chairperson: R.B. Wickner, National Institutes of Health, Bethesda, Maryland

- J. Hope, Institute for Animal Health, Berkshire, United Kingdom: Bridging the gap between the chemistry and biology of prion protein.
- P.T. Lansbury, Brigham and Women's Hospital, Boston, Massachusetts: Alpha-synuclein fibrillization, Lewy bodies, and Parkinson's disease? What is the connection?
- J.G. Safar, University of California, San Francisco: Quantitative traits of prion strains are enciphered in the conformation of the prion protein.
- D. Dormont, Commisariat a L'Energie Atomique, Fontenary-

SESSION 5: Other Models of Protein Misfolding

- Chairperson: C. Weissmann, Imperial College School of Medicine at St. Mary's, London, United Kingdom
- J.W. Kelly, The Scripps Research Institute, La Jolla, California: Understanding amyloid disease and developing small-molecule inhibitors of misfolding.
- D. Westaway, University of Toronto, Canada; The Doppel gene encodes a novel mammalian prion-like protein.

General Discussion

the yeast prion (PSI).

- J.S. Weissman, University of California, San Francisco: Mechanism of amyloid formation and propagation: Lessons from a yeast prion.
- C.-Y. King, Florida State University, Tallahassee: Nonsense suppression, antisuppression, and strains of the yeast prion (PSI).
- K.L. Taylor, National Institute of Diabetes and Digestive and Kidney Diseases, NIH, Bethesda, Maryland: Amyloid-based inheritance of (URE3): Initiation of amyloid formation in vitro by the Ure2p prion domain.

Roundtable Discussion: Infectivity from recombinant PrP and molecular basis of TSE strains

Moderator: D.S. Eisenberg, University of California, Los Angeles

Participants:

- S.B. Prusiner, University of California, San Francisco
- R. Glockshuber, Institut für Molekularbiologie und Biophysik, Zurich, Switzerland
- J.G. Safar, University of California, San Francisco
- B. Caughey, Rocky Mountain Laboratories, NIAID, NIH, Hamilton, Montana
- D.A. Harris, Washington University School of Medicine, St. Louis, Missouri

aux-Roses, France: Neuronal death induced by PrP peptides.

- D.S. Eisenberg, University of California, Los Angeles: A 7residue fragment of Sup35 that forms on amyloid.
- T. Wisniewski, New York University School of Medicine, New York: The conformation of PrPsc as a determinant of strain
- properties and as a therapeutic target.
- D. Riesner, Institüt für Physikalische Biologie, Dusseldorf, Germany: Intermediates in PrP-refolding: A soluble β-sheeted structure.
- P. Fraser, University of Toronto, Canada: Assembly and structure of a β amyloid.
- R. Wetzel, University of Tennessee Medical Center, Knoxville: Polyglutamine aggregation.

J.P. Morgan & Co., Incorporated/Cold Spring Harbor Laboratory Executive Conference on Genes and Genomes: Sequences to Patents

October 15-17

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

SESSION 1: Genes and Genomes

- J.D. Watson, Cold Spring Harbor Laboratory: Welcoming remarks.
- L. Hood, University of Washington, Seattle: The human genome project: From start to finish.

SESSION 2: Sequencing and Genome Biology

- R. Gibbs, Baylor College of Medicine, Houston, Texas: DNA sequencing and the future.
- D. Botstein, Stanford University School of Medicine, California: Seeing when genes act: Genome-wide patterns for gene expression.
- G. Rubin, Howard Hughes Medical Institute, University of California, Berkeley: Biological annotation of *Drosophila* genome sequence.

SESSION 3: Cold Spring Harbor Laboratory Research

- B. Stillman, Cold Spring Harbor Laboratory: Introduction— Genomics at Cold Spring Harbor Laboratory.
- L. Stein, Cold Spring Harbor Laboratory: Managing sequence data.

M. Wigler, Cold Spring Harbor Laboratory: Using DNA arrays.

SESSION 4: Applications and Patents

- M. Bevan, John Innes Centre, Colney, Norwich, United Kingdom: Sequencing a weed genome.
- J. Todd, Cambridge Institute for Medical Research, United Kingdom: The evolution, causes, prevention, and economics of inflammation.
- M. Freire, Office of Technology Transfer, NIH, Bethesda, Maryland: Commercial exploitation of genomic sequences.
- J.D. Watson, Cold Spring Harbor Laboratory: Discussion and closing remarks.



B. Stillman, J. Todd, C. Harley, J. Watson

Cell Death in Plants: Functions and Mechanisms

October 17-20

FUNDED BY Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY J. Dangl, University of North Carolina, Chapel Hill A. Jones, University of North Carolina, Chapel Hill C.J. Lamb, John Innes Centre, Norwich, United Kingdom

SESSION 1: Is Developmental PCD in Plants a Cell Recycling Program? **Chairperson: J. Dangl,** University of North Carolina, Chapel Hill

- M. Hengartner, Cold Spring Harbor Laboratory: Programmed cell death in *C. elegans*.
- A. Bleecker, University of Wisconsin, Madison: The role of ethylene in senescence and abscission.

H. Thomas, Institute of Grasslands and Environmental Research, Aberystwyth, Wales, United Kingdom: Creating, mapping, cloning stay-greens (mutants with defective mesophyll cell senescence).

- SESSION 2: What Is the Role of PCD in Cellular Proliferation and Differentiation?
- Chairperson: R. Amasino, University of Wisconsin, Madison
- A. Jones, University of North Carolina, Chapel Hill: Regulation of programmed cell death by a secreted protease during terminal differentiation of tracheary elements.
- K. Roberts, John Innes Centre, Norwich, United Kingdom: Cell death as a consequence of cell differentiation.

- R. Amasino, University of Wisconsin, Madison: Regulation of gene expression during developmental senescence.
- V. Buchanan-Wollaston, Horticulture Research International, Warwick, United Kingdom: Links between pathogen responses and leaf senescence in *Arabidopsis*.
- R.L. Jones, University of California, Berkeley: Blue light, reactive oxygen, and hormonal control of plant (cereal aleurone) cell death.
- R. Whetten, North Carolina State University, Raleigh: Programmed cell death in pine xylem formation—Signals and mechanisms.

M.C. Drew, Texas A&M University, College Station: Ethylenedependent programmed cell death in aerenchyma formation in roots.



J. Greenberg, J. Dangl, B. Staskawicz

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SESSION 3: How Do R Gene Products Initiate HR?

Chairperson: R. Amasino, University of Wisconsin, Madison

D.C. Baulcombe, John Innes Centre, Norwich, United Kingdom: Autoactivation of cell death based on mutant forms of the *Rx* gene from potato.

SESSION 4: Are ROIs Signals, Executioners or Both? Chairperson: R. Whetten, North Carolina State University, Raleigh

- C.J. Lamb, John Innes Centre, Norwich, United Kingdom: Hypersensitive cell-death cues and mechanisms.
- D.F. Klessig, Waksman Institute, Rutgers University, Piscataway, New Jersey: NO- and SA-mediated signaling in plant disease resistance.
- K. Shimamoto, Nara Institute of Science and Technology,

SESSION 5: How Does Negative Regulation Effect HR? Chairperson: M. Grant, University of London, Ashford, United Kingdom

J. Dangl, University of North Carolina, Chapel Hill: Negative regulation in disease resistance.

P. Schulze-Lefert, John Innes Centre, Norwich, United

SESSION 6: Where Do the Early Branchpoints of Pathogen Recognition Lead? Chairperson: P. Schulze-Lefert, John Innes Centre, Norwich, United Kingdom

- J.D.G. Jones, John Innes Centre, Norwich, United Kingdom: Possible roles for CDPKs and NADPH oxidase homologs in plant defense.
- D. Scheel, Institute of Plant Biochemistry, Halle, Germany:

SESSION 7: What Are The Cellular Rearrangements That Follow Infection? Chairperson: J.D.G. Jones, John Innes Centre, Norwich, United Kingdom

- M.C. Heath, University of Toronto, Canada: Commonality of cell-death induction and executive in different forms of the hypersensitive response.
- E. Schmelzer, Max-Planck Institute für Zuchtungsforschlung,

SESSION 8: How Do Pathogens Usurp Cell Death Pathways? Chairperson: J.D.G. Jones, John Innes Centre, Norwich, United Kingdom

F.M. Ausubel, Massachusetts General Hospital, Boston: Use of fumonisin B1 to study PCD in Arabidopsis thaliana.

A. Levine, The Hebrew University of Jerusalem, Israel: Cell

Calcium and reactive oxygen species in plant defense signaling. M. Grant, University of London, Ashford, United Kingdom: The role of intracellular calcium increase in hypersensitive cell death.

Köln, Germany: Hypersensitive cell death upon fungae infec-

E, Lam, Rutgers University, New Brunswick, New Jersey:

J.T. Greenberg, University of Chicago, Illinois: Are cell death

Caspase involvement in HR cell death.

death in plant interaction with necrotrophs.

and cell growth coupled in plants?

tion.

- Ikoma, Japan: Rac signaling in cell death and disease resistance of rice.
- G. Johal, Pioneer Hi-Bred International, Inc., Johnston, Iowa: Cell death in maize disease lesion mimic mutants.
- K.R. Davis, Ohio State University, Columbus: Ozone as a tool for probing programmed cell death in plants.

Kingdom: A possible role for SCF complexes in the signaling

of R-gene-triggered hypersensitive cell death.

B. Staskawicz, University of California, Berkeley: Bacterial effector proteins specifying plant cell death and disease resistance.

1999

October 26-29

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

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

SESSION 1

G.E. Allen, Washington University, St. Louis, Missouri: Eugenics: Past, present, and future.

SESSION 2

- J. Maienschein, Arizona State University, Tempe: From Darwin to Dolly: Developments in the biological sciences in the 20th century.
- L.M. Silver, Princeton University, New Jersey: Cloning: The biological and social implications of a new science.

SESSION 6

R. Shapiro, New York University, New York: Origins of life.M.A. Gallo, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey: Toxicology, the environment, and risk assessment.

SESSION 7

R.J. Roberts, New England BioLabs, Inc., Beverly, Massachusetts: The process of science vs. science in the courtroom.

SESSION 3

- J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: Human genetics.
- J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory: Human Genome Project.

SESSION 4

R.G. Crystal, Cornell University Medical College, New York, New York: Gene therapy.

SESSION 5

- P. Reilly, Eunice Kennedy Shriver Center, Waltham, Massachusetts: Social implications of genetic research.
- M.-E. Ruvolo, Harvard University, Cambridge, Massachusetts: Hurnan origins.



The Molecular Neurobiology of ATM

November 7–10

FUNDED BY A-T Children's Project

ARRANGED BY S.J. Elledge, Baylor College of Medicine, Houston, Texas N. Heintz, Rockefeller University, New York E.M. Johnson, Washington University Medical School, St. Louis, Missouri

Introduction:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory B. Margus, A-T Children's Project, Deerfield Beach, Florida

- **SESSION 1:** Can We Identify Key Issues That Should Be Covered In This Meeting?
- B. Margus, A-T Children's Project, Deerfield Beach, Florida
- S.J. Elledge, Baylor College of Medicine, Houston, Texas

SESSION 3: The A-T Protein and Interacting

Proteins/Complexes

Chairperson and Discussion Leader: S.J. Elledge, Baylor College of Medicine, Houston, Texas

Overview: Y. Shiloh, Tel Aviv University Sackler School of Medicine, Israel

Discussion Point(s): Resolving controversies-Identifying key experiments.

Brief Presentations by Participants:

- C.J. Bakkenist, St. Jude Children's Research Hospital, Memphis, Tennessee: Activation of neuronal ATM by growth factors.
- M.H.L. Green, University of Brighton, United Kingdom: Ataxia telangiectasia and endogenous mutagens.
- S. Harris, University of Connecticut Health Center, Farmington: Suppression of ATM kinase defects by mutational inactivation of a RecQ helicase.
- B. Hempstead, New York Hospital–Cornell Medical College, New York: Novel signaling pathways regulating neuronal survival.
- D.S. Lawrence, The Albert Einstein College of Medicine,

SESSION 2: Review of A-T the Disease

Chairperson and Discussion Leader: H.M. Lederman, Johns Hopkins Hospital, Baltimore, Maryland

Overview: T. Crawford, Johns Hopkins Hospital, Baltimore, Maryland

Discussion Point(s): What can the clinical picture tell us about missing areas of research?

Bronx, New York: Gene expression patterns in A-T cell lines. E.Y.-H. Lee, University of Texas Health Science Center at San

- Antonio: Multiple signal transduction pathways mediated by ATM. J. Qin, Baylor College of Medicine, Houston, Texas: Purification and identification of ATM complexes.
- Y. Shiloh, Tel Aviv University Sackler School of Medicine, Israel: ATM-mediated signaling pathways.
- R. Vibhakar, University of Iowa, Iowa City: Regulation of the AKT(PKB) kinase by ATM.



SESSION 4: New Insights or Plans Involving Mouse Models of A-T

Chairperson and Discussion Leader: M. Segal, The Weizmann Institute, Rehovot, Israel

Overview: C. Barlow, The Salk Institute for Biological Studies, La Jolla, California

Discussion Point(s): How "authentic" are mouse models? Brief Presentations by Participants:

P.J. McKinnon, St. Jude Children's Research Hospital, Memphis, Tennessee: ATM-dependent apoptosis in the nervous system.

- R. Eilam, The Weizmann Institute of Science, Rehovot, Israel: Nigro-striatal deficits in the ATM mice.
- G.S. Rotman, Tel Aviv University, Sackler School of Medicine, Israel: SAT mice—An animal model for increased oxidative stress on the background of ATM deficiency.
- M. Segal, The Weizmann Institute, Rehovot, Israel: Dopaminergic deficits in ATM knockout mice.

SESSION 5: Electrophysiology and Ion Channel Defects Discussion Point(s)

SESSION 6: Progress toward Gene Therapy

Overview: S. Wang, Human Gene Therapy Research Institute, Des Moines, Iowa

Discussion Point(s)

Brief Presentation by Participant:

S. Wang, Human Gene Therapy Research Institute, Des Moines, Iowa: ATM gene delivery and expression by a Heerper amplicon vector.

SESSION 7: Cytokines and A-T

Overview: L.C. Gahring, University of Utah School of Medicine, Salt Lake City

Discussion Point(s)

Brief Presentation by Participant:

L.C. Gahring, University of Utah School of Medicine, Salt Lake City: Exploring the role(s) of cytokines in the brain.

SESSION 8: Primate Models of A-T

- Overview: R.L. Sidman, New England Regional Primate Research Center, Southborough, Massachusetts, and R.
- Norgren, University of Nebraska Medical Center, Omaha
- Discussion Points(s): Potential and Problems of Using Primate Models

Brief Presentations by Participants:

- R. Norgren, University of Nebraska Medical Center, Omaha: Development of a rhesus macaque of ataxia-telangiectasia.
- R.L. Sidman, New England Regional Primate Research Center, Southborough, Massachusetts: Initial steps toward a cerebellar Purkinje neuron degeneration model in monkeys by injection of onconase.

SESSION 9: Stem Cells, Neural Implantation, and A-T Overview: E.Y. Snyder, Children's Hospital, Boston, Massachusetts

Discussion Point(s)

Brief Presentation by Participant:

D.A. Steindler, University of Tennessee Center Health Science, Memphis: Adult neural stem cells: Molecular cell biology and clinical applications.

SESSION 10: Oxidative Stress and A-T

Chairperson and Discussion Leader: E.M. Johnson,

Washington University Medical School, St. Louis, Missouri Overview: G.S. Rotman, Tel Aviv University, Sackler School of Medicine, Israel

Discussion Point(s)

Brief Presentations by Participants:

- C. Barlow, The Salk Institute for Biological Studies, La Jolla, California: Oxidative stress and lysosomal accumulation in ATM-deficient mouse brain.
- A. Barzilai, Tel Aviv University, Israel: Oxidative stress as a possible cause for neurodegeneration in A-T,
- L.L. Dugan, Washington University School of Medicine, St. Louis, Missouri: Developmental mechanisms underlying increased free radical load in brain relevant to A-T.
- H.M. Geller, UMDNJ-Robert Wood Johnson Medical School, Piscataway, New Jersey: Molecular mechanisms of neuronal apoptosis.
- M.F. Lavin, Queensland Institute of Medical Research, Brisbane, Australia: Peroxisomal ATM and oxidative stress.
- SESSION 11: Closing Discussion—Identifying Key Issues and Critical Experiments

Brief Comments:

- S.J. Elledge, Baylor College of Medicine, Houston, Texas
- E.M. Johnson, Washington University Medical School, St. Louis, Missouri
- Y. Shiloh, Tel Aviv University Sackler School of Medicine, Israel
- C. Barlow, The Salk Institute for Biological Studies, San Diego, California

Old Memories

November 14-17

FUNDED BY	The John A. Hartford Foundation, In	c.

ARRANGED BY J.D. Gabrieli, Stanford University, California M. Gallagher, Johns Hopkins University, Baltimore, Maryland T. Tully, Cold Spring Harbor Laboratory

SESSION 1

- T. Tully, Cold Spring Harbor Laboratory: CREB, Hartford, and old age.
- J.R. Burke, Duke University Medical Center, Durham, North Carolina: The natural history of mild cognitive impairment in the elderly.
- B. Johansson, University College of Health Sciences, Jonko-

SESSION 2

- P.R. Rapp, Mt. Sinai School of Medicine, New York: Strategies for exploring cognitive and neurobiological aging in the monkey.
- D.C. Park, University of Michigan, Ann Arbor: Visuo-spatial and verbal working memory across the lifespan: Integrating brain data with behavioral data.
- K.F. Berman, National Institute of Mental Health, NIH, Bethesda, Maryland: Context-dependent, neural system-specific neurophysiological concomitants.

SESSION 3

- J.D. Gabrieli, Stanford University, California: Age-associated changes in brain activation during memory performance.
- F.I.M. Craik, University of Toronto, Canada: Age-related changes in encoding and retrieval processes in human memory.
- N. Raz, Weizmann Institute of Science, Rehovot, Israel: Differential age-related changes in the brain and their role in

SESSION 4

- M. D'Esposito, Hospital of the University of Pennsylvania, Philadelphia: Isolating the neural mechanisms of age-related changes in human working memory using event-related functional MRI.
- H. Tanila, University of Kuopio, Finland: Memory encoding in old and young rat hippocampus.
- C. Mondadori, Hoechst Marion Roussel, Bridgewater, New

SESSION 5

- A.J. Silva, University of California, Los Angeles: Age-dependent cognitive decline: A tale of unwelcome channels, lazy synapses, and blasé neurons.
- P. Chapman, University of Wales, Cardiff, United Kingdom: Animal models of Alzheimer's disease: The role of aging in behavioral and physiological pathology.

ping, Sweden: Individual differences in episodic memory.

- D. Carmelli, SRI International, Menlo Park, California: Brain structure and cognitive function in men remain heritable in the seventh and eighth decades of life.
- R.E. Cabeza, University of Alberta, Canada: Functional neurolmaging of cognitive aging.
- of aging: Mapping PET correlates during cognitive activation.
- C.L. Grady, Rotman Research Institute, Baycrest Centre for Geriatric Care, Toronto, Canada: Neuroimaging studies of aging and memory.
- L.L. Light, Pitzer College, Claremont, California: Some aspects of episodic priming in young and older adults.
- R. West, University of Notre Dame, Indiana: Is working memory more variable in older than younger adults?

age-related changes in memory and executive function.

- C.M. Hulette, Duke University Medical Center, Durham, North Carolina: Neuropathological changes associated with normal aging.
- S.A. Small, Columbia University, New York: Regional analyses of the hippocampal formation in aging and Alzheimer's disease.

Jersey: The dynamics of long-term memory and druginduced memory.

- Y. Stern, Columbia University, The Sergievsky Center, New York: Cognitive and imaging studies of memory in aging.
- M. Gallagher, Johns Hopkins University, Baltimore, Maryland: New data in old models: Effects of aging on hippocampus in rats with cognitive impairment.
- R.N. Rosenberg, University of Texas Southwestern Medical Center at Dallas: How is Alzheimer's disease first detected?
- A. Wingfield, Brandels University, Waltham, Massachusetts: Age-related speech-speed preferences.
- C.R. Green, Mt. Sinai School of Medicine, New York: Memory training for healthy adults: Where do we go from here?

Microbial Targets for Small Molecules

November 28-December 1

FUNDED BY Cold Spring Harbor Laboratory Corporate Sponsor Program

ARRANGED BY P. Howley, Harvard Medical School, Boston, Massachusetts A.J. Levine, Rockefeller University, New York G.L. Verdine, Harvard University, Cambridge, Massachusetts

Introductory Remarks and Welcome:

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

SESSION 1: Viral Structure Targets

Chairperson: A.J. Levine, Rockefeller University, New York

- D.C. Wiley, Howard Hughes Medical Institute, Harvard University, Cambridge, Massachusetts: The structure of an HIV-1-specific cell entry inhibitor in complex with the HIV-1 gp41 trimeric core.
- P.S. Kim, Whitehead Institute for Blomedical Research, Cambridge, Massachusetts: HIV entry and its inhibition.
- J.J. Skehel, National Institute for Medical Research, London, United Kingdom: Influenza HA in virus entry.
- J.J. Hogle, Harvard Medical School, Boston, Massachusetts: Structurally biased combinatorial design of antivirals.
- R.A. Lamb, Howard Hughes Medical Institute, Northwestern University, Evanston, Illinois: Influenza virus M2 ion channel and paramyxoviral fusion-protein structure.

SESSION 2: Bacterial Targets

Chairperson: J.E. Davies, TerraGen Discovery Inc., Vancouver, Canada

- W.R. Jacobs, Howard Hughes Medical Institute, Albert Einstein College of Medicine, Bronx, New York: Lipid metabolism: A life and death struggle for tubercle bacillus.
- C.T. Walsh, Harvard Medical School, Boston, Massachusetts: Enzymes conferring resistance to vancomycin.
- T. Muir, Rockefeller University, New York: Peptide inhibitors of virulence in *Staphylococcus aureus*.
- A. Tomasz, Rockefeller University, New York: New targets against multiresistant clones of *Staphylococcus aureus* and *Enterococcus faecium*: Clues from molecular epidemiology and from mechanisms of resistance.
- D. Williams, University of Cambridge, United Kingdom: Restoring the affinity of vancomycin-group antibiotics against resistant bacteria without modification of the binding site.



J. Davies, P. Howley, A. Tomasz

SESSION 3: Molecular Targets I Chairperson: P.M. Howley, Harvard Medical School, Boston, Massachusetts

- A.J. Levine, Rockefeller University, New York: Oligonucleotide array analysis.
- H.L. Ploegh, Harvard Medical School, Boston, Massachusetts: New tools to study proteolytic pathways.
- G.L. Verdine, Harvard University, Cambridge, Massachusetts: Chemical biology approaches to macromolecular targeting and functional analysis.
- D. Cane, Universite Louis Pasteur, Strasbourg, France: Enzymatic and molecular strategies for the biosynthesis of unnatural natural products.
- E. Kieff, Brigham and Women's Hospital, Brookline, Massachusetts: Molecular targets for preventing or treating herpesvirus-related cancers.

SESSION 4: Fungal and Bacterial Targets

Chairperson: C.T. Walsh, Harvard Medical School, Cambridge, Massachusetts

- J.E. Davies, TerraGen Discovery, Inc., Vancouver, Canada: Mining molecular diversity from microbes.
- J.C. Clardy, Cornell University, Ithaca, New York: Dihydroorotate dehydrogenase as a bacterial target.
- E. Elion, Harvard Medical School, Boston, Massachusetts: A signal transduction rescue system for cell wall damage in

Saccharomyces cerevisiae.

- E.K. O'Shea, University of California, San Francisco: Regulation of nuclear transport.
- T.J. Silhavy, Princeton University, New Jersey: Two component regulatory systems: The sensory organs of bacteria.

SESSION 5: Molecular Targets II

Chairperson: G.L. Verdine, Harvard University, Cambridge, Massachusetts

- D.E. Kahne, Princeton University, New Jersey: New targets for glycopeptide antibiotics: How to overcome resistance.
- J.M. Berger, University of California, Berkeley: Mechanisms of drug activity in type II topoisomerases.
- C.R. Raetz, Duke University Medical Center, Durham, North Carolina: Enzymes of lipid A biosynthesis: Targets for the design of new antibiotics.
- P.M. Howley, Harvard Medical School, Boston, Massachusetts: Harnessing the ubiquitination machinery to degrade specific cellular proteins.
- S. Hecht, University of Virginia, Charlottesville: RNA as a therapeutic target.



Participants continue discussing the meeting outdoors.

Vaccines for Developing Economies: Who Will Pay?

December 5-7

FUNDED BY	Albert B. Sabin Vaccine Institute, Inc.
ARRANGED BY	P. Russell, Albert B.Sabin Vaccine Institute, Inc., Potomac, Maryland S. Lemon, University of Texas Medical Branch, Galveston
CO-CHAIRPERSONS	J. Sachs, Harvard University, Cambridge, Massachusetts P. Hotez, Yale University, New Haven, Connecticut

Introduction:

J.A. Witkowski, Banbury Center, Cold Spring Harbor Laboratory H.R. Shepherd, Albert B. Sabin Vaccine Institute, Inc., New Canaan, Connecticut

- SESSION 1: Setting the Stage: The Imbalance of Global Science
- Chairperson: D.T. Jamison, University of California, Los Angles
- D.T. Jamison, University of California Los Angeles: What harms and kills the world's children: Implications for science and technology.
- M. Miller, World Health Organization, Geneva, Switzerland: Economic and epidemiological factors encouraging adoption of vaccines into national vaccine programs.
- A. Mahmoud, Merck and Company, Inc., Whitehouse Station, New Jersey: Market pressures on academic biotechnological advances.
- W. Vandersmissen, SmithKline Beecham BioServices, Rixensart, Belgium: Market pressures on industry.
- G.W. Perkin, Global Health Program, Bill and Melinda Gates Foundation, Seattle, Washington: The new role of foundations.
- T. Godal, UNICEF, Geneva, Switzerland: The GAVI perspective.
- K.W. Bernard, National Security Council, Washington, D.C.: International Public Health—The evolving U.S. government policy on vaccines.

SESSION 2: Case Studies In Orphan Vaccines Chairperson: P.K. Russell, Albert B.Sabin Vaccine Institute, Inc., Potomac, Maryland

- B. Schwartz, Centers for Disease Control and Prevention, Atlanta, Georgia: Case studies in orphan vaccines.
- P.K. Russell, Albert B. Sabin Vaccine Institute, Inc., Potomac, Maryland: Malaria vaccines.
- P. Hotez, Yale University School of Medicine, New Haven, Connecticut: Helminth vaccines.
- R.E. Shope, University of Texas Medical Branch, Galveston: Dengue vaccines.
- S. Berkley, International AIDS Vaccine Initiative, New York: HIV vaccines.

- SESSION 3: Mobilization of Science and Technology for Developing Countries
- A. Attaran, The Malaria Project, Vancouver, Canada: Globalizing intellectual property.
- SESSION 4: The Millennium Vaccine Fund: Impact of a "Promised Market"
- Chairperson: G.T. Keusch, Fogarty International Center, National Institutes of Health, Bethesda, Maryland
- M. Kremer, Harvard University, Cambridge, Massachusetts: Overview of incentive Issues.
- A. Batson, The World Bank, Washington, D.C.: Results of World Bank study.
- J.D. Sachs, Harvard University, Cambridge, Massachusetts: Millennium Fund proposal.



L. Eros, R. Skolnik, A. Mahmoud

Host-Pathogen Interactions

December 12-15

FUNDED BY	Cold Spring Harbor Laboratory Corporate Sponsor Program, with additional support from Glaxo Wellcome Inc.
ARRANGED BY	 B.R. Bloom, Harvard University, Boston, Massachusetts S. Blower, University of California, San Francisco N.B. Freimer, University of California, San Francisco

SESSION 1: Approaches for Studying Host-Pathogen Interactions Chairperson: N.B. Freimer, University of California, San Francisco

- J.M. McNicholl, Centers for Disease Control and Prevention, Atlanta, Georgia: Host genes and infectious disease: A public health perspective.
- N.B. Freimer, University of California, San Francisco: An overview of genetic-mapping approaches.
- C.M. Fraser, The Institute for Genomic Research, Rockville,

SESSION 2: Pathogen Evolution Chairperson: S. Blower, University of California, San Francisco

- J.L. Gerberding, Centers for Disease Control and Prevention, Atlanta, Georgia: Antibiotic resistant bacteria: A public health perspective.
- M. Achtman, Max-Planck Institute for Molecular Genetics, Berlin, Germany: Population genetics of *N. meningitidis*, *H. pylori*, and *Y. pestis*.

Maryland: Genomics of microorganisms.

- B. Rannala, State University of New York, Stony Brook: Phylogenetic methods to reconstruct the evolutionary history of a virulent pathogen.
- D. Kirschner, University of Michigan Medical School, Ann Arbor: Understanding host-pathogen interactions using modeling.
- G. Myers, Los Alamos National Laboratory, New Mexico: Sexually transmitted disease pathogens: A database approach.
- J.W. Kazura, Case Western Reserve University, Cleveland, Ohio: Polymorphisms for *Plasmodium vivax* malaria: Simplicity and complexity.



D, Kirschner, C. Fraser

SESSION 3: Host Evolution

Chairperson and Introduction: N.B. Freimer, University of California, San Francisco

- M. Carrington, National Cancer Institute–Frederick Cancer Research and Development Center, Maryland: Host susceptibility to HIV.
- P. Demant, The Netherlands Cancer Institute, Amsterdam:

SESSION 4: Tuberculosis as a Model for Host-Pathogen Interactions Chairperson: B.R. Bloom, Harvard University, Boston, Massachusetts

- B.R. Bloom, Harvard University, Boston, Massachusetts: Introduction to TB,
- J.M. Musser, Rocky Mountain Laboratories, National Institute of Allergy and Infectious Diseases, NIH, Hamilton, Montana: Molecular population genetic analysis of antibiotic resistance and antigen genes in *M. tuberculosis*.
- D.B. Young, Imperial College School of Medicine, London, United Kingdom: Trafficking of mycobacteria and mycobacterial antigens in infected macrophages.

SESSION 5: Co-Evolution and Future Directions Chairperson: S. Blower, University of California, San Francisco

- J.T. Williams, Southwest Foundation for Biomedical Research, San Antonio, Texas: Statistical genetic analysis of hostpathogen interaction.
- M.J. Wade, Indiana University, Bloomington: Evolution of host maternal effects in response to pathogens affecting offspring.
- D.R. Taylor, University of Virginia, Charlottesville: The evolution of infectious mitochondrial mutants in plants.

- Genetic dissection of disease susceptibility in the mouse. P. Gros, McGill University, Montreal, Canada: Role of NRAMP genes in macrophage function and divalent cation transport.
- Kramnik, Harvard School of Public Health, Boston, Massachusetts: Genes regulating host resistance to virulent mycobacteria.
- A.V.S. Hill, University of Oxford, United Kingdom: Genomewide screening for TB susceptibility genes.
- R.D. Fleischmann, The Institute for Genomic Research, Rockville, Maryland: The genome of *M. tuberculosis*.
- S. Blower, University of California, San Francisco: Epidemic models of TB.
- S. Gupta, University of Oxford, United Kingdom: The effects of immune selection on pathogen population structure.
- M.J. Roossinck, The Noble Foundation, Ardmore, Oklahoma: The role of the host in the evolution of RNA viruses.
- T. Lenormand, University of British Columbia, Vancouver, Canada: Long-term resistance management in vectors: The mosquito case.



Meeting participants outside the conference center.