

Banbury Center

of Cold Spring Harbor Laboratory



1982

BANBURY CENTER

Banbury Center is a 45-acre estate adjoining the waters of Long Island Sound on the north shore of Long Island, barely 40 miles east of downtown Manhattan. Located just across the harbor from Cold Spring Harbor Laboratory, the estate was donated to the laboratory in 1976 by Charles Sammis Robertson. With the laboratory's long history and international research reputation and its own renowned ongoing programs of courses and conferences, the magnificent Banbury grounds and buildings presented an ideal site for a complementary program of smaller conferences concentrating on aspects of the biological sciences which also bore significant social implications. Banbury's primary concerns remain in areas of environmental and occupational risk assessment and social and public policy-bearing developments in the biological and health sciences.

Banbury conferences, kept small to maximize spontaneous uninhibited exchanges between participants, achieve wider dissemination through the Center's other primary function as a small

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



(Above) Architectural drawing of 1979 design of Sammis Hall, completed, with modifications, in 1981. (Cover) Banbury Center Meeting House

BANBURY CENTER

1982 ACTIVITIES

1982 represented the fifth year of Banbury Center programs. During the course of the year, the Center was the site of nine conferences as well as a full program of high-level summer courses. Four new books in the ongoing Banbury Report series were also published during the year, bringing the total in that series to thirteen.

The range of Banbury meetings held in 1982 reflected the widening sphere of social impact of biological sciences. Two of these emanated from rapidly developing areas of recombinant DNA applications, while a third addressed new insights, gained at least partly through recombinant DNA methods, into the molecular processes of carcinogenesis. Two other conferences looked at carcinogenesis from more immediate aspects—one through an assessment of one particular prevalent class of agents, the nitrosamines; the other by assembling a range of newly developed approaches for directly assessing the effects of genotoxic chemical exposure. The remaining 1982 conferences included a novel combination of clinicians and basic researchers in an exploration of biological aspects of Alzheimer's disease, a probing of one rapidly developing area of molecular genetic applications to industrial processes, and two retrospective meetings placing some current thrusts of molecular biology within historical perspectives.

The first meeting of the year was on a topic which, barely ten months later, would become the subject of newspaper editorials and congressional hearings. This conference, *Gene Therapy: Fact and Fiction*, was held early in February and was organized by W. French Anderson from the National Heart, Lung and Blood Institute, Paul Berg of Stanford University, and Theodore Friedmann from the University of California at San Diego. Supported by a grant from the Kaiser Family Foundation, the three-day meeting explored current capabilities, likely future developments, and the needs which might best be addressed through the at least theoretically possible direct alteration or replacement of aberrant disease-causing genes. This meeting transcript is currently being excerpted and edited for inclusion in a broadly accessible description of the nature and current state of this field.

The two Banbury spring conferences explored, respectively, two different aspects in assessing human

carcinogenesis. The first of these, organized by Peter Magee of the Fels Research Institute, was a comprehensive assessment of the role of nitrosamines in the genesis of human cancers. Over one hundred nitrosamine compounds are currently known to be carcinogenic, several of these proving to be so in a wide range of animal species. These compounds may be found in the environment, or may be formed metabolically from precursors once inside the body. This Banbury conference specifically addressed human aspects of such metabolic transformations, detection of these compounds and their metabolites, and their biological effects. *Nitrosamines and Human Cancer* was published as Banbury Report 12 in December 1982.

Also published in December was Banbury Report 13, emanating from the other spring conference, which was held during the third week of April. This conference, *Indicators of Genotoxic Exposure*, was organized by Bryn Bridges of the University of Sussex in England, Byron Butterworth from the Chemical Industry Institute of Toxicology, and I. Bernard Weinstein from Columbia University. The meeting brought together the multiplicity of emerging procedures for directly assessing the effects of genotoxic agents in the very individuals placed at risk through such exposure. Approaches of this sort will play important roles in quantitating the effects of such exposure and in the further development of rational bases in the regulation of such agents.

In the summer of 1982 three events were added to the regular program of summer courses. Two of these were an unusual departure for Banbury and were very special meetings. The first was held in honor of the memory of Luigi Gorini and, appropriately enough, was a high-level scientific conference on gene expression in prokaryotic organisms with nearly all participants tracing the origin of their research to some aspect of Gorini's seminal work in this area. The second conference was on the use of the simple fungus *Phycomyces* as a model organism in which to begin to understand the molecular mechanisms involved in the transduction of sensory input into behavioral responses. These participants were the disciples of Max Delbrück. After playing a major role in the forties and fifties in establishing bacterial viruses as simple model organisms with which to probe the molecu-

lar basis of heredity, Delbrück turned to the question of the mechanisms by which cells or organisms respond to their environment. His choice simple organism for probing this area was *Phycomyces*, whose rather rudimentary cellular organization belied a prodigious capacity for responding to an array of environmental stimuli. Again, the tracing of these scientific lines of investigation to an individual whose intellect and personality had such an impact upon both the origins of the field and current workers in it gave great insight both into the development of science and into the nature of this extraordinary individual. The Delbrück and Gorini meetings' proceedings will both be appearing as books from the Cold Spring Harbor publications office. The last meeting of the summer was a two-day intensive exploration of genetic manipulations in the cultivation and application of anaerobic bacteria. While noted as interesting pathogens, many of the anaerobes are also important potential sources of organic chemical intermediates and solvents. Organized by Ahmad Bukhari of Cold Spring Harbor Laboratory and Leonard E. Mortenson from Exxon Research and Engineering Company, this meeting proved to be an incisive and in-depth survey of this bacterial group and their possible industrial applications in production of acetone, butanol, methane, and volatile fatty acids.

The final three conferences of the year returned to more traditional Banbury topics, although in themselves encompassing a range almost as broad as the entire range of prior Banbury conferences. The first of these examined the application of recombinant DNA procedures to human disease. Organized by C. Thomas Caskey of the Baylor College of Medicine and Raymond L. White from the Howard Hughes Medical Institute, this meeting was, in a sense, an outgrowth of the earlier 1982 conference on gene therapy. The emphasis in this later meeting, however, was on the extremely rapid development of methods for the actual molecular identification and localization of disease-causing aberrant genes

within the human genome. Given the extraordinary pace of development, this is probably the last time that a meeting of this small size and spontaneity of interaction could possibly even begin to encompass the essential features of this field. *Recombinant DNA Applications to Human Disease* will be appearing as Banbury Report 14 in the spring of 1983. This meeting was followed within three weeks by the second major conference of October, *Biological Aspects of Alzheimer's Disease*. The organizer for this meeting, Robert Katzman of Albert Einstein College of Medicine, brought together a heterogeneous mix of clinicians and basic researchers for a multidisciplinary approach to looking at the biology of this devastating affliction. The interaction of neuropathologists, psychiatrists, epidemiologists, virologists, and molecular geneticists in considering this major public health concern, responsible for at least half of all cases of dementia in the aged, led to both novel formulations and discussions arising from this stimulus of participatory "hybrid vigor." The proceedings of this conference will also be appearing in the spring of 1983 as Banbury Report 15.

The final 1982 meeting was a special workshop for congressional staff made possible through a grant from the Sloan Foundation. Judiciously held after the November elections, this conference recapped one of the most exciting and rapidly developing areas of cancer research—the nature of oncogenes and their implications for determining the mechanisms of human carcinogenesis. Congressional staff members seemed especially gratified at the opportunity to partake of the excitement of science so directly while both they and the scientists addressing them were appreciative of the opportunity of interacting outside of the almost automatically adversary setting of formal congressional hearings.

February 1, 1983

Michael Shodell
Director, Banbury Center



Banbury staff: Lynda Moran, Beatrice Toliver, Michael Shodell

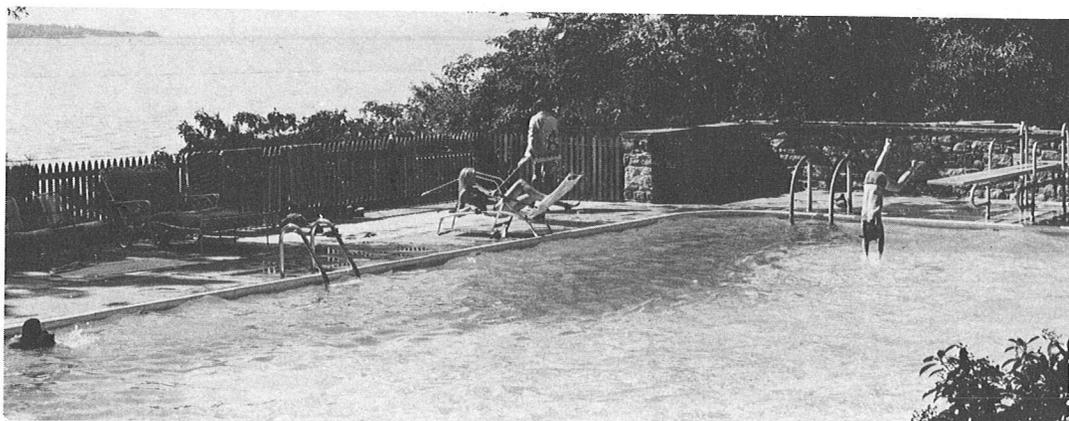


Robertson House

1982 SUPPORT

Along with the donation of his estate, Charles S. Robertson also established a fund for the maintenance of the grounds and of Robertson House. Support for the activities of the Banbury Center, however, are dependent upon government and foundation grants and private and corporate contributions. In 1982, core support for operation of the Center in general came from the generous donations of the following twelve companies: The Bristol-Myers Fund, The Chevron Fund, Conoco, Inc., The Dow Chemical Company, E. I. du Pont de Nemours & Company, Exxon Corporation, Getty Oil Company, Grace Foundation Inc., Hoffman La Roche Inc., International Business Machines Corporation, Eli Lilly and Company, New York Life Foundation, and Rockwell International Corporation Trust. While support for specific meetings came partially from National Institutes of Health grants and from the National Science Foundation, these programs would have been impossible without major additional funding. The Kaiser Family Foundation was instrumental in enabling the holding of the Gene Therapy meeting, while an ongoing grant from the Sloan Foundation has supported science writers and congressional workshops. The

Alzheimer's meeting and preparation of its publication was largely supported by the National Institute on Aging, the National Institute of Neurological and Communicative Disorders and Stroke, and the Fogarty International Center, in conjunction with the Retirement Research Foundation (International Symposium on Aging and Cancer). The March of Dimes Birth Defects Foundation and The Burroughs Wellcome Fund joined with the National Cancer Institute, the Fogarty International Center, and the National Institute of General Medical Sciences in support of the conference on Recombinant DNA Applications to Human Disease, while the American Petroleum Institute largely supported the meeting on Genotoxic Indicators. Additional sources of funding for the holding of particular meetings were generously donated by the following: Bayer AG/Cutter/Miles, Biogen, S.A., Bristol-Myers Company, Cetus Corporation, E. I. du Pont de Nemours & Company, Merck Sharp & Dohme Research Laboratories, Schering-Plough, Searle Research and Development, SmithKline, Society for Microbiology, The Squibb Institute for Medical Research, Stauffer Chemical Company, and The Upjohn Company.



1982 PROGRAMS AND PARTICIPANTS

Prospects for Gene Therapy: Fact and Fiction

February 5–February 7

Opening Session

Chairperson: W.F. Anderson, National Heart, Lung and Blood Institute, Bethesda, Maryland

V.A. McKusick, Johns Hopkins University, Baltimore, Maryland: Review of genetic components of human disease.

Y.W. Kan, University of California, San Francisco: New approaches to diagnosis.

Session 1 Therapy

Chairperson: T. Friedmann, University of California, San Diego

W.L. Nyhan, University of California, San Diego: Current methods of therapy.

W.F. Anderson, National Heart, Lung and Blood Institute, Bethesda, Maryland: New approaches to therapy.

Session 2 Introduction of Genes into Cells and Complex Organisms

Chairperson: P. Berg, Stanford University, California

T. Maniatis, Harvard University, Cambridge, Massachusetts: Characterization and isolation of genes.

R. Axel, College of Physicians and Surgeons, Columbia University, New York, New York: Genes into cells.

F. Costantini, University of Oxford, England: Genes into complex organisms.

Session 3 Animal Models and Target Organs

Chairperson: U. Pettersson, University of Uppsala, Sweden

R.J. Desnick, Mount Sinai Medical Center, New York, New York: Animal models for human disease.

M.J. Cline, UCLA School of Medicine, Los Angeles, California: Potential human target organs.

Session 4 Approaches to Human Disease

Chairperson: L. Siminovitch, Hospital for Sick Children, Toronto, Canada

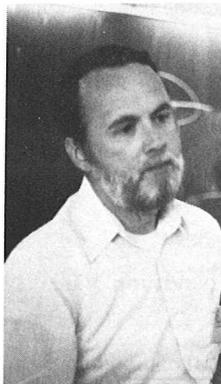
B.G. Forget, Yale University, New Haven, Connecticut: Hematological disease.

W.S. Sly, Stanford University, California: Lysosomal and other storage diseases.

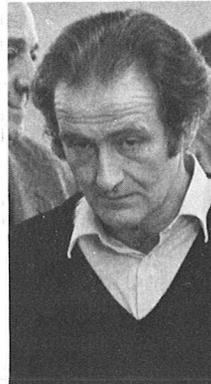
M.S. Brown, University of Texas, Dallas: LDL receptor deficiency hypercholesterolemia.



P. Berg



B. Forget



J. Tooze



W. McKusick

The Possible Role of Nitrosamines in Human Cancer

April 4–April 7

Session 1 *Evidence Suggesting That Human Beings are Susceptible to Carcinogenesis by N-nitroso Compounds*

Chairperson: S. Goldfarb, University of Wisconsin, Madison

In vitro studies

G.E. Milo, Ohio State University, Columbus: In vitro transformation in cultured human diploid fibroblast cells.

I. Parsa, SUNY Downstate Medical Center, Brooklyn, New York: Transplantation of dimethylnitrosamine-transformed cultured tumor cells.

In vivo studies

R.D. Kimbrough, Centers for Disease Control, Atlanta, Georgia: Pathological changes in human beings acutely poisoned by dimethylnitrosamine.

W.E. Fleig, University of Ulm, Federal Republic of Germany: Pathological changes in a human subject chronically exposed to dimethylnitrosamine.

Session 2 *Comparative Metabolism and Alkylation Reactions*

Chairperson: A.E. Pegg, Pennsylvania State University, Hershey

P.F. Swann, Middlesex Hospital Medical School, London, England: Metabolism of *N*-nitroso compounds and alkylation of cellular macromolecules including DNA—An overview.

C.J. Michejda, Frederick Cancer Research Facility, Maryland: Metabolic formation of N_2 from *N*-nitroso compounds in vitro and in vivo.

M.C. Archer, University of Toronto, Canada: Metabolism of unsymmetrical nitrosamines.

S. Hecht, American Health Foundation, Valhalla, New York: Metabolism and activation of tobacco-associated nitrosamines in human and animal tissues.

C.C. Harris, National Cancer Institute, Bethesda, Maryland: Metabolism of *N*-nitrosamines by cultured human tissues and cells.

R. Montesano, International Agency for Research on Cancer, Lyon, France: Metabolism of nitrosamines by human liver slices in vitro.

R.C. Shank, California College of Medicine, Irvine: Liver nucleic acids after homicidal poisoning by dimethylnitrosamine.

R. Montesano¹ and A.E. Pegg², ¹International Agency for Research on Cancer, Lyon, France; ²Pennsylvania State University, Hershey: Overview of repair by microbial and mammalian enzyme systems of DNA lesions induced by *N*-nitroso compounds, and recent studies with human enzymes.

Session 3 *Analytical Methods for Nitrosamines in Biological Media*

Chairperson: D.H. Fine, New England Institute for Life Sciences, Waltham, Massachusetts

D.H. Fine, New England Institute for Life Sciences, Waltham, Massachusetts: Analytical methods for nitrosamines—Overview.

G.W. Harrington, Temple University, Philadelphia, Pennsylvania: Electrochemical detection of *N*-nitroso compounds with high performance liquid chromatography (HPLC).

W. Garland and A.H. Conney, Hoffman-La Roche Inc., Nutley, New Jersey: Mass spectrometry in the analysis of nitrosamines in biological media.

Session 4 *Exposure of Human Beings to Nitrosamines*

Chairperson: J.H. Weisburger, American Health Foundation, Valhalla, New York

Exogenous sources of nitrosamines

D.H. Fine, New England Institute for Life Sciences, Waltham, Massachusetts: Nitrosamines in the general environment and food.

D. Hoffmann, American Health Foundation, Valhalla, New York: Nitrosamines in tobacco carcinogenesis.

Endogenous Formation

- S. Mirvish, University of Nebraska, Omaha: Nitrosation reactions in vitro and in vivo.
- B.C. Challis, Imperial College of Science and Technology, London, England: A kinetic model for the gastric synthesis of *N*-nitroso compounds.
- W. Lijinsky, Frederick Cancer Research Facility, Maryland: Carcinogenesis by simultaneous exposure to nitrites and amines.
- D.H. Fine, New England Institute for Life Sciences, Waltham, Massachusetts: Presence of nitrosamines in human beings.
- M.L. Simenhoff, Jefferson Medical College, Philadelphia, Pennsylvania: Presence of nitrosamines in the blood and gastrointestinal fluids of normal and diseased human subjects.
- H. Bartsch, International Agency for Research on Cancer, Lyon, France: Endogenous nitrosation in human beings—Proline I.
- S.R. Tannenbaum, Massachusetts Institute of Technology, Cambridge: Endogenous nitrosation in human beings—Proline II.
- P.I. Reed¹ and C. Walters², Wexham Park Hospital, ¹Berkshire, ²Horsham, West Sussex, England: Possible effects of cimetidine on intragastric nitrosation in human beings.
- J.B. Elder, University of Manchester, England: Possible role of cimetidine and its nitrosation products in human stomach cancer.
- D.E. Jensen and C.T. Gombar, Temple University, Philadelphia, Pennsylvania: Chemistry, pharmacokinetics and biological actions of nitrosocimetidine—DNA methylation.
- W. Lijinsky, Frederick Cancer Research Facility, Maryland: Carcinogenesis studies with nitrosocimetidine I.
- R. Preussmann, Deutsches Krebsforschungszentrum, Heidelberg, Federal Republic of Germany: Carcinogenesis studies with nitrosocimetidine II.

Session 5 Nitrites and Amines

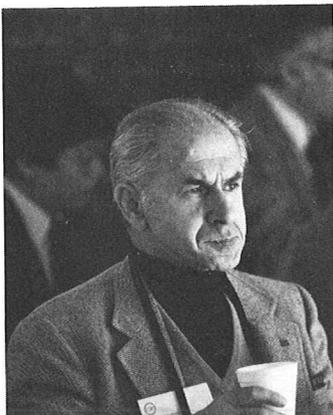
Chairperson: N.P. Sen, Health and Welfare Canada, Ottawa

- P.E. Hartman, Johns Hopkins University, Baltimore, Maryland: Metabolism of nitrite—Overview.
- S.R. Tannenbaum, Massachusetts Institute of Technology, Cambridge: Endogenous formation of nitrite.
- C. Walters, Horsham, West Sussex, England: Endogenous amines—Amines in human gastric juice.

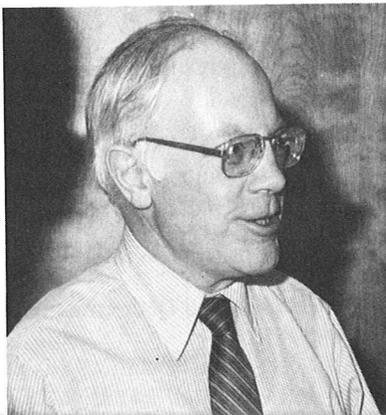
Session 6 Human Epidemiology

Chairperson: P. Correa, Louisiana State University, New Orleans

- R.M. Hicks, Middlesex Hospital Medical School, London, England: Nitrosamines as possible etiological agents in bilharzial bladder cancer.
- L.Y.-Y. Fong, University of Hong Kong: Possible relationship of nitrosamines in the diet to causation of cancer in Hong Kong.
- C.S. Yang, New Jersey Medical School, Newark: Nitrosamines and other etiological factors in esophageal cancer in Northern China.
- S.R. Tannenbaum, Massachusetts Institute of Technology, Cambridge: Stomach cancer.



J. Weisburger



P. Magee



R. Peto

Session 7 Dose-Response Relationships in Nitrosamine Carcinogenesis

Chairperson: R. Preussmann, Deutsches Krebsforschungszentrum, Heidelberg, Federal Republic of Germany

L.M. Anderson, Sloan-Kettering Institute for Cancer Research, Rye, New York: Dimethylnitrosamine metabolism and tumorigenesis during early life in the mouse.

W. Lijinsky, Frederick Cancer Research Facility, Maryland: Comparative carcinogenesis of some nitrosamines in rats and hamsters.

R. Peto, University of Oxford, England: Carcinogenesis study with dimethylnitrosamine and diethylnitrosamine in 4080 inbred rats—Experimental design and general nature of the dose-response relationship.

P. Grasso, BP Group Occupational Health Centre, Sunbury-on-Thames, Middlesex, England: Pathology of tumors observed in study with 4080 inbred rats.

Indicators of Genotoxic Exposure in Man and Animals

April 18–April 21

Session 1 Clinical Perspectives

Chairperson: B.A. Bridges, University of Sussex, England

I.B. Weinstein, College of Physicians and Surgeons, Columbia University, New York, New York: Molecular epidemiology—Combined laboratory and epidemiologic approaches to genetic toxicology.

E.B. Hook, Birth Defects Institute, New York State Department of Health, Albany: The value and limitations of clinical observations in assessing chemically induced genetic damage.

Session 2 Detection of Mutagens in Body Fluids

Chairperson: N.L. Petrakis, University of California, San Francisco

Urine

E. Eisenstadt, Harvard School of Public Health, Boston, Massachusetts: Urine as a monitor of mutagenic exposure of smokers.

Feces

R.D. Combes, Portsmouth Polytechnic, England: Rat, human and other animal samples.

Breast Fluid

N.L. Petrakis, University of California, San Francisco: Mutagens in nipple aspirates of breast fluid.

Session 3 DNA Damage and Repair

Chairperson: B.E. Butterworth, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina

Unscheduled DNA synthesis

J.C. Mirsalis, SRI International, Menlo Park, California: Rat hepatocytes.

B.E. Butterworth, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina: Chemically induced DNA repair in rodent and animal cells.

M.J. Skinner, Mobil Oil Corporation, Princeton, New Jersey: Unscheduled DNA synthesis in rat lymphocytes.

C. Furihata, University of Tokyo, Japan: Unscheduled DNA synthesis in rat stomach—Short-term assay of potential stomach carcinogens.

Alkaline elution

S. Parodi, University of Genoa, Italy: Alkaline elution in vivo—Quantitative predictivity of carcinogenicity as compared with other, shorter-term tests.

Alkylated macromolecules

C.J. Calleman, University of Stockholm, Sweden: Alkylated hemoglobin.

P.B. Farmer, MRC Toxicology Unit, Carshalton, England: Significance of the occurrence of S-methyl cysteine in normal, untreated animals.

M.A. Pereira, United States Environmental Protection Agency, Cincinnati, Ohio: The use of alkylated hemoglobin as a dose monitor for chemical carcinogens and mutagens.

Session 4 DNA Adducts

Chairperson: I.B. Weinstein, College of Physicians and Surgeons, Columbia University, New York, New York.

W.K. Lutz, University of Zurich, Switzerland: DNA adducts as quantitative indicators of carcinogenic exposure.

Animal models

J.A. Swenberg, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina: Cell specific effects—Application of new fluorometric techniques to detect adducts.

G.N. Wogan, Massachusetts Institute of Technology, Cambridge: Aflatoxin–DNA adducts and their detection in urine.

G. Theall, College of Physicians and Surgeons, Columbia University: Quantitative relationships between adduct formation and biological effects.

Human studies

D.C. Herron, Atlantic Richfield Company, Los Angeles, California: DNA adducts following a human DMN poisoning.

W.A. Haseltine, Sidney Farber Cancer Institute, Boston, Massachusetts: Studies using defined DNA sequences and postlabeling techniques.

Monoclonal antibodies to carcinogen-DNA adducts

M.F. Rajewsky, University of Essen, Federal Republic of Germany: High-affinity monoclonal antibodies specific for DNA components structurally modified by alkylating agents.

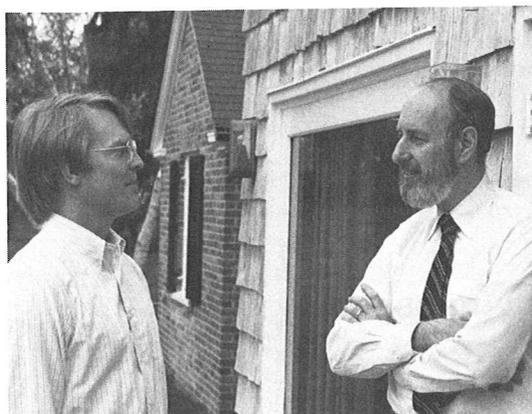
Session 5 Cytogenetics and Sister-Chromatid Exchange (SCE)

Chairperson: H.J. Evans, MRC Clinical and Population Cytogenetics Unit, Edinburgh, Scotland

Sister chromatid exchange in animal models

A. Kligerman, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina: In vivo and in vitro rat lymphocytes.

J.W. Allen, United States Environmental Protection Agency, Research Triangle Park, North Carolina: Species and organ specificity of sister-chromatid exchange in the mouse.



W. Thilly, J. Heddle



S. Parodi, A. Wyrobek

Human studies

- A.V. Carrano, Lawrence Livermore National Laboratory, Livermore, California: Measurement of sister-chromatid exchange induction in human populations as an indicator of exposure.
- W.H. McKenzie, North Carolina State University, Raleigh: Controlled human exposure studies.
- H.J. Evans, MRC Clinical and Population Cytogenetics Unit, Edinburgh, Scotland: Industrially exposed populations.
- M. Sorsa, Institute of Occupational Health, Helsinki, Finland: Sister chromatid exchange induction among nurses handling cytostatic drugs.
- L.M. Henderson, University of Sussex, England: Measuring prenatal genotoxic effects in mice and men.

Micronucleus test

- J.A. Heddle, Ludwig Institute for Cancer Research, Toronto, Canada: Application in human and animal systems.

Session 6 Mutagenesis

Chairperson: R.J. Albertini, University of Vermont, Burlington

Animal models

- L.B. Russell, Oak Ridge National Laboratory, Tennessee: The Russell spot test.

Human studies

- R.J. Albertini, University of Vermont, Burlington: Human lymphocytes.
- G. Zetterberg, University of Uppsala, Sweden: Use of the cell sorter to concentrate mutants.
- G.H. Strauss, University of Sussex, England: Development of a lymphocyte cloning assay.
- H.D. Garcia, Philip Morris U.S.A., Richmond, Virginia: Development of a rat assay.
- T.R. Skopek, Yale University, New Haven, Connecticut: Induced versus spontaneous mutations in human lymphocytes.
- W.G. Thilly, Massachusetts Institute of Technology, Cambridge: Use of mutational spectra to diagnose the causes of somatic mutation in man.

Altered gene products

- H. Mohrenweiser, University of Michigan, Ann Arbor: Biochemical approaches to monitoring human populations for germinal mutation rates.

Session 7 Germ Cell Effects

Chairperson: A.J. Wyrobek, Lawrence Livermore National Laboratory, Livermore, California

Animal models

- G. Sega, Oak Ridge National Laboratory, Tennessee: DNA repair in spermatocytes.
- H.V. Malling, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina: Detecting sperm mutants.
- R.J. Preston, Oak Ridge National Laboratory, Tennessee: Chromosome aberrations in decondensed sperm DNA.

Human studies

- A.J. Wyrobek, Lawrence Livermore National Laboratory, Livermore, California: Sperm morphology (man and animals) and the fluorescent Y marker.
- H.J. Evans, MRC Clinical and Population Cytogenetics Unit, Edinburgh, Scotland: Sperm morphology in smokers.
- B.A. Bridges, University of Sussex, England: Summation—Future directions.

Prokaryotic Gene Expression—Symposium In Memory of Luigi Gorini

June 27–July 1

- D. Fraenkel, Harvard Medical School, Boston, Massachusetts: Remembrance of Luigi Gorini.

Session 1 *Ribosome Function*

Chairperson: R.A. Zimmermann, University of Massachusetts, Amherst

Biosynthesis

M. Nomura, University of Wisconsin, Madison: Regulation of the synthesis of ribosomes and ribosomal components in *E. coli*.

J.D. Friesen, University of Toronto, Canada: Mutations affecting gene expression in the *rplJ* operon.

Structure and genes

K. Isono, Max-Planck-Institut, Berlin, Federal Republic of Germany: Genetics of the *E. coli* ribosomal protein—Some new aspects.

I.G. Wool, University of Chicago, Illinois: Alpha sarcin action and the structure and function of eukaryotic ribosomes.

J. Warner, Albert Einstein College of Medicine, Bronx, New York: Ribosomal protein genes of *S. cerevisiae* and their regulation.

Session 2 *Translational Fidelity I*

Chairperson: J. Davies, Biogen, S.A., Geneva, Switzerland

J.A. Gallant, University of Washington, Seattle: The ribosome's frame of mind.

C.G. Kurland, University of Uppsala, Sweden: Proofreading on ribosomes?

D. Elseviers, New York Medical College, Valhalla, New York: *E. coli* mutants with reduced misreading levels.

E.J. Murgola, University of Texas, Houston: tRNA, suppression, and the code.

Session 3 *Regulation of Gene Expression: Transcription and Translation*

Chairperson: W.K. Maas, New York University Medical Center, New York, New York

C. Yanofsky, Stanford University, California: Attenuation control of tryptophan operon expression.

B. Weisblum, University of Wisconsin, Madison: Translational control of resistance to MLS antibiotics.

M. Rosenberg, National Cancer Institute, Bethesda, Maryland: Regulation of gene expression by transcription termination and RNA processing.

K. Campbell, University of Colorado, Boulder: RegA—T4's amazing translational repressor.

H.E. Umbarger, Purdue University, West Lafayette, Indiana: The multivalent repression of isoleucine and valine biosynthesis in *E. coli*.

T. Eckhardt, Smith, Kline and French Laboratories, Philadelphia, Pennsylvania: The *E. coli* arginine repressor gene (*argR*).

S. Adhya, National Cancer Institute, Bethesda, Maryland: Ribosomal proteins control transcription termination.



Prokaryotic Gene Meeting

Session 4 Translational Fidelity II

Chairperson: J.A. Gallant, University of Washington, Seattle

J. Parker, Southern Illinois University, Carbondale: Nonrandom codon misreading.

M. Yarus, University of Colorado, Boulder: Interaction of suppressor tRNA with the *strA* ribosome.

L. Bossi and J.R. Roth, University of Utah, Salt Lake City: Role of a tRNA modified base (anticodon loop ψ) in code translation and gene regulation.

R.C. Thompson, Temple University, Philadelphia, Pennsylvania: The reciprocal relationship between fidelity and speed in protein biosynthesis.

Session 5 Protein Secretion I

Chairperson: A. Torriani-Gorini, Massachusetts Institute of Technology, Cambridge

S.A. Benson, Frederick Cancer Research Center, Maryland: Genetic analysis of protein export.

L. Randall, Washington State University, Pullman: Processing of exported proteins in *E. coli*.

J. Beckwith, Harvard Medical School, Boston, Massachusetts: Genetics of the secretory apparatus of *E. coli*.

M. Schwartz, Institut Pasteur, Paris, France

J.O. Lampen, Rutgers University, Piscataway, New Jersey: Lipoprotein intermediates in secretion by Gram-positive bacteria.

Session 6 Protein Secretion II

Chairperson: P. Margolin, The Public Health Research Institute of the City of New York, Inc., New York.

B.D. Davis, Harvard Medical School, Boston, Massachusetts: Some aspects of protein secretion in bacteria.

W. Wickner, UCLA School of Medicine, Los Angeles, California: Studies of membrane assembly in *E. coli*.

G. Blobel, Rockefeller University, New York, New York: Mechanism of protein translocation across and integration into membranes.

Phycomyces

August 2–August 8

Session 1 Physiology I

Chairperson: E.D. Lipson, Syracuse University, New York

E.D. Lipson, Syracuse University, New York: Sensory transduction in *Phycomyces*.

D.S. Dennison, Dartmouth College, Hanover, New Hampshire: Phototropic perplexities.

P. Meyer, California Institute of Technology, Pasadena: *Phycomyces*' avoidance in a wind-free environment.

J.-F. Lafay and J. Matricon, University of Paris, France: Interferences between two simultaneous stimuli (barrier/wind; barrier/light).

Session 2 The Photoreceptor

Chairperson: D.E. Presti, University of Oregon, Eugene

D.E. Presti, University of Oregon, Eugene: The photoreceptor in *Phycomyces* photobiology considered in the light of flavin and carotene.

M. Jayaram, State University of New York, Stony Brook: Light-induced carotene synthesis in *Phycomyces*.

W. Shropshire, Jr., Smithsonian Radiation Biology Laboratory, Rockville, Maryland: Action spectra for light-induced carotenoid synthesis.

E. Schafer and G. Loser, University of Freiburg, Federal Republic of Germany: Photogeotropism of *Phycomyces*.

P.A. Galland, Syracuse University, New York: Action spectra of photogeotropic equilibrium in *Phycomyces* wild type and three behavioral mutants.

Session 3 Genetics

Chairperson: A.P. Eslava, University of Salamanca, Spain

- M.I. Alvarez and A.P. Eslava, University of Salamanca, Spain: Mutants of *Phycomyces* with abnormal phototropism isolated with ICR-170.
M.I.G. Roncero and E. Cerda-Olmedo, University of Seville, Spain: Mutagenesis.
I. Lopez-Diaz and E.D. Lipson, Syracuse University, New York: Genetics of hypertropic mutants.
M. Orejas Suarez and A.P. Eslava, University of Salamanca, Spain: Mutagenesis with EMS in *Phycomyces*.
F. Rivero and E. Cerda-Olmedo, University of Seville, Spain: Spontaneously germinating mutants.

Session 4 Biochemistry I

Chairperson: R.J. Cohen, University of Florida, Gainesville

- J. Ruiz-Herrera, University of Guanajuato, Mexico: Chitin biosynthesis in Mucorales with emphasis on *Phycomyces*.
J. Soler, D. De Arriaga, and F. Busto, University of Leon, Spain: Regulation of carbohydrate metabolism of *Phycomyces blakesleeanus* by lactic dehydrogenase.
G. Sandmann, University of Constance, Federal Republic of Germany: Inhibitory effect of continuous illumination on intermediary metabolism in *Phycomyces*.
A. Flores-Carreón, M.A. Avalos, and J. Ruiz-Herrera, University of Guanajuato, Mexico: Glucuronosyl transferase activity in cell free extracts of *Phycomyces blakesleeanus*.
J.A. Pollock, D.T. Sullivan, and E.D. Lipson, Syracuse University, New York: Characterization of plasma membrane flavoproteins from stage-1 sporangiophores of *Phycomyces* wild type and class-1 mutants by two-dimensional gel electrophoresis.

Session 5 Physiology II

Chairperson: D.S. Dennison, Dartmouth College, Hanover, New Hampshire

- K.W. Foster, Mount Sinai School of Medicine, New York, New York: The signal processing of light in *Phycomyces*.
R.C. Poe and E.D. Lipson, Syracuse University, New York: White-noise analysis of *Phycomyces* photomutants as a probe of the internal dynamics of the light growth response.
P.A. Galland and E.D. Lipson, Syracuse University, New York: Wavelength dependence of phototropic dark adaptation in *Phycomyces*.
S.M. Block, J. Segall, and H. Berg, California Institute of Technology, Pasadena: Excitation and adaptation in bacterial chemotaxis.

Session 6 Special Lecture

- E.-P. Fischer, University of Konstanz, Federal Republic of Germany: Max Delbrück—A physicist who looked at biology.

Session 7 Genetics and Sexual Development

Chairperson: R.P. Sutter, West Virginia University, Morgantown

- M.I. Pelaez and A.P. Eslava, University of Salamanca, Spain: Recombination studies in *Phycomyces*.
R.P. Sutter, West Virginia University, Morgantown: Why do cultures of each mating type emit unique sex pheromones—Precursors of TAs (trisporic acids)?
W. Gauger, University of Nebraska, Lincoln: Mating-type heterokaryons and isogenicity in *Phycomyces*.
T. Suarez, A.P. Eslava, and A. Jimenez, University of Salamanca, Spain: Toward the isolation of a plasmid with a *Phycomyces* replication origin.

Session 8 Biochemistry/Genetics

Chairperson: E. Cerda-Olmedo, University of Seville, Spain

- P.M. Bramley, Royal Holloway College, Egham, Surrey, England: Carotene biosynthesis in cell extracts of *Phycomyces*.

- F. Parra, A. De La Concha, and F.J. Murillo, University of Murcia, Spain: Regulation of carotenogenesis in *Phycomyces*.
- J.-L. Revuelta Doval¹ and A.P. Eslava², ¹University of Leon; ²University of Salamanca, Spain: A new type of mutant disturbed in the photoindication of carotenoids in *Phycomyces*.
- D. De Arriaga, J. Soler, F. Teixido, and E.G. Gallarraga, University of Leon, Spain: Pyridine-dependent dehydrogenases in *Phycomyces blakesleeanus*—Effects of light and vitamin A.
- J.R. Medina, University of Seville, Spain: Genetics and regulation of alcohol-dehydrogenase in *Phycomyces*.

Session 9 Cytology and Development

Chairperson: T. Ootaki, Yamagata University, Japan

- S.K. Malhotra and J.P. Tewari, University of Alberta, Canada: *Phycomyces blakesleeanus*—Plasma membrane as a model for studies on the structure and function.
- A.J. Van Laere¹, B. Furch,² and J. Van Assche, ¹Catholic University of Louvain, Belgium; ²University of Kiel, Federal Republic of Germany: Dormancy and germination of *Phycomyces* sporangiophores.
- B. Furch, University of Kiel, Federal Republic of Germany: On the cell wall of sporangiophores of *Phycomyces blakesleeanus* in relation to heat-induced germination.
- K. Koga and T. Ootaki, Yamagata University, Japan: Growth and behavior of piloboloid mutants in *Phycomyces*.
- F. Gutierrez-Corona and E. Cerda-Olmedo, University of Seville, Spain: Microphorogenesis and carotene biosynthesis.

Session 10 Biochemistry II

Chairperson: P.V. Burke, University of California, Santa Cruz

- R.J. Cohen, University of Florida, Gainesville: Cyclic nucleotide and polyamine metabolism.
- L.S. Leutwiler and M. Brandt, California Institute of Technology, Pasadena: The absence of light-induced changes in cAMP concentration in the sporangiophore of *Phycomyces*.
- M.V. Reddy, University of Florida, Gainesville: cAMP phosphodiesterase in *Phycomyces blakesleeanus*—A genetic and biochemical analysis.
- W. Hilgenberg and F. Hoffman, J.W. Goethe-Universität, Frankfurt, Federal Republic of Germany: Indoleacetic acid (IAA) in *Phycomyces blakesleeanus*.

Session 11 Physiology III

Chairperson: W. Shropshire, Jr., Smithsonian Radiation Biology Laboratory, Rockville, Maryland

- K. Bergman, Northeastern University, Boston, Massachusetts: Controlled-release polymers—A new tool for the study of chemosensory systems.
- R.I. Gamow, University of Colorado, Boulder: Fine structure analysis of the growing zone.
- P.V. Burke, University of California, Santa Cruz: Geotropism in the hypertropic mutant C5.

Session 12 Directions of Future Research

Chairpersons: P.V. Burke, University of California, Santa Cruz, and E.D. Lipson, Syracuse University, New York.

- E. Cerda-Olmedo¹ and E.D. Lipson², ¹University of Seville, Spain; ²Syracuse University, New York: Status report on the *Phycomyces* monograph.

Panel led by session chairpersons: *Directions of future research*.

Anaerobic Genetics

August 16–August 17

Session 1

Chairperson: L.E. Mortenson, Exxon Research and Engineering Company, Linden, New Jersey

Clostridium

J.L. Johnson, Virginia Polytechnic Institute and State University, Blacksburg: General taxonomy.

C. acetobutylicum-pasteurianum

G. Gottschalk, University of Göttingen, Federal Republic of Germany: A continuous process for the production of butanol and acetone.

J.-S. Chen, Virginia Polytechnic Institute and State University, Blacksburg: (1) Acetone-butanol fermentation by *C. beijerinckii* (*C. butylicum*) in cultures maintained at neutral pH. (2) Study of nitrogenase genes and nitrogen-fixation in *C. pasteurianum*.

J.G. Morris, University College of Wales, Aberystwyth: The physiology of solvent production in continuous flow cultures of *C. acetobutylicum*.

D.R. Woods, University of Cape Town, South Africa: Molecular genetic studies on *C. acetobutylicum*.

M. Hermann, Institut Francais du Petrole, Rueil-Malmaison, France: Isolation of butanol resistant mutants of *C. acetobutylicum*.

Session 2

Chairperson: J.G. Morris, University College Wales, Aberystwyth, United Kingdom

C. thermocellum

E.A. Johnson and A.L. Demain, Massachusetts Institute of Technology, Cambridge: Anaerobic nature of *C. thermocellum* cellulase.

R.F. Gomez, Genentech, Inc., South San Francisco, California: An insertion sequence from *C. thermocellum*.

Other clostridia

L.G. Ljungdahl, University of Georgia, Athens: Aspects of electron transfer processes in acetogenic bacteria.

M.L. Britz, Massachusetts Institute of Technology, Cambridge: Production of larger varied (C_4 to C_6) volatile fatty acids by anaerobes.

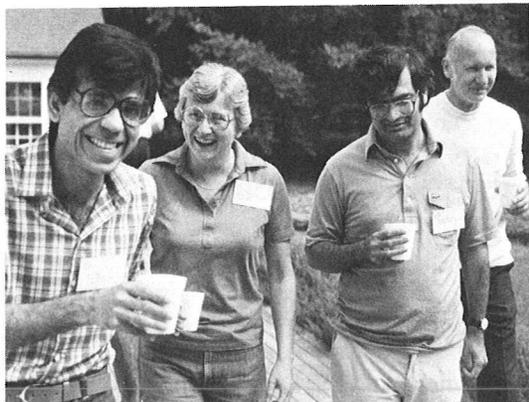
J.N. Grindley, Biogen Inc., Cambridge, Massachusetts: Attempts to create a transformation system and cloning vector for *C. thermosaccharolyticum*.

M. Sebald, Institut Pasteur, Paris, France: Present status of genetics in clostridia—Emphasis on pathogens.

Other systems

A. Matin, Stanford University, California: Physiology of bacterial acidophilism.

B.L. Marrs, St. Louis University, Missouri: Development of genetic systems for photosynthetic bacteria.



Participants at Anaerobic Genetics Meeting

Session 3

Chairperson: G. Gottschalk, University of Gottingen, Federal Republic of Germany

Methanogens

M.J. Wolin, New York State Department of Health, Albany: Overview of methanogens—Methane-producing bacteria of the human gut.

S. Yamazaki, National Institutes of Health, Bethesda, Maryland: Properties of selenium-containing hydrogenase from *Methanococcus vannielii*.

G. Bertani and L. Baresi, Jet Propulsion Laboratory, Pasadena, California: Some mutants of *Methanococcus voltae*.

W.B. Whitman, University of Georgia, Athens: Physiology of *Methanococcus voltae*.

J. Konisky, University of Illinois at Urbana-Champaign: Expression of *Methanococcus voltae* genes in *E. coli*.

P. Hamilton, Ohio State University, Columbus: Cloning and expression of methanogen DNA.

Other systems

C.E. Nord, National Bacteriology Laboratory, Stockholm, Sweden: β -lactamases in anaerobic bacteria.

Session 4

Chairperson: M. Sebald, Institut Pasteur, Paris, France

Bacteroides

F. Tally, Tufts University, Boston, Massachusetts: Introduction.

F. Tally and M. Malamy, Tufts University, Boston, Massachusetts: Drug-resistance transfer in *Bacteroides fragilis*.

J.L. Johnson, Virginia Polytechnic Institute and State University, Blacksburg: Plasmid distribution in *Bacteroides*.

F.L. Macrina, Virginia Commonwealth University, Richmond: Plasmid- and nonplasmid-mediated gene transmission in *Bacteroides*.

C.J. Smith, Bethesda Research Laboratories, Gaithersburg, Maryland: Transferable Clindamycin resistance in *B. ovatus*.

D.G. Guiney, University of California, San Diego: Cloning and expression in *E. coli* of a tetracycline-resistance gene from *B. fragilis*.

D.R. Woods, University of Cape Town, South Africa: UV repair systems in *B. fragilis*.

Session 5 Summary and Discussion

Chairperson: A.I. Bukhari, Cold Spring Harbor Laboratory, New York

J.E. Brenchley, Genex Corporation, Gaithersburg, Maryland

J.G. Morris, University College of Wales, Aberystwyth

L.E. Mortenson, Exxon Research and Engineering Company, Linden, New Jersey

J. Konisky, University of Illinois at Urbana-Champaign

B.L. Marris, St. Louis University, Missouri

Comments

E.B. Priestley, Exxon Research and Engineering Company, Linden, New Jersey

O.H. Smith, United States Department of Energy, Washington, D.C.

Recombinant DNA Applications to Human Disease

October 3–October 6

Session 1 Globin Genes, HLA, and Immunoglobins

Chairperson: S.M. Weissman, Yale University, New Haven, Connecticut

B.G. Forget, Yale University, New Haven, Connecticut: Normal human globin gene structure and mutations causing different thalassemia syndromes.

- S. Orkin, The Children's Hospital Medical Center, Boston, Massachusetts: A review of β -thalassemias—The spectrum of gene mutations.
- H.H. Kazazian, Jr., Johns Hopkins Hospital, Baltimore, Maryland: DNA polymorphisms in the β -globin gene cluster: Use in discovery and in prenatal diagnosis.
- S.M. Weissman, Yale University, New Haven, Connecticut: Molecular studies of the genes of the human major histocompatibility complex.
- T.A. Waldmann, National Cancer Institute, Bethesda, Maryland: The arrangement of immunoglobulin genes in human lymphoid leukemias.
- D. Pious, University of Washington, Seattle: Analysis of the HLA region using somatic cell mutants.
- D.E. Housman, Massachusetts Institute of Technology, Cambridge: Discussion.

Session 2 *Specific Disease Entities*

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

- C.T. Caskey, Baylor College of Medicine, Houston, Texas: Mutation at the *hprt* locus in rodent and man.
- T. Friedmann, University of California, San Diego: Characterization of an expressible human HPRT cDNA.
- A.L. Beaudet, Baylor College of Medicine, Houston, Texas: Altered mRNA for argininosuccinate synthetase in citrullinemia.
- S.L.C. Woo, Baylor College of Medicine, Houston, Texas: α_1 -antitrypsin deficiency and pulmonary emphysema—Identification of recessive homozygotes by direct analysis of the mutation site in the chromosomal gene.
- D. Pious, University of Washington, Seattle: Discussion.

Session 3 *Oncogenes and Heritable Cancers*

Chairperson: D. Botstein, Massachusetts Institute of Technology, Cambridge

- F. Dautry, Massachusetts Institute of Technology, Cambridge: Mechanism of activation of an oncogene from a human bladder carcinoma.
- M. Wigler, Cold Spring Harbor Laboratory, New York: Human transforming genes.
- W.F. Benedict, Children's Hospital of Los Angeles: Human retinoblastoma—A prototype of a suppressor class of human cancer genes.
- L.C. Strong, University of Texas Cancer Center, Houston: Genetic heterogeneity and retinoblastoma.
- S.M. Weissman, Yale University, New Haven, Connecticut: Discussion.

Session 4 *Chromosome Alteration and Mapping*

Chairperson: P.L. Pearson, Sylvius Laboratories, Leiden, The Netherlands

- M.E. Harper, The Agouron Institute, La Jolla, California: Chromosome mapping of single copy sequences by *in situ* hybridization.
- T.B. Shows, Roswell Park Memorial Institute, Buffalo, New York: Chromosome mapping of cloned genes and DNA polymorphisms associated with disease.



S. Brenner, K.E. Davies, M. Shodell



M. Siniscalco, U. Francke, D. Botstein

- U. Francke, Yale University, New Haven, Connecticut: Mapping of DNA sequences to chromosome regions in somatic cell hybrids.
- S.A. Latt, Children's Hospital Medical Center, Boston, Massachusetts: Construction, analysis, and utilization of recombinant phage libraries enriched for the human X chromosome by fluorescence activated flow sorting.
- T.T. Puck, Eleanor Roosevelt Institute for Cancer Research, Inc., Denver, Colorado: Human gene mapping, exposure, and expression.
- D. Patterson, Eleanor Roosevelt Institute for Cancer Research, Inc., Denver, Colorado: Somatic cell genetics and molecular analysis of Down's syndrome.
- P.L. Pearson, Sylvius Laboratories, Leiden, The Netherlands: Discussion.

Session 5 Specific Linkage Associations

Chairperson: R.L. White, University of Utah, Salt Lake City

- R.L. White, University of Utah, Salt Lake City: Approaches to linkage analysis in the human.
- M. Skolnick, LDS Hospital, Salt Lake City, Utah: The variation in expected LOD score by degree of polymorphism and recombination.
- J.F. Gusella, Massachusetts General Hospital, Boston: The use of restriction fragment length polymorphisms to map the Huntington's disease gene.
- D.C. Page, Massachusetts Institute of Technology, Cambridge: Homologous single-copy sequences on the human X and Y chromosomes.
- H. Erlich, Cetus Corporation, Berkeley, California: Discussion.
- R. Williamson, St. Mary's Hospital Medical School, London, England: The study of the basic defects in cystic fibrosis.
- K.E. Davies, St. Mary's Hospital Medical School, London, England: An X chromosome probe linked to Duchennes muscular dystrophy.
- M. Siniscalco, Memorial Sloan-Kettering Cancer Center, New York, New York: Molecular mapping of the human genome—A crossroad between basic and applied research.
- R.L. Nussbaum, Baylor College of Medicine, Houston, Texas: Molecular analysis of the *hprt* locus.
- B.G. Forget, Yale University, New Haven, Connecticut: Discussion.

Session 6 Growth Hormone and Therapies

Chairperson: S. Brenner, Cambridge University, England

- J.D. Baxter, University of California, San Francisco: Expression of growth hormone-related genes.
- J.A. Phillips, Johns Hopkins Hospital, Baltimore, Maryland: The growth hormone gene in human disease.
- G.I. Bell, University of California, San Francisco: The polymorphic locus adjacent to the human insulin gene and its association with diabetes mellitus—A population study.
- H. Erlich, Cetus Corporation, Berkeley, California: Restriction fragment length polymorphism analysis of HLA-typed families using cloned HLA probes.
- H.I. Miller, Food and Drug Administration, Rockville, Maryland: The role of the Food and Drug Administration in the regulation of the products of recombinant DNA technology—Update 1983.
- D. Botstein, Massachusetts Institute of Technology, Cambridge: Growth hormone therapies.
- S. Brenner, Cambridge University, England: Discussion.

Biological Aspects of Alzheimer's Disease

October 24–October 27

Session 1 The Alzheimer's Patient—The Human Dimension

- R. Katzman, Albert Einstein College of Medicine, Bronx, New York.
- Panel Discussion—G.D. Cohen, National Institute of Mental Health, Rockville, Maryland; J.P. Blass, The Burke Rehabilitation Center, White Plains, New York; D.A. Drachman, University of Massachusetts, Worcester; M.F. Folstein, Johns Hopkins Hospital, Baltimore, Maryland.

Session 2 Cell and Tissue Changes in Alzheimer's Disease

Chairperson: R. Katzman, Albert Einstein College of Medicine, Bronx, New York

- T.L. Kemper, Boston City Hospital, Massachusetts: Organization of the neuropathology of the amygdala in Alzheimer's disease.
- P.C. Burger, Duke University, Raleigh, North Carolina: Limbic system in Alzheimer's disease.
- M.J. Ball, University of Western Ontario, Canada: Hippocampal morphometry in Alzheimer's dementia—Implications for neurochemical hypotheses.
- G.D. Cohen, National Institute of Mental Health, Rockville, Maryland: Discussion.
- D.L. Price, Johns Hopkins University, Baltimore, Maryland: Basal forebrain cholinergic neurons and neuritic plaques in primate brain.
- M. Mesulam, Beth Israel Hospital, Boston, Massachusetts: Cortical projections from the nucleus basalis in primates.
- R.D. Terry, Albert Einstein College of Medicine, Bronx, New York: Cortical morphometry in Alzheimer's disease.
- R. Katzman, Albert Einstein College of Medicine, Bronx, New York: Discussion.

Session 3 *Fibrous Proteins*

Chairperson: R.J. Lasek, Case Western Reserve University, Cleveland, Ohio

- W.W. Schlaepfer, University of Pennsylvania, Philadelphia: Some observations on the structural and chemical nature of neurofilaments.
- L. Autilio-Gambetti, Case Western Reserve University, Cleveland, Ohio: Paired helical filaments—Relatedness to neurofilaments shown by silver staining and reactivity with monoclonal antibodies.
- D.J. Selkoe, McLean Hospital, Belmont, Massachusetts: Protein chemistry of paired helical filaments.
- G.G. Glenner, University of California, San Diego: Alzheimer's disease—Multiple cerebral amyloidosis.
- H.M. Wisniewski, New York State Institute for Basic Research in Mental Retardation, Staten Island: Pathogenesis of neuritic and amyloid plaques.
- S. Yen, Albert Einstein College of Medicine, Bronx, New York: Discussion.

Session 4 *Genetics and Biochemistry of Alzheimer's and Related Disorders*

Chairperson: X.O. Breakefield, Yale University, New Haven, Connecticut

- C.J. Epstein, University of California, San Francisco: Down's syndrome and Alzheimer's disease—Implications and approaches.
- L.L. Heston, University of Minnesota, Minneapolis: Dementia of the Alzheimer's type—Perspectives from studies of families.
- C.A. Marotta, McLean Hospital, Belmont, Massachusetts: In vitro protein synthesis by messenger RNA from the Alzheimer's disease brain.
- D.E. Housman, Massachusetts Institute of Technology, Cambridge: Molecular genetic approaches.
- X.O. Breakefield, Yale University, New Haven, Connecticut: Discussion.

Session 5 *Neurotransmitter Changes in Alzheimer's Disease*

Chairperson: P. Davies, Albert Einstein College of Medicine, Bronx, New York

- R.T. Bartus, Lederle Laboratories, Pearl River, New York: Evidence for a cholinergic deficiency using animal models of aging—Implications for studying and treating Alzheimer's disease.
- D.M. Bowen, Institute of Neurology, London, England: Neurotransmitters and metabolism in Alzheimer's disease.
- J.T. Coyle, Johns Hopkins University, Baltimore, Maryland: Synaptic neurochemistry of the basal forebrain cholinergic projections.
- I. Hanin, University of Pittsburgh, Pennsylvania: Chemically induced cholinotoxicity in vivo—Studies utilizing ethylcholine aziridinium ion (AF64A).
- P. Davies, Albert Einstein College of Medicine, Bronx, New York: Neurotransmitters and neuropeptides in Alzheimer's disease.
- R.H. Perry, Newcastle General Hospital, England: Discussion.

Session 6

Chairperson: C.W. Cotman, University of California, Irvine

Trophic factors

- R. Katzman, Albert Einstein College of Medicine, Bronx, New York: In vivo cholino-trophic activity.
C.W. Cotman, University of California, Irvine: Increase in neurotrophic factor following brain injury.
S.H. Appel, Baylor College of Medicine, Houston, Texas: Neurotrophic effects of hippocampal extracts on medial septal nucleus.

Metabolism

- J.P. Blass, The Burke Rehabilitation Center, White Plains, New York: Fibroblast phosphofructokinase in Alzheimer's disease and Down's syndrome.
D.F. Benson, University of California, Los Angeles: Alterations in glucose metabolism in Alzheimer's disease.
F.S.J. Frackowiak, Hammersmith Hospital, London, England: O¹⁵ metabolism.
C.W. Cotman, University of California, Irvine: Discussion.

Session 7 Behavioral Correlates

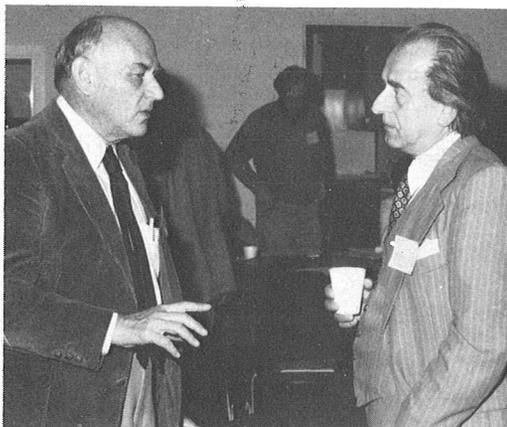
Chairperson: C.W. Cotman, University of California, Irvine

- M.F. Folstein, The Johns Hopkins Hospital, Baltimore, Maryland: Differential cognitive changes in the hereditary form of Alzheimer's disease.
R.H. Perry, Newcastle General Hospital, England: Relation of cholinergic loss to dementia.
D.A. Drachman, University of Massachusetts, Worcester: Aging and dementia—Insights from the study of anticholinergic drugs.
R. Katzman, Albert Einstein College of Medicine, Bronx, New York: Discussion.

Session 8 Viral and Environmental Agents

Chairperson: R.G. Rohwer, National Institute of Neurological and Communicative Disorders and Stroke, Bethesda, Maryland

- S.B. Prusiner, University of California, San Francisco: On the molecular biology of prions.
A.G. Dickinson, ARC and MRC Neuropathogenesis Unit, Edinburgh, Scotland: The relevance of scrapie as an experimental model for Alzheimer's disease.
R.G. Rohwer, National Institute of Neurological and Communicative Disorders and Stroke, Bethesda, Maryland: Discussion.
E.E. Manuelidis, Yale University, New Haven, Connecticut: Novel biological properties of Creutzfeldt-Jakob brains in vitro.
L. Manuelidis, Yale University, New Haven, Connecticut: Fractionation and infectivity studies in Creutzfeldt-Jakob disease.
D.C. Gajdusek, National Institute of Neurological and Communicative Disorders and Stroke, Bethesda, Maryland: Environmental factors responsible for ALS, P-D, and other neurological syndromes in high incidence foci.
D.P. Perl, University of Vermont, Burlington: Aluminum in Alzheimer's disease.



R. Katzman, H. Wisniewski



L. Manuelidis, M. Folstein, G. Glenner

R.G. Rohwer, National Institute of Neurological and Communicative Disorders and Stroke, Bethesda, Maryland: Discussion.

Session 9 Therapeutic Interventions

Chairperson: R.J. Wurtman, Massachusetts Institute of Technology, Cambridge

K.L. Davis, Veterans Administration Medical Center, Bronx, New York: Pharmacological and biological studies of Alzheimer's disease.

J.H. Growdon, Massachusetts General Hospital, Boston, Precursor therapies.

L.J. Thal, Albert Einstein College of Medicine, Bronx, New York: Oral physostigmine and lecithin improve memory in Alzheimer's disease.

R.J. Wurtman, Massachusetts Institute of Technology, Cambridge: Discussion.

Congressional Workshop: Carcinogenesis—From the Environment to the Gene

November 19–November 21

Session 1

J. Cairns, Harvard School of Public Health, Boston, Massachusetts: Epidemiology and molecular biology—More than just good friends?

Session 2

A.J. Levine, State University of New York at Stony Brook: What we now know about the organization of the human genome.

J. Sambrook, Cold Spring Harbor Laboratory, New York: How we know what we now know about the organization of the human genome.

Session 3

R.A. Weinberg, Massachusetts Institute of Technology, Cambridge: Finding oncogenes by "transfection."

R.L. Erikson, University of Colorado, Denver: Retroviruses and oncogenes.

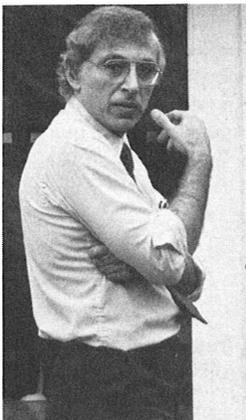
D.E. Housman, Massachusetts Institute of Technology, Cambridge: Probing the human genome.

Session 4

R.C. Gallo, National Cancer Institute, Bethesda, Maryland: Viruses and human cancer.

R. Wilson, Harvard University, Cambridge, Massachusetts: New parameters for the health-risk equation?

J.M. Bishop, University of California, San Francisco: Summary.



R. Gallo



A. Levine, J. Tuchman-Mathews



M. Bishop

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