19TH ANNUAL MEETING

ENVIRONMENTAL MUTAGEN SOCIETY

PROGRAM

MARCH 27-31, 1988
Omni Hotel at Charleston Place
Charleston, SC
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<td>Short Talks I</td>
<td>Sunday 6:30-8:30 pm</td>
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<td>Special Lecture</td>
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ENVIRONMENTAL MUTAGEN SOCIETY

Nineteenth Annual Meeting

March 27-31, 1988
Omni Hotel at Charleston Place
Charleston, SC

The ENVIRONMENTAL MUTAGEN SOCIETY was founded in 1969 and incorporated under the laws of the District of Columbia. It is operated to encourage the study of mutagens in the human environment—particularly as they may affect public health—and to engage in and sponsor research, study, and the dissemination of information related to this problem. Membership is open to all interested scientists.

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Meeting Manager
Diane Taub
NOTES

1. All sessions will be held in the ballroom area of the Omni Hotel.

2. Smoking is not permitted in the session rooms.

3. Coffee breaks will be in the Grand Hall area outside the ballrooms.

4. The phone number of the Omni Hotel is (803) 722 - 4900.

5. Council meetings are scheduled as follows:
   Sunday, 27th March         8:30 am to 1 pm, Colleton Room
   Thursday, 31st March      6:00 pm to 10 pm, Colleton Room

6. PLEASE REMEMBER to check the Message Board in the Registration Area frequently for changes in the Program, changes in room assignments, and special announcements. You may leave messages for other attendees but if you wish to post any other material, please check at the Registration Desk first.

7. The Registratoin Desk will be open Sunday 10:30am to 6:00pm, Monday and Tuesday 8:00am to 5:00pm, and Wednesday 8:00am to noon.

8. POSTERS are in the MAGNOLIA ROOM;
   SET-UP TIMES ARE AS FOLLOWS:

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<th>SET-UP STARTS</th>
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<td>(Mon. 3:45 - 6:00)</td>
<td>Sunday noon</td>
<td>Mon. 9 pm</td>
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<tr>
<td>Session II</td>
<td>Mon. 9 pm - Tues. 9 am</td>
<td>Wed. 11 am</td>
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<tr>
<td>(Tues. 10:30 - 12:30)</td>
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</table>
COUNCILORS

(Past President)  Robert Haynes (1988)
James M. Gentile (1989)

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John G. DeLuca  Richard D. Storer
Eugene L. Elmore  Michael D. Waters

REGISTRATION FEES

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<tr>
<td>Members</td>
<td>$90.00</td>
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<tr>
<td>Non - members</td>
<td>$100.00</td>
<td>$125.00</td>
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<td>Student (member)</td>
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<td>Student (non - member)</td>
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<td>Spouse</td>
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The council of the Society may elect a corporation a Patron or Sustaining Member as a result of demonstrated and substantiated acts benefitting the Society and its purposes.

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WORKSHOPS
Sunday, 1:00 pm - 4:30 pm

MUTAGENICITY RISK ASSESSMENT

Jenkins - King Charles Room
A. Auletta and D. Jacobson - Kram, presiding
Sponsor: U.S.EPA Office of Toxic Substances and Office of Research and Development

1:00
U.S. EPA MUTAGENICITY RISK ASSESSMENT GUIDELINES
L. Valcovic, EPA Office of Research and Development

1:30
ETHYLENE OXIDE RISK ASSESSMENT
V. Vaughn - Dellarco, EPA Office of Research and Development

2:00
COMPARISON OF THE VISIBLE AND BIOCHEMICAL SPECIFIC LOCUS ASSAYS
M. Shelby, National Institute of Environmental Health Sciences

2:30 COFFEE BREAK

3:00
USE OF MUTAGENICITY TEST DATA AT THE EPA.
K. Dearfield, Office of Pesticides and Toxic Substances
A. Auletta, Office of Toxic Substances

3:40 DISCUSSION

EXPERIENCE WITH AUTOMATED MICROSCOPES IN CYTOGENETICS AND GENETIC TOXICOLOGY

Willow Room
C. Bean, presiding
Sponsor: Image Recognition Systems

1:00
INTRODUCTION

1:05
THE MAGISCAN (JOYCE LOEBL)
C. Bean, Merck Sharp and Dohme Research Laboratories

1:20
THE OMNICON (BAUSCH AND LOMB)
D. Shafer, Emory University

1:35
THE MAGISCAN AND OTHER SYSTEMS
A. Martin, Northwestern University

1:50
THE IBAS (ZEISS)
R. Peer, Bristol Myers

2:05
THE CYTOSCAN (IMAGE RECOGNITION SYSTEMS)
D. Lloyd, National Radiological Protection Board, England

2:20 COFFEE BREAK

2:50
PANEL-LED OPEN DISCUSSION

3:30
PANEL MEMBERS AVAILABLE FOR INDIVIDUAL DISCUSSION WITH INTERESTED PERSONS
NEW RESEARCH IN GERM CELLS AND ZYGOTES

Live Oak Room
J. Allen and L. Russell, presiding

1:00
SYNAPTONEMAL COMPLEX STRUCTURE AND FUNCTION
M. Moses, Department of Anatomy, Duke University

1:20
CHEMICAL-INDUCED SYNAPTONEMAL COMPLEX DAMAGE
J. Allen, U.S.EPA, Genetic Toxicology Division

1:40
SYNAPTONEMAL COMPLEX DAMAGE IN RELATION TO CHROMOSOME ABERRATIONS
L. Backer, Environmental Health Research and Testing, Inc.

2:00
PANEL-LED DISCUSSION: STRENGTHS AND WEAKNESSES OF SYNAPTONEMAL COMPLEX ANALYSIS AS AN ASSAY IN GENETIC TOXICOLOGY
J. Allen, M. Moses, L. Backer, P. Poormen (Burroughs Wellcome Co.) J. Gibson (Duke University)

2:20 COFFEE BREAK

2:40
MOLECULAR EVENTS IN MOUSE GERM CELLS AND THEIR GENETIC CONSEQUENCES
G. Sega, Oak Ridge National Laboratories

3:10
EXPOSURE OF ZYGOTES TO CHEMICAL MUTAGENS PRODUCES HIGH FREQUENCIES OF DEVELOPMENTAL ANOMALIES IN MICE
W. Generoso, Oak Ridge National Laboratories

3:40
ANALOGIES BETWEEN SPONTANEOUS MALFORMATIONS IN HUMANS AND MUTAGEN-INDUCED DEVELOPMENTAL DEFECTS IN MICE
J. Rutledge, University of Texas Medical Center

GENETIC ACTIVITY PROFILES: EVALUATION OF QUANTITATIVE DATA

Cypress - Dogwood Room
M. Waters, presiding

1:00
INTRODUCTION TO GENETIC ACTIVITY PROFILES: EPA/IARC SUPPLEMENT
6 DATA BASE AND EPA NON-CARCINOGEN DATA BASE
M. Waters, USEPA, Genetic Toxicology Division

1:20
POTENCY DATA AND THE EVALUATION OF CARCINOGEN/NONCARCINOGEN PAIRS AND CHEMICAL CLASSES
L. Kier, Monsanto Company

1:40
USE OF PROFILES TO DISTINGUISH GENOTOXIC AND NONGENOTOXIC CARCINOGENS
J. Ashby, ICI, PLC, England

2:00
Discussion
2:30 COFFEE BREAK

EVALUATION OF NONGENOTOXIC CARCINOGENS
A. Li, presiding

3:00
OVERVIEW: TOXICOLOGICAL SIGNIFICANCE OF NONGENOTOXIC CARCINOGENS
A. Li, Monsanto Company

3:15
GENETIC ACTIVITY PROFILES OF SOME NONGENOTOXIC CARCINOGENS
M. Waters, U.S.EPA

3:30
PEROXISOME INDUCTION ASSAY FOR THE DETECTION OF NONGENOTOXIC HEPATIC CARCINOGENS
L. Loretz, Monsanto Co.

3:45
IN VIVO / IN VITRO HEPATOCYTE S - PHASE INDUCTION ASSAY
J. Mirsalis, SRI International

4:00
RISK ANALYSIS OF NONGENOTOXIC CARCINOGENS
F. Ennever, Case Western Reserve Univ.

4:15
GENERAL DISCUSSION
Advances in Modern Environmental Toxicology, Vol. 14
BIOCHEMICAL MECHANISMS AND REGULATION
OF INTERCELLULAR COMMUNICATION

Edited by Harry A. Milman and Eugene Elmore

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  Charles C. Tong and Gary M. Williams
Applications of the Chinese Hamster V79 Metabolic Cooperation Assay in
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  Eugene Elmore, Harry A. Milman and Gail P. Wyatt

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<td>Live Oak Room</td>
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<td>T. Ma and L. Overton, presiding</td>
<td>G. Erexson and M. Manandhar, presiding</td>
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<td>M. Bempong, Norfolk State University</td>
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<th>7:00</th>
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<tr>
<td><strong>CULTURED LYMPHOCYTE CHROMOSOMES OF BULLFROG (RANA CATESBEIANA ) TADPOLES --- A POTENTIAL IN VIVO MONITORING SYSTEM FOR WATER POLLUTION</strong></td>
<td><strong>THE PERSISTENCE OF SCE-INDUCING LESIONS IN MOUSE PERIPHERAL BLOOD AND SPLEEN LYMPHOCYTES FOLLOWING IN VIVO EXPOSURE TO DIAZIQONE</strong></td>
</tr>
<tr>
<td>K. Kim¹, T. Ma¹ and G. Cabrera², ¹Western Illinois University and ²Universidad Autonoma de Queretaro, Mexico</td>
<td>M. Bryant, G. Erexson and A. Kligerman, Environmental Health Research and Testing, Inc.</td>
</tr>
</tbody>
</table>
CONTRIBUTED PAPERS I
Sunday, 6:30pm-8:30pm

MOLECULAR MECHANISMS IN MAMMALIAN CELLS

Cypress - Dogwood Room
G. Adair and J. Hozier, presiding

6:30

GC-RICH SEQUENCES IN ONCOGENES AND VERTEBRATE GENOMES AS PREFERRED SITES FOR DNA ALKYLATION

W. Mattes, Stauffer Chemical Co.

6:45

TARGETED HOMOLOGOUS RECOMBINATION AT THE CHO APRT LOCUS

G. Adair, R. Naim, J. Scheerer, C. MacKinnon and K. Brotherman, University of Texas System Cancer Center

7:00

CARCINOGEN-INDUCED HOMOLOGOUS RECOMBINATION BETWEEN DUPLICATED CHROMOSOMAL SEQUENCES IN MAMMALIAN CELLS

N. Bhattacharyya, Y. Wang, V. Maher, and J. McCormick, Michigan State University

MOUSE GERM CELLS

Jenkins - King Charles Room
J. Bishop and S. Niemann, presiding

6:30

DOMINANT MUTAGENIC EFFECT OF ENU ON FIRST-GENERATION LITTER SIZE IN MICE FOLLOWING TREATMENT OF SPERMATOLOGIN STEM CELLS

W. Russell and P. Hunsicker, Oak Ridge National Laboratory

6:45

HIGH FREQUENCY OF DOMINANT MUTATIONS CAUSING STUNTED GROWTH IS INDUCED IN SPERMATOLOGIN STEM CELLS BY ENU

P. Selby, G. Raymer and P. Hunsicker, Oak Ridge National Laboratory

7:00

HIGH FREQUENCY OF MOSAIC MUTANTS FROM ENU TREATMENT OF MOUSE ZYGOTES

L. Russell and K. Stelzner, Oak Ridge National Laboratory
CONTRIBUTED PAPERS I
Sunday, 6:30pm-8:30pm

NON-MAMMALIAN EUKARYOTES
Willow Room
T. Ma and L. Overton, presiding

7:15
EFFECTS OF THE EXCISION REPAIR GENE, Mus (2)201, ON SEX-LINKED RECESSIVE LETHALS INDUCED BY METHYL AND ETHYL GROUPS IN DROSOPHILA

P. Foureman and W. Lee, Louisiana State University

7:30
RELATION OF METHYL OR ETHYL ADDUCTS TO INDUCTION OF SEX-LINKED RECESSIVE LEthal Mutations IN DROSOPHILA

W. Lee, Louisiana State University

7:45
HETEROZYGOUS EFFECTS OF MULTICOLOCUS DELETION MUTATIONS AT THE Ad-3A Locus OF Neurospora crassa

L. Overton and F. de Serres, Research Triangle Institute

CYTOGENETICS TESTING AND DOSIMETRY
Live Oak Room
G. Erxson and M. Manandhar, presiding

7:15
ANALYSIS OF MICRONECULI USING A CYTOKINESIS-BLOCK METHOD IN V79 CHINESE HAMSTER LUNG CELLS FOLLOWING TREATMENT WITH MITOMYCIN C (MMC) OR CYCLOPHOSPHAMIDE (CP)

G. Krishna, M. Kropko and J. C. Theiss, Warner-Lambert Company

7:30
DOSIMETRY OF RADIATION-INDUCED CHROMOSOME ABERRATIONS IN CHINESE HAMSTER LYMPHOCYTES IN VIVO AND IN VITRO

W. Au¹, M. Waters², Z. Xu¹, P. Nechay¹ and A. Hsie¹, ¹University of Texas Medical Branch and ²EPA/HERL

7:45
A CYTOGENETIC COMPARISON OF THE RESPONSES OF MOUSE AND HUMAN PERIPHERAL BLOOD LYMPHOCYTES TO COBALT 60 GAMMA RADIATION

A. Kligermer¹, E. Halperin², G. Erxson¹, G. Honore², B. Westbrook-Collins³ and J. Allen³, ¹Environmental HealthResearch and Testing, Inc.

²Duke University Medical Center and ³U.S.EPA
CONTRIBUTED PAPERS I  
Sunday, 6:30pm-8:30pm

MOLECULAR MECHANISMS IN MAMMALIAN CELLS  
Cypress - Dogwood Room  
G. Adair and J. Hozier, presiding

7:15

ISOLATION AND CHARACTERIZATION OF THE DNA ADDUCT N-(DEOXYGUANOSIN-8-YL)-3-AMINOFLUORANTHENE  
A. Dietrich, L. Ball and A. Gold, University of North Carolina

7:30

KINDS OF MUTATIONS INDUCED BY 1-NITROSOPYRENE (1-NOP) WHEN A PLASMID REPLICATES IN HUMAN CELLS AND THE EFFECT OF DNA REPAIR ON THE MUTAGENICITY OF 1-NP IN DIPLOID HUMAN FIBROBLASTS  
J. Yang, J. Patton, V. Maher and J. McCormick, Michigan State University

7:45

MUTAGENICITY OF ACRYLONITRILE AND ITS METABOLITE 2-CYANOETHYLENE OXIDE IN HUMAN LYMPHOBLASTS IN VITRO  
L. Recio and T. Skopek, Chemical Industry Institute of Toxicology

MOUSE GERM CELLS  
Jenkins - King Charles Room  
J. Bishop and S. Niemann, presiding

7:15

SELECTION AND ANALYSIS OF ENU-INDUCED RECESSIVE GERM-LINE MUTATIONS IN A 6-10-CENTI-MORGAN REGION OF MOUSE CHROMOSOME 7  
E. Rinchik and D. Carpenter, Oak Ridge National Laboratory

7:30

BINDING OF ACRYLAMIDE TO SPERMIOGENIC STAGES IN THE MOUSE AND ITS CORRELATION WITH GENETIC DAMAGE  
G. Sega, R. Valdivia and P. Brimer, Oak Ridge National Laboratory

7:45

EXPOSURE OF FEMALE MICE TO NOCODAZOLE ONE HOUR AFTER MATING RESULTS IN ABNORMAL CHROMOSOME NUMBERS AND EARLY DEATH AMONG CONCEPTUSES  
J. Bishop, M. Katoh, K. Cain and W. Generoso, NIEHS and Oak Ridge National Laboratory
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<tr>
<th>Time</th>
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<tr>
<td>8:00</td>
<td>Molecular Analysis of His - 3 Mutants of <em>Neurospora crassa</em>: Correlation Between Biochemical and Genetic Data</td>
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<td>J. Dubins, L. Overton, R. Cobb and F. de Serres, Research Triangle Institute</td>
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<td>8:15</td>
<td>Fungal Extended Quinones: Modulation of Photodynamic Activities by Reducing Agents</td>
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<td>8:00</td>
<td>Cyto genetics Testing and Dosimetry</td>
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<td>Live Oak Room</td>
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<td>G. Erexson and M. Manandhar, presiding</td>
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<tr>
<td>8:15</td>
<td>Mouse Micronucleus Assay: Comparison of Bone Marrow and Peripheral Blood Assays</td>
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<td>F. Oleson and S. Getman, Bristol-Myers Company</td>
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MOLECULAR MECHANISMS IN MAMMALIAN CELLS

Cypress - Dogwood Room
G. Adair and J. Hozier, presiding

8:00

Molecular Analysis of the tk Locus in Large and Small Colony Mouse Lymphoma Cell Mutants

R. Cobb, J. Martin, E. Korytynski, L. Monteith and T. Hughes, Research Triangle Institute

8:15

Molecular Dissection of Mutations at the Heterozygous Thymidine Kinase (tk) Locus in Mouse L5178Y TK+/-3.7.2C Cells

M. Applegate¹, G. Juhn¹, A. Wadhams², M. Moore³ and J. Hozier¹, ¹Florida State University, ²Florida Institute of Technology and ³U.S.EPA

MOUSE GERM CELLS

Jenkins - King Charles Room
J. Bishop and S. Niemann, presiding

8:00

Ethylene Oxide Induces Stage-specific Germ Cell Damage in SEC and C57BL/6 Mice

S. Niemann and R. Popp, University of Tennessee and Oak Ridge National Laboratory

8:15

Mutational Sensitivity of Mouse Immature Oocytes Measured with Low Doses of Neutrons and Two Genetic Endpoints

R. Dobson, T. Straume, T. Kwan, V. Uhl and L. Goldstein, Lawrence Livermore National Laboratory, University of California, Livermore and University of California, San Francisco

8:30

Cytogenetic Study of Abnormal Mouse Embryos Sired by Carriers of Balanced Reciprocal Translocations

N. Cacheiro, K. Cain, C. Cornett and J. Rutledge, Oak Ridge National Laboratory and University of Texas
SPECIAL LECTURE

Monday, 8:30am - 9:15am

Live Oak and Cypress-Dogwood Rooms

A REANALYSIS OF THE NTP CARCINOGEN DATABASE: AN EXPLANATION FOR RECENT PROBLEMS

J. Ashby, ICI, England
THE ALEXANDER HOLLÄNDER SYMPOSIUM

TRANSGENIC MICE USED IN STUDIES OF ONCOGENE ACTIVITY, GENE EXPRESSION AND MUTAGENESIS

Presiding: R. Pedersen, University of California, San Francisco

Sponsors: National Institute of Environmental Health Services
E.I. duPont de Nemours and Co.
Arthur D. Little, Inc.

Soon after the advent of recombinant DNA technology, methods were developed for inserting cloned genes into early embryos. The first such experimental animals were transgenic mice, which contained the integrated exogenous DNA sequences as a novel Mendelian trait. Pronuclear injection at the zygote stage, as well as injection with retroviruses at preimplantation or postimplantation stages, are efficient means of introducing the exogenous DNA. By now, many mouse lines have been created that efficiently express the transgenes, often with profound physiological impact. For example, giant mice have resulted from expression of rat or human growth hormone genes, tumors have arisen precociously in animals expressing oncogenes, and expression of exogenous immune response genes has expanded the immunological repertoire of transgenic mice. The integrated gene may have consequences besides its expression. The chromosomal environment at the integration site may be subject to developmental regulation, such as genomic imprinting, to be discussed by Dr. Swain and coworkers; alternatively, the transgene may be mutagenic, as discussed by Dr. Soriano; finally, the transgene itself could become a target of mutagenesis, as discussed by Dr. Short and coworkers. These approaches are representative of the uses of transgenesis, a powerful new genetic tool.

9:15 INTRODUCTION: R. Pedersen

9:25 PARENTAL LEGACY DETERMINES METHYLATION AND EXPRESSION OF AN AUTOSOMAL TRANSGENE: A MOLECULAR MECHANISM FOR PARENTAL IMPRINTING
J. Swain, Duke University Medical Center

10:05 COFFEE BREAK

10:35 RETROVIRUSES AND MAMMALIAN DEVELOPMENT
P. Soriano, Baylor College of Medicine

11:15 A SHUTTLE VECTOR SYSTEM IN TRANSGENIC MICE
J. Short, Stratagene Cloning Systems, Inc.
CONTRIBUTED PAPERS II
Monday, 1:15pm - 3:15pm

HUMAN POPULATION MONITORING
Willow Room
R. Leonard and K. Hooper, presiding

1:15
CHROMOSOMAL RADIOSensitivity of Peripheral Lymphocytes from Smokers and Non-smokers
W. Au, P. Nechay, Z. Xu, J. Ward and M. Legator, The University of Texas Medical Branch

1:30
Effect of Low Folate Culture Medium on Chromosome Aberrations Associated with Smoking
J. Reidy, H. Zhou, A. Chen, J. Annest and T. Welty, Centers for Disease Control

1:45
A Comparative Cytogenetic Study of Students with and without Exposure to Smokeless Tobacco
G. Livingston, R. Reed, J. Lockey and B. Olson, University of Cincinnati and Indiana University Dental School

2:00
HUMAN UrINE MUTAGENICITY STUDY Comparing Cigarettes Which Burn or Only Heat Tobacco
D. Doolittle, C. Rahn, S. McKarns, G. Burger and A. Hayes, R. J. Reynolds Tobacco Company

PROKARYOTES
Live Oak Room
A. Gordon and R. Baker, presiding

1:15
Mutational Specificity of Dimethylsulfate (DMS) in the lacI Gene of Escherichia coli
M. Zielinska and B. Glickman, York University, Toronto, Ontario

1:30
Mutational Specificity of BPDE in the lacI Gene of Escherichia coli
A. Gordon, C. Belenlot-Moens and B. Glickman, York University, Toronto, Ontario

1:45
Differences in the Mutational Specificities of Activated N-Nitroso-N-methyl-N-benzylamine and N-Nitroso-N-dimethylamine as Revealed in DNA Sequence Studies
M. Horsfall¹, M. Zeilmaker², M. Archer³, G. Mohn² and B. Glickman¹,
¹York University, Toronto, ²University of Leiden and ³Ontario Cancer Institute, Toronto

2:00
Molecular Analysis of Salmonella Typhimurium HisD3052 Revertants
T. Cebula, W. Payne and K. Lampel, Food and Drug Administration
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<tr>
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<tr>
<td>1:45</td>
<td>Deletions Predominate in &quot;Spontaneous&quot; hpRT Mutant T-Cells of the Human Newborn</td>
<td>M. McGinniss and R. Albertini, University of Vermont</td>
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<td>1:15</td>
<td>Reevaluation of the Mutagenicity of Chemicals Previously Identified as “False Positives” in the Salmonella TYPHIMURIUM Mutagenicity Assay</td>
<td>M. Prival and V. Dunkel, U.S. Food &amp; Drug Administration</td>
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<td>1:30</td>
<td>Reevaluation of the Carcinogenicity of Chemicals Previously Identified as “False Positives” in the Salmonella TYPHIMURIUM Mutagenicity Assay</td>
<td>V. Dunkel and M. Prival, U.S. Food &amp; Drug Administration</td>
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<td>1:45</td>
<td>Indirect Estimates of the Sensitivity and Specificity of the Salmonella Assay</td>
<td>F. Ennever and H. Rosenkranz, Case Western Reserve University School of Medicine</td>
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<td>2:00</td>
<td>Structure-activity Considerations in the Deployment of Predictive Short-term Tests</td>
<td>H. Rosenkranz, Case Western Reserve University School of Medicine</td>
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CONTRIBUTED PAPERS II  
Monday, 1:15pm - 3:15pm  

**HUMAN POPULATION MONITORING**  
Willow Room  
R. Leonard and K. Hooper, presiding  

**PROKARYOTES**  
Live Oak Room  
A. Gordon and R. Baker, presiding  

2:15  
**CHROMOSOMAL ABBERATIONS AND SISTER CHROMATID EXCHANGES IN LYMPHOCYTES FROM COKE OVEN WORKERS**  
M. Bender, R. Leonard, O. White, Jr., J. Costantino and C. Redmond, Brookhaven National Laboratory and University of Pittsburgh  

2:15  
**MODULATION OF "DIRECT"-ACTING MUTAGENS BY S9-COFACTORS IN A SALMONELLA ASSAY METHOD**  
G. Lofroth, E. Agurell and C. Stensman, 1Nordic School of Public Health, Gothenburg and 2University of Stockholm  

2:30  
**HUMAN SPERM CYTOGENETICS: NO INCREASE IN CHROMOSOMAL ABERRATIONS WITH AGE**  
B. Brandriff, L. Gordon, D. Moore II and A. Carrano, Lawrence Livermore National Laboratory  

2:30  
**REDUCTION OF AZIDOALANINE MUTAGENICITY BY GLUTATHIONE S-TRANSFERASE**  
W. Owais, Yarmouk University, Irbid - Jordan  

2:45  
**THE EFFECT OF AGE ON CYTOGENETIC MEASUREMENTS IN A LARGE POPULATION SAMPLE**  
R. Leonard, M. Bender, J. Preston, JPartin and M. Shelby, 1Brookhaven National Laboratory, 2Oak Ridge National Laboratory, 3SUNY Stony Brook and 4The National Toxicology Program  

2:45  
**GENOTOXICITY OF CHROMIUM(V) COMPLEXES: POSSIBLE CARCINOGENIC INTERMEDIATES OF CHROMIUM(VI)**  
R. Farrell, R. Judd, P. Lay, N. Dixon, A. Bonin and R. Baker, 1University of Sydney, 2Australian National University, 3National Institute of Occupational Health and Safety, Australia  

3:00  
**DISCUSSION**  

3:15 - 3:45 Coffee Break
MAMMALIAN CELL MUTAGENESIS AND MOLECULAR MECHANISMS
Cypress - Dogwood Room
J. O'Neil and N. Biggart, presiding

2:15
COMPARISON OF THE ABILITY OF THE MOUSE LYMPHOMA AND CHO ASSAYS TO QUANTITATE INDUCED GENETIC EVENTS

2:30
A MAMMALIAN CELL LINE (6M2) ALLOWS DETECTION AND MOLECULAR ANALYSIS OF MUTATION BY BOTH CLASTOGENIC AND MUTAGENIC AGENTS
N. Biggart¹, E. Murphy, Jr.² and R. Rinehart², ¹San Diego State University and ²University of Texas Cancer System

2:45
MEASUREMENT OF MUTATION IN MAMMALIAN CELLS
T. Puck and C. Waldren, Eleanor Roosevelt Institute for Cancer Research

3:00
ESTIMATION OF SOMATIC MUTATION RATES AND DEMONSTRATION OF NON-RANDOMNESS OF MUTAGENESIS IN HUMAN CELLS
E. Chu, M. Boehnke, S. Hanash, R. Kuick, B. Lamb, J. Neel, W. Niezgoda, S. Pivirio and G. Sundling, University of Michigan

3:15 - 3:45 COFFEE BREAK

RISK ASSESSMENT, TEST STRATEGIES AND THEORIES OF CARCINOGENESIS
Jenkins - King Charles Room
V. Dunkel and W. Thilly, presiding

2:15
RETINOID STRUCTURE-ACTIVITY ANALYSIS
S. Woods and M. Mass, EHRT, Inc. and U.S.EPA

2:30
JACKPOT MUTATIONS DURING FETAL CELL DIVISION ARE THE MOST PROBABLE SOURCE OF EXPRESSED ONCOMUTATIONS IN MAN
W. Thilly, Massachusetts Institute of Technology

2:45
THE EMPEROR WEARS NO CLOTHES IN THE FIELD OF GENETIC TOXICOLOGY
J. Trosko and C. Chang, Michigan State University

3:00
DISCUSSION

3:15 - 3:45 COFFEE BREAK
POSTERS I
Monday, 3:45pm - 6:00pm
Magnolia Room

Set up: Sunday noon Take down: by Monday, 9pm

CYTOGENETIC MECHANISMS AND CELL CYCLE KINETICS

1
ANALYSIS OF CHROMOSOME ABERRATIONS IN A MAMMALIAN CELL LINE THAT INDUCTIBLY EXPRESSES THE EcoRI RESTRICTION ENDONUCLEASE

R. Winegar, M. Land and W. Morgan, University of California, San Francisco

2
CYTOGENETIC RADIOPROTECTIVE EFFECT OF DIMETHYL SULFOXIDE IN VIVO

K. Lowe and A. McFee, Oak Ridge Associated Universities

3
DMSO CONCENTRATION DEPENDENT MODULATION OF X-RAY INDUCED ABERRATIONS IN LYMPHOCYTES OF TWO MAMMALIAN SPECIES

E. Joiner¹, L. Littlefield¹, S. Colyer¹ and E. Frome², ¹Oak Ridge Associated Universities and ²Oak Ridge National Laboratory

4
REPAIR OF MUTAGEN-INDUCED LESIONS IN FRESH OR FROZEN HUMAN LYMPHOCYTES MEASURED BY SISTER CHROMATID EXCHANGE (SCE)

H. Murli¹, S. Galloway², J. Ivett¹, D. Parry³ and J. Mulvihill³, ¹Hayleton Laboratories, ²Merck Institute for Therapeutic Research and ³National Cancer Institute

5
CELL CYCLE STAGE SENSITIVITY OF CHINESE HAMSTER OVARY CELLS (CHO) TO SODIUM FLUORIDE-INDUCED CHROMOSOME ABERRATIONS COMPARED TO APHIDICOLIN, A KNOWN INHIBITOR OF DNA REPAIR

M. Aardema, D. Gibson and R. LeBoeuf, The Proctor & Gamble Co.

6
SCE INDUCTION AND ITS RELATIONSHIP TO CELLULAR PROLIFERATION AND RELATIVE CLONING ABILITY IN HUMAN TERATOCARCINOMA-DERIVED P3 CELLS

S. Morris, O. Domon, L. McGarry and R. Kcdell, NCTR, Jefferson, AR

7
CHROMOSOME ABERRATION INDUCTION AND CELL CYCLE PROGRESSION IN AN X-RAY SENSITIVE CHO CELL

D. Kohmescher and J. Preston, Oak Ridge National Laboratory
8 Development of a Dual Parameter Flow Cytometric Assay to Evaluate Cell Cycle Kinetics

C. Bean, J. Miller, J. Selden, S. Galloway and W. Nichols, Merck Institute for Therapeutic Research

9 The Use of Cell Kinetic Data to Refine Estimates of Micronucleus Induction in Human Peripheral Blood Lymphocyte Cultures

J. Leonard and R. Leonard, Brookhaven National Laboratory

10 Lymphocyte Proliferation Kinetics as a Cytostatic Screening System

P. Ostrosky1, R. Montero1, N. Hernandez2, L. Ruiz2, L. Gasque2, L. Herrera1, M. Ruiz1, C. CortinasdeNava1 and C. Rodriguez3, 1Instituto de Investigaciones Biomedicas, 2Facultad de Quimica, and 3Facultad de Medicina, UNAM, Mexico

Oncogenes, Chromosomes in Tumors, and Fragile Sites

11 Correlation of Metacentric Indicator Chromosomes and Oncogene Activation with Neoplastic Progression in Vitro

S. McKarns, K. Nikbakht, W. Yang and J. Preston, University of Tennessee and Oak Ridge National Laboratory

12 C-Myc Oncoprotein Distribution in Normal and Malignant Tissues of the Rat Colon

N. Tulchin, L. Ornstein, J. Guillem, K. O'Toole, M. Lambert, Mt. Sinai School of Medicine, N.Y., Columbia University, and the Cold Spring Harbor Laboratory

13 Common Fragile Sites Induced by Ara C in Leukemia Patient and Normal Person

J. Li, X. Li, H. Jiang and X. Zhou, Institute of Genetics, Academia Sinica, Beijing, China

14 The Effect of Hydroxylamine Inducing Common Fragile Site 3p14 on Human Chromosome

Wang Hui and X. Zhou, Institute of Genetics, Academia Sinica, Beijing, China
POSTERS I  Monday, 3:45pm - 6:00pm  Magnolia Room

15 Chromosomal Changes Associated with Rat Pleural Mesotheliomas Induced with Mineral Fibers
J. Eyre¹, L. Palekar¹ and D. Coffin², ¹Northrop Services Inc. and ²U.S.EPA

TRANSFORMATION

16 Enhanced Morphological Transformation of Syrian Hamster Embryo Cells Cultured Under Conditions of Reduced Bicarbonate Concentration and pH is Not Carcinogen Specific — An Interlaboratory Comparison
R. LeBoeuf, G. Kerckaert, J. Poiley and R. Raineri (introduced by E. Thompson), The Proctor & Gamble Company and Microbiological Associates Inc.

17 Improved Transformation Response of Syrian Hamster Embryo Cells in pH 6.7 Medium
C. Zisson, A. Sivak and A. Tu, Arthur D. Little, Inc.

18 Factors Affecting the Recovery of Colonies of BALB/C-3T3 Cells in an Agar Suspension Assay
M. Cifone and E. Matthews, Hazleton Laboratories America

19 Transformation of Human Embryo Renal Epithelial-Like Cells in-vitro Induced by Cigarette Smoke Aerosol Extract
J. Chen, Z. Wu, H. Chen and J. Feng (introduced by J. Nath), Guangzhou Medical College, People’s Republic of China

20 Effects of Bowman-Birk Protease Inhibitor on Doubling Time of Cells Treated with Transforming Doses of UV Radiation and β-Propiolactone
N. Baturay, D. Brown and D. Justus, St. John’s University
A. PROKARYOTES

21
AN ANALYSIS OF THE SPECTRUM OF SPONTANEOUS MUTATION IN THE lacI GENE OF ESCHERICHIA COLI

J. Halliday and B. Glickman, York University, Ontario

22
INDUCTION OF GENETIC DUPLICATIONS AND BASE-PAIR SUBSTITUTIONS IN BACTERIA BY DIMETHYL SULFATE AND DIETHYL SULFATE


23
DNA BASE CHANGES FOLLOWING IN VIVO EXPOSURE OF ESCHERICHIA COLI TO 2-HYDROXYETHYLNITROSOUREA

K. Richardson, R. Crosby and T. Skopek, Chemical Industry Institute of Toxicol.

B. YEAST AND NEUROSPORA

24
SPECTRUM OF SPONTANEOUS MUTATIONS IN THE SUP4 -O GENE OF YEAST

B. Kunz1, C. Giroux2, S. Kohalmi1 and J. Mis1, 1University of Manitoba, Canada and 2NIEHS, Research Triangle Park

25
DNA SEQUENCE ANALYSIS OF MNNG AND EMS-INDUCED MUTATIONS IN YEAST

S. Kohalmi and B. Kunz, University of Manitoba, Canada

26
MUTATIONAL SPECIFICITY OF BIFUNCTIONAL ALKYLATED AGENTS IN YEAST

J. Mis and B. Kunz, University of Manitoba, Canada

27
MOLECULAR SPECTRUM ANALYSIS OF FRAMESHIFT MUTATIONS IN YEAST

M. Plewa1, D. Kalinowski2, K. Mottus1, P. Cihak1, J. Pillote1 and F. Larimer2, 1University of Illinois and 2Oak Ridge National Laboratory

28
MOST X-RAY-INDUCED AD-3 IRREPARABLE MUTANTS IN NEUROSPORA CRASSA MAP AS A SERIES OF OVERLAPPING MULTILOCUS DELETIONS BUT AN UNEXPECTEDLY HIGH NUMBER RESULT FROM CLOSELY LINKED INDEPENDENT SITES OF GENETIC DAMAGE

F. de Serres, Research Triangle Institute
POSTERS I  Monday, 3:45pm - 6:00pm  Magnolia Room

29  SPONTANEOUS AD-3 MUTANTS RECOVERED FROM A TWO-COMPONENT HETERO-OKARYON (H-12) OF NEUROSPORA CESSA CONSIST OF GENE/POINT MUTA-ITIONS AND MULTILOCUS DELETIONS

F. de Serres, Research Triangle Institute

C. MAMMALIAN CELLS

30  STUDIES OF MUTANT LYMPHOCYTES INDUCED IN VIVO BY GAMMA RADIATION OF THE MOUSE


31  ETHYLMETHANESULFONATE BUT NOT 2-AMINOPURINE CAUSES G TO A TRANSITIONS IN HUMAN CELLS

P. Stambrook1, D. Schaff2, R. Jarrett2 and J. Tischfield2, 1University of Cincinnatti College of Medicine and 2Indiana University

32  SPECTRA OF IN VIVO HPRT MUTATION IN HUMAN T-LYMPHOCYTES FROM NORMAL INDIVIDUALS


33  THE PREDOMINANT MUTATIONAL CHANGE AT THE GPT LOCUS IN AS52 CELLS DIFFERS WITH DOSE FOLLOWING MITOMYCIN-C TREATMENT

K. Tindall and L. Stankowski, Jr., NIEHS and Pharmakon Research International,

34  COMPARISON OF MITOMYCIN C-INDUCED MUTATION, SCE AND CHROMOSOME ABERRATION BETWEEN CHO-K1-BH4 AND AS52 CELLS


35  MOLECULAR ANALYSIS OF INDUCED MUTATIONS AT THE HPRT LOCUS IN CHINESE HAMSTER CELLS EXPRESSING AND NOT EXPRESSING THE E. COLI AL-KYLTRANSFERASE GENE

M. Chaudry and M. Fox, Paterson Institute for Cancer Research, England
36 Sequence Analysis of Point Mutations at the HPRT Gene
H. Vrieling, M. Zdzienicka, M. van Rooijen, J. Simons, A. van Zeeland and P. Lohman, State University of Leiden, The Netherlands

37 Characterization of Glucose-6-phosphate Dehydrogenase Deficient Chinese Hamster Cells Derived from Pure Mutant Colonies
T. Stamato, E. Richardson and A. Giaccia, The Wistar Institute

GERM CELLS, DEVELOPMENT

38 The Selectivity of Cyclophosphamide Interaction with Differentiating B-Lymphocytes in vivo
R. Misra and S. Bloom, Cornell University

39 Bleomycin-induced Synaptonemal Complex Damage in Mice
P. Poorman¹, J. Allen², L. Backer³, B. Westbrook-Collins² and M. Moses⁴, ¹Wellcome Research Laboratories, ²U.S.EPA, ³Environmental Health Research and Testing and ⁴Duke University Medical Center

40 Genetic Studies of a Behavioral Mutant Induced by Ethylene Oxide in the Mouse
L. Barnett, S. Lewis and M. Davisson, ( introduced by M. Shelby ), Research Triangle Institute and The Jackson Laboratory

41 A Null Mutation at Car-2 in the Mouse Induced by Ethynitrosourea Results in a New Animal Model of a Human Disease
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Monday, 7:00pm

AWARDS
Willow Room

RECEPTION
Live Oak and Cypress-Dogwood Rooms

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Research Triangle Institute
Post Office Box 12194
Research Triangle Park, North Carolina 27709
(919) 541-6516
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<th>B. TUMORIGENICITY AND SCE</th>
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<tr>
<td>T. Skopek and P. deJong, presiding</td>
<td>P. Smith and R. Okinaka, presiding</td>
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CYTOGENETICS; MECHANISMS
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J. Morgan¹, E. Dainty², K. Westaway¹, and A. Horton³,
¹CANMET EM&R, Ottawa, Ontario, Laurentian University, Sudbury, Ontario, Ontario Research Foundation, Miss.

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<td>The Induction of Chromosomal Repair Enzymes by 1 cGy (1 rad) of Xrays to Human Lymphocytes</td>
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<td>S. Wolff and J. Wiencke, University of California, San Francisco</td>
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<tr>
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Magnolia Room

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D. MacPhee and L. Hafner, La Trobe University, Australia

107
The DNA Repair Defect to Alkylation Damage in Alzheimer's Disease T-Lymphocytes Is Not Associated with Changes in O6-Methylguanine Acceptor Protein Levels

J. Bartlett, W. Bradley and S. Robison, University of Vermont

108
A Reduction in Radiation-induced Chromosomal Aberrations Observed in Cultured Human Lymphocytes Following Pretreatment with Cycloheximide

J. Youngblom and J. Wiencke, University of California, San Francisco

109
Isolation and Characterization of DNA Repair Deficient Variants from CHO-UV-1 Cells

M. Sognier1, C. Waldren2 and A. Hsie1, 1University of Texas Medical Branch and 2Eleanor Roosevelt Institute for Cancer Research
110 Characterization of EMS-Resistant Phenotypes Produced by Transfection of Human DNA into EMS-Sensitive CHO Cells
M. Paxton, K. Kennedy and L. Barrows, George Washington University, and University of Utah

111 Sequence Specificity and DNA Repair Requirements for Mutagenesis by Photoactive Intercalating Compound Gilvocarcin V
R. Elespuru, A. Andrews and S. Look, NCI-Frederick Cancer Research Facility

112 The Centromere of Yeast is a Sensitive Target for UV-Induced Damage
J. Westmoreland, K. Bloom and M. Resnick, National Institute of Environmental Health Sciences and University of North Carolina, Chapel Hill

113 Simultaneous Expression of Recessive Alleles Signifies Aneuploidy in S. cerevisiae Strain D61.M
V. Mayer and C. Goin, U.S. Food & Drug Administration

114 Differential Effect of the Carcinogen Chromium(VI) on Gene Expression in vivo
J. Hamilton and K. Wetterhahn, Dartmouth College

115 Mutagenicity of Topoisomerase-active Agents in Bacteriophage T4
B. Lawrence and D. DeMarini, U.S.EPA

116 Evaluation of the Genotoxicity of m-AMSA, Etoposide, Teniposide and Ellipticine in Neurospora crassa
R. Gupta, Illinois State University

117 Regulation of Photolyase Activity in High Population Doubling Frog Cells
C. Chao and S. Lin-Chao, Stanford University
SYMPOSIUM II
Tuesday, 2:00pm - 4:40pm
Live Oak and Cypress - Dogwood Rooms

METABOLISM:
THE CYTOCHROME P-450 ENZYMES AS THEY RELATE TO GENETIC TOXICOLOGY.

Presiding: B. Langenbach, NIEHS, Research Triangle Park

Sponsors: Chevron Environmental Health Center, Inc.
SRI International

Most environmental organic chemicals require metabolism to manifest their genotoxic activity. The cytochrome P-450 enzymes comprise a primary system for metabolizing many exogenous and endogenous chemicals. This symposium will focus on recent developments in our understanding of P-450 enzymes as they relate to organ and species differences, inducibility, their relation to other drug metabolizing systems, human polymorphisms and their possible use for human risk assessment. In addition, approaches for utilizing our knowledge of the P-450 enzymes for improving in vitro genetic toxicity assays will be described.

2:00
CYTOCHROME P-450 ENZYMES AND THE OXIDATION OF PRO-CARCINOGENS IN ANIMALS AND HUMANS
F. Guengerich, Vanderbilt Univ. School of Medicine, Nashville, TN

2:35
DIFFERENCES AMONG TISSUES AND SPECIES IN THE EXPRESSION OF HOMOLOGS OF RABBIT CYTOCHROME P-450 ISOZYME 5: IMPLICATIONS FOR MUTAGENICITY TESTING
R. Philpot, NIEHS, Research Triangle Park, NC

3:10
COFFEE BREAK

3:35
ROLE OF SPECIFIC MONOOXYGENASES AND PEROXIDASES IN THE METABOLIC ACTIVATION OF AROMATIC AMINES AND NITROAROMATIC HYDROCARBONS
F. Kadlubar, National Center for Toxicological Research, Jefferson, AR

4:10
IMPROVEMENTS TO THE METABOLIC PROPERTIES OF TARGET CELLS FOR GENOTOXICITY ASSAYS USING DNA MEDIATED GENE TRANSFER AND OTHER METHODS
C. Crespi, Gentest Corporation, Woburn, MA
REFRESHMENTS
Tuesday, 5:00pm

PUBLIC SYMPOSIUM
Tuesday, 5:30pm - 7:30pm
Live Oak and Cypress-Dogwood Rooms

UNDERSTANDING AND TREATING HUMAN GENETIC DISEASE

Sponsors: Environmental Health Research & Testing, Inc.
R.J.Reynolds Tobacco Co.

As knowledge of the molecular basis of human genetic disease increases, so does the possibility of treating such diseases by correction of the primary lesion. Dr. C. Thomas Caskey (Director, Institute for Molecular Genetics, Baylor College of Medicine) will discuss his most recent research on the detection of mutations at the molecular level and the potential for mutation reversal. Dr. Eric Juengst (Assistant Professor of Humanities, Pennsylvania State College of Medicine) will address the ethical implications of altering human genes. Dr. H. Hugh Fudenberg (Professor of Medicine and Immunology, Medical University of South Carolina) and Dr. Barry Glickman (Professor of Biology, York University) will then join the two speakers for a panel discussion encompassing research, possibility, and philosophy.

5:30
Dr. Caskey

6:15
Dr. Juengst

6:45
Panel discussion followed by open discussion
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Wednesday, 8:30am - 9:15am

Live Oak and Cypress-Dogwood Rooms
SYMPOSIUM III
Wednesday, 9:15am - 11:45am
Live Oak and Cypress-Dogwood Rooms

Molecular Biology of Centromere, Kinetochore and Nuclear Matrix

Presiding: M. Resnick, NIEHS

Sponsors: Bristol-Myers, Co.
Rohm and Haas, Co.

In this symposium, chromosomal and nuclear organization are examined. Since the cell nucleus is an obvious target for environmental agents, it is important to understand its organization and the mechanisms for chromosome apportionment within this organelle. Considerable information has been gained in recent years concerning the nuclear matrix, the relationship of chromosome to that matrix, and the segregational apparatus. In mammalian cells substantial progress has been made on identifying proteins within the centromere/kinetochore region and determining their function in terms of microtubule binding. In yeast the DNA sequence required for centromere function has been defined and has been subjected to mutational studies and examined for response to DNA damaging agents.

9:20
Functional and Molecular Investigation of the Centromeres of Yeast

M. Resnick, NIEHS, Research Triangle Park, N C

10:00
Coffee Break

10:30
Proteins of the Centromere of Mammalian Chromosomes: The Kinetochore-Microtubule Connection

B. Brinkley, University of Alabama at Birmingham, AL

11:10
The Nuclear Matrix

D. Coffey, The Johns Hopkins University School of Medicine, Baltimore, MD

AFTERNOON FREE
SYMPOSIUM IV
Wednesday, 7:30pm - 9:30pm
Live Oak and Cypress-Dogwood Rooms

GENE REGULATION BY ENDOGENOUS PROMOTERS

Presiding: N. Colburn, NCI-FCRF

Sponsors: Pharmakon Research International
Monsanto Co.
Burroughs Wellcome, Co.

Tumor promotion comprises most if not all of the rate limiting steps in multi-stage carcinogenesis. Whether the agents of human tumor promotion are exogenous drugs or toxins, dietary components or life-style patterns, the final effectors are likely to be growth factors, reactive oxygen or other stress molecules. New evidence has emerged showing that specific genes are known to be inducible by growth factors and tumor promoters. These induction events are regulated by cis elements in the transcriptional promoter and trans-acting factors that bind to the cis elements.

7:30
GENES THAT COOPERATE WITH TUMOR PROMOTERS

N. Colburn, National Cancer Institute, Fredrick, MD

8:10
TRANSFORMING GROWTH FACTORS

H. Moses, Vanderbilt University School of Medicine, Nashville, TN

8:50
CIS- AND TRANS-ACTING ELEMENTS THAT MEDIATE TRANSCRIPTIONAL RESPONSES TO STRESS FACTORS

P. Herrlich, Institut fur Genetik und Toxikologie, Karlsruhe, Federal Republic of Germany
NOTES
### CONTRIBUTED PAPERS IV
**Thursday, 8:30am - 10:00am**

#### Cytogenetics: Mechanisms

<table>
<thead>
<tr>
<th>8:30</th>
<th>Inducible Expression of the EcoRI Restriction Endonuclease in Chinese Hamster Ovary Cells and Its Cytogenetic Effects</th>
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<tr>
<td></td>
<td>W. Morgan, M. Fero, M. Land and R. Winegar, University of California, San Francisco</td>
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<tr>
<th>8:45</th>
<th>Restriction Endonucleases-Induced Chromosome Aberrations in Human Lymphoblastoid Cells</th>
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<tbody>
<tr>
<td></td>
<td>G. Hook and J. Preston, University of Tennessee and Oak Ridge National Laboratory</td>
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<tr>
<th>9:00</th>
<th>Failure to Observe Adaptive Response to Ionizing Radiation in Mouse Bone Marrow Cells in Vivo</th>
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<tbody>
<tr>
<td></td>
<td>D. Jacobson-Kram and J. Williams, Johns Hopkins University Oncology Center</td>
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</tbody>
</table>

#### Population Monitoring

<table>
<thead>
<tr>
<th>8:30</th>
<th>The Development of Methods with which to Evaluate Immuno-toxic Effects of Environmental Mutagens</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G. Strauss¹, H. Garland¹, C. Curtis², S. Berkowitz² and W. Stanford², ¹U.S.EPA and ²EHRT, Research Triangle Park</td>
</tr>
</tbody>
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<tr>
<th>8:45</th>
<th>Mutagenesis Researchers’ Views on the Significance and Proper Use of Mutagenicity Tests Applied to Clinical Specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D. Busch¹, D. Easterling², H. Leventhal² and G. Bryan², ¹Armed Forces Institute of Pathology and ²Univ. of Wisconsin, Madison</td>
</tr>
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<tr>
<th>9:00</th>
<th>Dose-dependent Neutrophil Myeloperoxidase-deficiency and Onset of Myelogenous Leukemia in Gamma - Irradiated Beagle Dogs: An Opportunity to Link Subtle Effects of Mutagen Exposure with Disease Consequences?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G. Strauss¹, B. Giammara², T. Seed³ and J. Hanker⁴, ¹U.S.EPA, ²University of Louisville, ³Argonne National Laboratory and ⁴Univ. of N.Carolina</td>
</tr>
<tr>
<td>Test Method Development</td>
<td>In vivo Testing</td>
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<tr>
<td>Cypress-Dogwood Room</td>
<td>Jenkins- King Charles Room</td>
</tr>
<tr>
<td>E. Matthews and B. Boyes, presiding</td>
<td>T. Barfknecht and T. Ong, presiding</td>
</tr>
</tbody>
</table>

### 8:30
**Liver Protein Expression in Heterozygous Carriers of Recessive Lethal Mutations**

C. Giometti, J. Taylor, D. Grahn and T. Roderick, Argonne National Laboratory and Jackson Laboratory

### 8:45
**Effect of Near-physiological Oxygen Levels on Genotoxicity of Hypoxia-activated Nitroimidazoles in Chinese Hamster Cells**

C. Geard and G. Pichardo, Columbia University

### 9:00
**Comparison of the Cloning Efficiency of BALB/C-3T3 Cells in Chemically-treated High and Low Density Cell Cultures**

E. Matthews, Hazleton Laboratories America

### 8:45
**Cytogenetic Evaluation of a Structurally Related Triplet of Phenylenediamines in the Mouse Micronucleus Assay**

L. Soler-Niedziela, J. Nath and T. Ong, West Virginia University and National Institute for Occupational Safety and Health

### 9:00
**Genotoxic Interaction Between Drug and Environmental Chemicals: Praziquantel and Benzene Effects**

W. Anwar¹, W. An² and M. Legator²,
¹Ain Shams University, Cairo, Egypt and ²University of Texas Medical Branch
CONTRIBUTED PAPERS IV
Thursday, 8:30am - 10:00am

CYTOGENETICS: MECHANISMS
Willow Room
G. Hook and J. Tucker, presiding

9:15
ARA-C POTENTIATION OF CHROMOSOME DAMAGE INDUCED BY “DIRECT” VS. “INDIRECT” RADIATION ACTION
L. Littlefield, E. Frome1 E. Joiner and S. Colyer, Oak Ridge Associated Universities and 1Oak Ridge National Laboratory

9:30
CYTOGENETIC CHARACTERIZATION OF THE IRS1 V79 CELL LINE, AN X-RAY SENSITIVE MUTANT
J. Tucker, J. Minkler, N. Jones, L. Thompson and A. Carrano, Lawrence Livermore National Laboratory

9:45
CHARACTERIZATION OF AN ARA-C RESISTANT X-RAY SENSITIVE CHO MUTANT
G. Greer and J. Preston, University of Tennessee and Oak Ridge National Laboratory

POPULATION MONITORING
Live Oak Room
K. Kelsey and D. Busch, presiding

9:15
SHIFTS IN LYMPHOCYTE SUBPOPULATIONS AFTER IMMUNIZATION: IMPLICATIONS FOR HUMAN POPULATION MONITORING
N. Rosa and D. Tomkins, McMaster University, Ontario

9:30
FACTORS INFLUENCING THE DETECTION OF PERSISTENTLY ELEVATED SCE AFTER IN VIVO INHALATION EXPOSURE TO ETHYLENE OXIDE IN NON-HUMAN PRIMATES
K. Kelsey1, J. Wiencke2, E. Eisen1, D. Lynch3, T. Lewis3 and J. Little1,
1Harvard School of Public Health, 2Univ. of California, San Francisco and 3National Institute for Occupational Safety and Health

9:45
PERSISTENTLY ELEVATED SCE IN ETHYLENE OXIDE-EXPOSED PRIMATES INVOLVE A SUBPOPULATION OF HIGH FREQUENCY CELLS
K. Kelsey1, J. Wiencke2, E. Eisen1, D. Lynch3, T. Lewis3 and J. Little1,
1Harvard School of Public Health, 2Univ. of California, San Francisco and 3National Institute for Occupational Safety and Health

10:00 - 10:30 Coffee Break
CONTRIBUTED PAPERS IV  
Thursday, 8:30am - 10:00am

**Test Method Development**

Cypress-Dogwood Room  
E. Matthews and B. Boyes, presiding

9:15  
*Multiple End-point Analysis of the Activation Properties of Hepatocytes from Untreated Fischer 344 Rats and Those Fed 2% Butylated Hydroxyanisole*

B. Boyes, C. Rogers, E. Lok, C. Heroux-Metcalf and I. Langlois, Toxicology Research Division, Health and Welfare Canada

9:30  
*Lack of Genotoxic Activity of Acrylonitrile to Human Bronchial Epithelial Cells Grown in Culture and in Xenografted Tracheas*

T. Hesterberg, S. Maness, Y. Kodama, J. Sanchez, J. Iglehart, J. Mangum, J. Everitt and C. Boreiko, Chemical Industry Institute of Toxicology and Duke University Medical Center

9:45  
*Testing Above the Limit of Solubility (in vitro)*

A. Seeberg and R. Forster, Life Science Research, Rome, Italy

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**In Vivo Testing**

Jenkins- King Charles Room  
T. Barfknecht and T. Ong, presiding

9:15  
*The Genotoxic Activity of Acrylamide*


9:30  
*Evaluation of the Potential of Riddelline to Induce Unscheduled DNA Synthesis (UDS), S-Phase Synthesis (SPS) or Micronuclei Following in vivo Treatment with Multiple Doses*


9:45  
*Germ and Somatic Cell Abnormalities Following Disturbances in DNA Precursor Pools with Thymidine and Adenine*

S. Clode and D. Anderson, The British Industrial Biological Research Association, Carshalton, England

10:00 - 10:30 Coffee Break

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10:00 - 10:30 Coffee Break
POSTERS III
Tuesday, 10:30am - 12:30pm
Magnolia Room

Set up: Wednesday noon
Take down: by Thursday 5pm

HUMAN MONITORING

118
Molecular Methods for Detecting Germinal Gene Mutations

H. Mohrenweiser and M. Lambert, Lawrence Livermore National Laboratory

119
A Double-blind Placebo-controlled Cytogenetic Study of Oral Acyclovir in Patients with Recurrent Genital Herpes

D. Clive\textsuperscript{1}, J. Hozier\textsuperscript{2}, L. Corey\textsuperscript{3}, R. Reichman\textsuperscript{4} and L. Davis\textsuperscript{1}, \textsuperscript{1}Wellcome Research Laboratories, \textsuperscript{2}Applied Genetics Laboratory, Inc., \textsuperscript{3}Children's Orthopedic Hospital, Seattle and \textsuperscript{4}Strong Memorial Hospital, Rochester

120
HPRT-Mutant Frequency of Humans According to Age, Sex and Smoking Habits

K. Messing and A. Seifert, Universite du Quebec a Montreal

121
Evaluation of Immune Response and Genetic Damage on Lymphocytes from Neurocysticercotic Patients

R. Montero\textsuperscript{2}, D. Valencia\textsuperscript{1}, M. Sandoval\textsuperscript{3}, A. Flisser\textsuperscript{2}, A. Plancarte\textsuperscript{3}, D. Correa\textsuperscript{2}, I. Madrazo and P. Ostrosky\textsuperscript{2}, \textsuperscript{1}Facultad de Medicina, \textsuperscript{2}Instituto de Investigaciones Biomedicas,UNAM, \textsuperscript{3}Hospital de Especialidades Centro Medico La Raza, Mexico

MAMMALIAN CELL MUTAGENESIS: TESTING, METHOD DEVELOPMENT AND LOCUS COMPARISONS

122
Construction of a Transgenic Mouse for Mutation Analysis

T. Craft, K. Mohr, T. Skopek and P. Working, Chemical Industry Institute of Toxicology

123
Mouse Lymphoma (MOLY) Cell Spontaneous Mutants: Large or Small Colonies?

D. Daston and W. Caspary, NIEHS
POSTERS III  Thursday, 10:30am - 12:30pm  Magnolia Room

124  
**Validation and Application of an Abbreviated Mouse Lymphoma L5178Y TK+/- Mutagenesis Assay**

G. Blackburn, S. Irwin, J. Dooley, C. Schreiner and C. Mackerer, Mobil Environmental & Health Science Laboratory

125  
**Locus and Species Specificity in Mutagenesis**

W. Caspary, R. Langenbach, D. McGregor, B. Myhr, A. Mitchell, B. Penman and C. Crespi, NIEHS, IRI Scotland, LBI, SRI and Gentest

126  
**Mutagenicity of Nitrofurantoin and Furazolicone in Chinese Hamster Ovary Cell Strains**

N. Gao, Y. Ni, J. Thornton-Manning, P. Fu and R. Heflich, National Center for Toxicological Research

127  
**Chemical Testing with a CHO/HGPRT Suspension Culture Mutation Assay**

B. Myhr¹, L. Bowers¹, W. Caspary², ¹Hazleton Laboratories America and ²NIEHS

128  
**Detection of Mammalian Cell Mutagenesis in AS52 Cells**

L. Stankowski, Jr., C. Aaron, W. Tuman, E. Godek, R. Matthews and R. Naismith, Pharmakan Research International, Inc. and The Upjohn Company

129  
**Evaluation of Eight Coded Noncarcinogens in the CHO/HPRT and AS52/XPRT Assays**


130  
**Evaluation of Eight Noncarcinogens in the CHO/HGPRT Gene Mutation System**

L. Flowers and A. Li, Environmental Health Laboratory, Monsanto Company

131  
**Diphtheria Toxin Resistance in Non-dividing Chinese Hamster Ovary Cells**

D. Couch and J. Heddle, University of Mississippi Medical Center and York University, Canada
POSTERS III    Thursday, 10:30am - 12:30pm    Magnolia Room

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**Effect of alpha - Difluoromethylornithine (DFMO) on the Induction of Trifluorothymidine-resistant (TFTr) TK +/- L5178Y Mouse Lymphoma Cells by Fecapentaenes**

C. Rudd, P. Lee, K. Pardo, D. Deen and J. Peters, SRI International and University of California, San Francisco

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**CYTOGENETICS IN VITRO: Test Development and Testing**

133  
**Induction of Cytogenetic Damages in Primary Lung Cells by Genotoxic Agents**

W. Whong, J. Stewart and T. Ong, U.S. National Institute for Occupational Safety and Health

134  
**BrdU Concentration and Cell Number Influence SCE Frequency in Mouse Lymphoma TK +/- Cells**

J. Majeska, S. O’Lone, W. Gunther and D. Matheson, Stauffer Chemical Co.

135  
**High Efficiency Method for Sister Chromatid Differential Staining**

J. Luo, Y. Lu, H. L. Huang, H. P. Huang and D. Zeng, Guangdong Medical and Pharmaceutical College, Guangzhou, People’s Republic of China

136  
**Development of Rat Whole Blood Lymphocyte Culture for Genotoxicity Assays**

M. Cunningham, M. Moore and G. Theall Arce, Haskell Laboratories, E.I. du Pont de Nemours & Company

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**Evaluation of Rat Lymphocytes for in vitro Cytogenetic Assays**

A. Sinha, B. Gollapudi, V. Linscombe, R. Bruce and M. McClintock, The Dow Chemical Company

138  
**Cytogenetic Effects of 3-Nitrobenzo[a]Pyrene in Chinese Hamster Ovary Cells**

R. Neft, H. Schol, P. Fu and D. Casciano, NCTR

---

**Late Abstract**

**Factors Affecting the Occurrence of Chromosomal Aberrations in CHO Cells in the Presence of Metabolic Activation**

139
Cytotoxic and Aneuploidy Inducing Activities of Some Isomers of Ethyl 5-Amino-1,2-dihydro-2-methyl-3-phenylpyrido 3,4-B-Pyrazin-7-yIcarbamates in a Human WI-38 Cell Line

K. Siddiqui, C. Temple, Jr., W. Shannon and G. Lavelle, Southern Research Institute

140
Dose Response Parameters for X-ray-Induced Micronuclei in Cytokinesis-Blocked Human Lymphocytes

A. Sayer, L. Littlefield, E. Frome, S. Kholeif and S. Ismail, Oak Ridge Associated Universities, Oak Ridge National Laboratory and Medical Research Institute, Alexandria, Egypt

141
A Combined in Vitro Assay for Chromosome Aberrations and Micronuclei

M. Garriott, C. Piper and S. Soelter, G. D. Searle & Company

PROKARYOTES: TESTING AND TEST DEVELOPMENT

142
Cytotoxicity of Three Buffers to Salmonella Strain TA98 in a Microsuspension Reverse-Mutation Assay and the Effects of These Buffers on the Mutagenic Potencies of Complex Mixtures and Pure Compounds

M. Dallas¹ and D. DeMarini², ¹EHRT and ²U.S.EPA

143
Mutagenic Benzene Metabolite Detected in the Microscreen Assay

C. Klein, T. Rossman and C. Snyder, New York University Medical Center

144
A New Bioluminescent Test for Genotoxic Agents

S. Ulitzer, A. Bulich and B. Sediak, Technion-Israel Institute of Technology, Haifa, Israel and Microbios Corporation

145
Development and Validation of an Automated Approach to Bacterial Mutagenicity Testing

V. Houk¹, S. Schalkowsky² and L. Claxton¹, ¹U.S.EPA and ²Spiral System Instruments, Inc.
146 MUTAGENICITY OF THE ACTIVE INGREDIENTS IN BIRTH CONTROL PILLS
R. Blevins and S. Char, East Tennessee State University

147 MUTAGENICITY EVALUATION OF TETRAHYDRO AMINO ACRIDINE (THA) BY THE SALMONELLA/MICROSOME MUTAGENICITY TEST (AMES TEST)

148 THE MUTAGENIC ACTIVITY OF HYDROGEN PEROXIDE IN SALMONELLA TY-PHIMURIUM
A. Abu-Shakra and E. Zeiger, National Institute of Environmental Health Sciences

149 ROLE OF EXCISION REPAIR IN CYTOTOXICITY AND MUTAGENICITY OF THE ANTITUMOR DRUG CISPLATIN AND ITS ANALOGUE, CARBOPLATIN
A. Al-Dakan, M. Amer and M. Hannan, King Faisal Specialist Hospital and Research Centre, Saudi Arabia

COMPLEX MIXTURES

150 EXTRACTION OF BOTH MUTAGENIC AND ANTIMUTAGENIC FACTORS FROM A DESERT MUSHROOM (TIRMANIA PINOYI) BY USING DIFFERENT SOLVENTS
M. Hannan, A. Al-Dakan, H. Aboul-Enein and A. Al-Othaimeen, King Faisal Specialist Hospital and Research Centre, Saudi Arabia

151 MONOCLONAL ANTIBODIES FOR THE IMMUNOASSAY OF MUTAGENIC COMPOUNDS PRODUCED BY COOKING FOOD
J. Felton, M. Vanderlaan, B. Watkins, M. Hwang and M. Knize, Lawrence Livermore National Laboratory

152 GENOTOXICITY OF DIRECT-ACTING DIETARY AGENTS AND THEIR POSSIBLE TARGET SITES
153 Examination of the Role of Nitroreduction in the Greater-than-Additive Mutagenicity of Mixtures of Nitrobenzo[a]pyrene Isomers


154 Direct Exposure to Assess Mutagenicity from Coal and Wood Combustion Using Ames Salmonella typhimurium Plate Incorporation Assay

J. Mumford, E. Perry, R. Burton and D. Harris, U.S.EPA and Environmental Health Research and Testing, Inc.

155 Evaluation of a Protocol for Preparing Soil and Sediment Samples for Ames Mutagenicity Testing


156 Environmental Monitoring for Mutagenic Responses of Water Samples


157 Monitoring for Polycyclic Aromatic Hydrocarbons and Mutagens in Air Particulate Matter from Santa Clara County, California

P. Flessel, Y. Wang, I. Kim, K. Chang and W. Siu, Dept. of Health Services, Berkeley and Bay Area Air Quality Management District, San Francisco

158 Biomarker Characterization of Marine Sediment Extracts: Correlations with Neoplastic Disease in Two Aquatic Species


159 Assessment of the Antimutagenic Effects of Natural Mixtures Using a Novel Mutagenicity Test Protocol

D. Parisis, J. Glotzer and G. Rao, Loyola University
160  
Mouse-peripheral-erythrocyte-micronucleus (MUS-PEMN) Assay on Clastogenicity of Pollutants in Waste Water Under Chronic Exposure  
G. Loarca¹, G. Arreola¹, S. Lecona¹, T. Ma², X. Zhou² and Y. Peng², ¹Universidad Autonoma de Queretaro, Mexico and ²Western Illinois University

161  
Mutagenicity of Combinations of Volatile Organic Compounds Identified in Potable Water Supplies  
T. Calandra, J. Caruso and S. Shahied, New Jersey State Dept. of Health

162  
Recovery of 3-Chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) from Water on XAD Resins  

163  
Evaluation of Three Methods of Sample Preparation for the Recovery of Mutagens from Waters  
A. McDaniels¹ and L. Wymer², ¹U.S.EPA and ²Computer Sciences Corporation

164  
Mutagenicity of 16 Volatile Organic Chemicals in a Vaporization Technique with Salmonella typhimurium TA100  

165  
An Integrated Approach for the Evaluation of Industrial Effluents: Bioassays Coupled with Chemical Analysis  
L. Meyer¹, J. Oxenford¹, L. McGeorge¹, K. Kasselbach¹, R. Rosen², K. Cooper², T. Hartman², L. Rovin² and T. Atherholt³, ¹N.J. Dept. of Environmental Protection, ²Rutgers University and ³Coriell Institute for Medical Research

166  
Preparing Aqueous Samples for Genotoxicity Testing: Simulated Wastewater and Implications for Routine Wastewater Testing  
R. Stahl, Jr., Haskell Laboratories, Du Pont Co.
167
*In situ* Genotoxicity Monitoring of Sewage Habitats by Animal Denizens and Experimental Plant Systems

C. Sharma, M. Rajendran, R. Gowri, N. Panneerselvam and R. Saraswathi, Bharathiar University, Coimbatore, India

168
Modified Ames Assay for Petroleum-derived Complex Mixtures: Whole Sample Emulsions or DMSO Slurries vs. Cyclohexane/DMSO Extracts

J. Carver and M. Machado, Chevron Environmental Health Center, Inc.

169
Comparative Mutagenicity of Nitrofluoranthenes of Environmental Importance to *Salmonella typhimurium*

B. Shane, G. Squadrito, D. Church and W. Pryor, Louisiana State University

170
The Role of Oxygen Free Radicals in the Induction of Sister Chromatid Exchanges by Cigarette Smoke

C. Lee, B. Brown, W. Rice, Jr. and D. Doolittle, R. J. Reynolds Tobacco Company
BUSINESS MEETING
Thursday, 1:30pm - 2:30pm
Live Oak and Cypress-Dogwood Rooms

SYMPOSIUM V
Thursday, 2:30pm - 5:00pm
Live Oak and Cypress-Dogwood Rooms

TOPOISOMERASES: Regulators of DNA Metabolism

Presiding: M. Mattern, Smith Kline and French Laboratories

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Most enzymes that catalyze the various reactions that comprise what is referred to as DNA metabolism have single functions, e.g., polymerization of deoxyribonucleotidetriphosphates, polymerization of ribonucleotidetriphosphates, ligation, or specific nuclease activity. Topoisomerases, on the other hand, are capable of applying their concerted breakage and reunion activities to any additional enzymic action on chromatin. For this reason, they have been studied extensively as mediators of a number of cellular functions in which DNA metabolism is involved. The significance of their regulatory role is illustrated in the first talk, which describes the recent identification and utilization of topoisomerases as targets in cancer chemotherapy. In the second talk, evidence indicating likely physiological roles for these enzymes will be described. Finally, recent data which suggest that topoisomerases can mediate eukaryotic mutagenesis will be discussed.

2:30
Altered Functions of DNA Topoisomerases as a Basis for Antineoplastic Drug Action
W. Ross, University of Florida College of Medicine

3:10
Coffee Break

3:40
Cellular Functions of DNA Topoisomerases
L. Liu, Johns Hopkins University School of Medicine, Baltimore, MD

4:20
Moderation of Mutagenesis by Topoisomerases
D. DeMarini, U.S.EPA, Research Triangle Park, N.C.

4:50
Meeting Adjourns

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<td>Contributed Papers II</td>
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</tr>
<tr>
<td>9:15-11:45am</td>
<td>Symposium I</td>
<td></td>
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<tr>
<td>1:00-4:30pm</td>
<td>Workshops</td>
<td></td>
</tr>
<tr>
<td>8:30-1:00pm</td>
<td>Council Meeting</td>
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<tr>
<td>3:00-6:00pm</td>
<td>30th Anniversary</td>
<td></td>
</tr>
<tr>
<td>10:30am-6:00pm</td>
<td>30th Anniversary</td>
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**Main Events**

- Live Oak-Cypress
- Symposium
- Poster Session
- Symposium III
- Contributed Papers
- Workshops
- Council Meeting

**Schedule**

- **Thursday, March 31st**: Collection, Council Meeting, Live Oak-Cypress Promotion, Symposium I, Poster Session I, Symposium III, Contributed Papers I, Workshops, Council Meeting.
- **Friday, April 1st**: Symposium II, Contributed Papers II, Symposium I, Workshops, Council Meeting.
- **Saturday, April 2nd**: 30th Anniversary, 30th Anniversary, 30th Anniversary, 30th Anniversary, 30th Anniversary, 30th Anniversary, 30th Anniversary, 30th Anniversary.