25TH ANNUAL MEETING

ENVIRONMENTAL MUTAGEN SOCIETY

Silver Anniversary PROGRAM

MAY 7 – 12, 1994
Marriott Hotel and Convention Center
Portland, Oregon
<table>
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<th>Session</th>
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<tr>
<td>WORKSHOP I</td>
<td>Saturday</td>
<td>7:00–9:00 PM</td>
<td>6-7</td>
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<tr>
<td>Career Development</td>
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<td>Workshop and Reception</td>
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<td>WORKSHOPS II &amp; III</td>
<td>Sunday</td>
<td>8:00–11:45 AM</td>
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<td>WORKSHOPS IV &amp; V</td>
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<td>1:00–5:00 PM</td>
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<td>AWARDS</td>
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<td>SPECIAL LECTURE</td>
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<td>RECEPTION</td>
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<td>SYMPOSIUM I</td>
<td>Monday</td>
<td>8:15–11:30 AM</td>
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<tr>
<td>CONTRIBUTION PAPERS I-IV</td>
<td>Monday</td>
<td>1:00–5:15 PM</td>
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<td>POSTERS I</td>
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<td>5:15–7:30 PM</td>
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<td>SYMPOSIUM II</td>
<td>Tuesday</td>
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<tr>
<td>BUSINESS MEETING</td>
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<td>POSTER SESSION II</td>
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<td>3:00–5:30 PM</td>
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<td>SYMPOSIUM III</td>
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<td>SPECIAL LECTURE III</td>
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<td>SYMPOSIUM IV</td>
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<td>8:00–11:30 AM</td>
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<td>POSTERS III</td>
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<td>11:30 AM-1:30 PM</td>
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<tr>
<td>CONTRIBUTION PAPERS V-VII</td>
<td>Thursday</td>
<td>1:30–3:30 PM</td>
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<td>MINI-SYMPOSIA I-III</td>
<td>Thursday</td>
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<td>EXHIBITS</td>
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AN AUTHOR INDEX
IS IN THE BACK OF THIS BOOKLET
ENVIROMENTAL MUTAGEN SOCIETY

Twenty-Fifth Annual Meeting

May 7–12, 1994
Portland Marriott Hotel
and Convention Center
Portland, Oregon

The Environmental Mutagen Society was founded in 1969 and is incorporated under the laws of the District of Columbia. Its purpose is to encourage the study of mutagens in the human environment—particularly as they may affect public health—and to engage in and sponsor research and the dissemination of information related to mutagens. Membership is open to all interested scientists.

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ON-SITE REGISTRATION FEES

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<tr>
<td>Spouse nonmembers</td>
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FUTURE MEETINGS

1995 - St Louis Hyatt
   St Louis, MO

1996 - Empress Hotel
   Victoria, BC, Canada
SPONSORS OF THE 25th ANNUAL MEETING

ALLIED SIGNAL INC.
   Contributed Papers I
AMERICAN CYANAMID COMPANY
   Mini-symposium: Session I
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   Workshops II and III
BASF WYANDOTTE CORP
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   Symposium II
ENVIRONMENTAL HEALTH RESEARCH AND TESTING, INC.
   Contributed Papers IV
FMC CORP
   Student Social — Workshop I
GLAXO INC.
   Contributed Papers II and III
DR. PHIL HANAWALT
   Coffee Break
HAZLETON WASHINGTON
   Co-Sponsor EMS Awards Reception
HOFFMANN-LAROCHE, INC.
   Special Lecture: Dr. N. Arnheim
MERCK RESEARCH LABORATORIES
   Special Lecture: Dr. T. Kunkel
MICROBIOLOGICAL ASSOCIATES, INC.
   Co-Sponsor EMS Awards Reception
PHARMAKON USA
   Two Coffee Breaks, Contributed Papers VII
R.W. JOHNSON-PHARMACEUTICAL RESEARCH INSTITUTE
   Mini-symposium Session III
STERLING WINTHROP
   Alexander Hollaender Symposium
STRATAGENE
   Coffee Break
THE PROCTER AND GAMBLE CO.
   Workshop V
THE UPJOHN COMPANY
   Special Lecture: Dr. L. Loeb
PATRONS AND SUSTAINING MEMBERS

The EMS Council may elect a corporation to be a Patron or Sustaining Member as a result of demonstrated and substantiated acts benefiting the Society and its purposes. The following is a list of corporations making contributions or joining the Society as Patrons or Sustaining Members. This listing contains 1993 members as well as 1994 members.

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Representative: Mark Hite
WORKSHOP I
Saturday, May 7
7:00 PM - 9:00 PM
Kings Wharf Restaurant

CAREER DEVELOPMENT
AND STUDENT RECEPTION

Presiding:
George Hoffman
The College of the Holy Cross
and
William Morgan
University of California - SF

Sponsor:
FMC Corporation

The EMS has organized a career development workshop for its 1994 annual meeting. All undergraduate and graduate students and postdocs registered for the meeting are invited to attend. The format will be informal—a few short presentations accompanied by pizza, beer and soft drinks. In the presentations, EMS members will comment upon such matters as the planning of a graduate program, finding postdoctoral opportunities and fellowships, and looking for positions in the discipline. The presentations on positions in mutation research and genetic toxicology will consider faculty positions in liberal arts colleges and research universities, research associate positions in universities, and positions in industry and government. After the presentations speakers will be available for informal discussion.

Graduate Education
J Preston, CIIT
M Lippert, University of Vermont

Postdoctoral Positions and Fellowships
W Morgan, University of California, SF
A Abu-Shakra, USEPA
WORKSHOP I
Saturday, May 7
7:00 PM - 9:00 PM
Kings Wharf Restaurant

Opportunities in Academic Institutions
H Brockman, Illinois State University
G Hoffmann, The College of the Holy Cross
S Wolff, University of California - SF

Opportunities in Industry
S Galloway, Merck Research Laboratories

Opportunities in Government
M Waters, USEPA

_________________________________________________________

COUNCIL MEETING
Saturday, May 7
6:00 PM - 10:00 PM
Portland Room

_________________________________________________________
WORKSHOP II
Sunday, May 8
8:00 AM — 11:45 AM
Salons A - D

UPDATE ON MUTATION ASSAYS
IN TRANSGENIC MICE

Presiding:
Nancy Gorelick, Procter & Gamble Co.
Barry Glickman, University of Victoria

Sponsor:
American Industrial Health Council

The study of mutagenesis in vivo has entered a new era since the development of transgenic mice that carry bacterial genes as mutational targets. This workshop will describe some of the ways in vivo mutagenicity investigations are changing. For example, the possibility of routine assessment of potential mutagenicity in vivo in virtually any tissue opens new doors in genotoxicity testing. Progress has been made in identifying appropriate study designs and methods for analysis of data. A database of lacI mutations is under development for the comparison of in vivo mutational spectra. This workshop will also provide an up to the minute review of progress in the application and evaluation of the mutation assays in transgenic mice.

8:00 Introduction

8:05 Overview of Mutation Assays in Transgenic Mice for Routine Testing
N Gorelick, Procter & Gamble Co.

8:25 Sources of Variability in Mutation Assays in Transgenic Mice: Implications for Study Design
W Piegorsch, University of South Carolina

9:15 Assembling and Assessing Sequence Data for lacI Mutations in Big Blue™
B Glickman, University of Victoria
WORKSHOP II
Sunday, May 8
8:00 AM — 11:45 AM
Salons A - D

9:45  Coffee Break,  Ballroom Foyer

10:15  Short Presentations on New Experimental Information

11:00  Application of lacZ Plasmid-Based Transgenic Mice in Mutagenicity Studies
        J Gossen, Beth Israel Hospital
WORKSHOP III  
Sunday, May 8  
8:00 AM — 11:45 AM

Salon E

**In Vivo Cytogenetics**

Presiding:  
Marilyn Aardema  
Procter & Gamble Co.

Sponsor:  
*American Industrial Health Council*

The *in vivo* cytogenetics assay plays a key role in many genotoxicity/carcinogenicity safety assessments. However, there is still debate about the appropriate way to conduct the assay. In this workshop, current topics related to the conduct and interpretation of data from *in vivo* cytogenetic assays will be discussed along with novel uses for the assay. Topics will include whether an analysis of micronuclei is equivalent to an analysis of chromosome aberrations, how the maximum tolerated dose is selected and what data are sufficient to show bone marrow exposure. We will also discuss how an assessment of cytogenetic endpoints can be included in other standard toxicity tests, other tissues and the use of FISH probes.

8:00  Introduction

8:15  Do *In Vivo* Micronucleus and Aberration Results Agree?  
M D Shelby, NIEHS

8:45  Appropriate Methods for Dose  
J Mackay, ZENECA

9:15  Combination of Cytogenetic Analyses with Other Tests  
J MacGregor, SRI International

9:45  Coffee Break, Ballroom Foyer

10:15  Tissues Other Than Bone Marrow That Can Be Used for Cytogenetic Analysis  
F Angelosanto, Mobil Oil Co

10:45  Discussion and Presentations from the Floor
EXHIBITOR'S WORKSHOP
Sunday, May 8
11:45 AM - 1:00 PM

Salon G

STRATAGENE

NEW DEVELOPMENTS IN TRANSGENIC MUTAGENESIS ASSAYS
Mutagenesis and risk assessment in the germ cell line are fundamentally different from that in somatic cells. Risk of germ line exposure is expressed in succeeding generations, metabolism of mutagens differs among different organs with substantial differences between testes and other organs, and repair ranges from none in spermatozoa to competence for many repair mechanisms in premeiotic and some postmeiotic cell stages. Because of the diversity among germ cell stages, molecular dosimetry is required for a better understanding of germ cell risk. The presentations in this workshop will provide an excellent perspective on new approaches to resolving complex issues relative to mutagenesis and risk assessment in germ line cells.

1:00  Status of Germ Line Mutagenesis
W R Lee, Louisiana State University

1:45  Molecular Dosimetry of Germ Line Adducts
K Turteltaub, Lawrence Livermore National Lab

2:15  Comparison of Germ Cell Development Among Drosophila, Mice and Humans
J Drost, Louisiana State University

3:00  Coffee Break, Ballroom Foyer
3:30  Comparison of Molecular Mutational Spectra for Heritable and Somatic Mutations at Three Loci: $hprt$, $p53$ and $rb$
R Albertini, University of Vermont

4:15  Complexity of Studying Germ Line Mutations in Humans
H Mohrenweiser, Lawrence Livermore National Lab
USE OF CELL TRANSFORMATION SYSTEMS TO ANALYZE HUMAN AND ANIMAL CELL CARCINOGENESIS

Presiding:
J. Justin McCormick
Michigan State University

Sponsor:
The Procter & Gamble Co

Mammalian cells are transformed into tumorigenic cells by a multistep process that involves alterations in key transforming genes. Recent advances in this field have made it possible to use cells in culture, including human cells, to dissect the number and nature of organic changes involved and to analyse the mechanisms by which cells acquire in a stepwise fashion various properties of transformed cells. Data indicate that proto-oncogenes and suppressor genes are the cellular targets for carcinogen attack in the cell transformation process. Evidence from four model systems will be presented to support this hypothesis, along with information on how such systems can be used to identify carcinogens.

1:00  Cell Transformation in Syrian Hamster Embryo Cells: A Useful Method for Assessing the Carcinogenic Potential of Chemicals
R LeBoeuf, Procter & Gamble Co

1:45  Neoplastic Transformation of Human Fibroblasts: A Multistep Process with Individual Steps that Can Be Quantitated
J J McCormick, Michigan State University
WORKSHOP V
Sunday, May 8
1:00 PM - 5:00PM
Salon E

2:15 Molecular Mechanisms Involved in the Multistep Process of Skin Carcinogenesis: HaCaT, an In Vitro Model
P Boukamp, German Cancer Research Center

3:00 Coffee Break, Ballroom Foyer

3:30 HPV16 E6, but not E7, Confers a Chromosome Mutator Phenotype on Human Epithelial Cells
C Reznikoff, University of Wisconsin-Madison

4:15 General Discussion
Sunday, May 8
EMS AWARDS
6:00 PM
Salons E & F

SPECIAL LECTURE I
7:00 PM—8:00 PM
Salons E & F
Mutations and Cancer

Lawrence A. Loeb
University of Washington-Seattle

Presiding:
Philip C. Hanawalt
Stanford University

Sponsor:
The Upjohn Co.

RECEPTION
8:00 PM
Exhibit Hall

Sponsored by:
Hazleton Washington, Inc.
Microbiological Associates, Inc.
Genetic and Mammalian Toxicology
Product Safety Assessment

Microbiological Associates provides fast, cost-effective insights into a product's toxicity and mechanism of action. We offer testing for pesticides, chemicals, petroleum products, medical devices, pharmaceuticals/biopharmaceuticals, cosmetics and personal care products. Our testing programs include:

- Bacterial Mutation Assays
- Mammalian Cell Gene Mutation Assays
  - Mouse Lymphoma Assay
  - CHO/HGPRT Gene Mutation Assay
- \textit{In Vivo} Mammalian Mutation Assays in Transgenic Mice
- \textit{In Vitro} Cytogenetics
- \textit{In Vivo} Cytogenetics
  - Metaphase Analysis
  - Micronucleus Test
- Dominant Lethal Assay in Rodents
- Unscheduled DNA Synthesis
- DNA Damage to Germ Cells
- Sister Chromatid Exchanges \textit{In Vitro} and \textit{In Vivo}
- \textit{In Vitro} Mammalian Cell Transformation Assays
- Cell Proliferation Assays
- Microbial Pesticide Assessment
- Mammalian S-9 Microsome Preparations

Our scientific strengths, pursuit of the latest technology, GLP compliance, and regulatory knowledge, provide our clients the surest path to product approval worldwide.

\textbf{Microbiological Associates, Inc.}

Booth 20
SYMPOSIUM I
Monday, May 9
8:15 AM - 11:30 AM

Salons E & F

MOLECULAR GENETIC TOXICOLOGY

Presiding:
David DeMarini
USEPA

Sponsor:
Bristol-Myers Squibb Co

This symposium will present the molecular basics for the gene-mutation assays used most commonly for genetic toxicology screening. The speakers will describe the types of mutations that can be recovered by the standard tester strains of Salmonella and by the most commonly used cell lines/loci of mammalian cells. Presentations will also consider the similarity of the classes of mutations recovered by these assays to those observed in rodent and human tumors and in various human disease genes. The symposium will reveal that colonies aren't just for counting anymore!

8:15  Symposium Overview
      David DeMarini, USEPA

8:30  Mutational Events at Salmonella typhimurium Base-Substitution Alleles as Predictors of Eukaryotic Mutational Specificity
      W Koch, Food and Drug Administration

9:00  Molecular Analysis of Mutations Detected at the Frameshift Allele hisD3052 of Salmonella typhimurium
      D DeMarini, USEPA

9:30  Coffee Break, Exhibit Hall

10:00 Molecular Analysis of Mutations Detected at the gpt Locus in AS52 Cells
      K Tindall, NIEHS

10:30 Molecular Analysis of the Mutations Detected at the tk Locus of L5178Y Mouse Lymphoma Cells
      M Moore, USEPA

11:00 Comparative Analysis of Mutational Mechanisms at the tk, hprt, and aprt Loci in Human Lymphoblastoid Cell Lines
      A Grosovsky, University of California- Riverside
Monday, May 9
11:30 AM - 1:00 PM

EXIBITORS WORKSHOP

Eugene Room

INGENY B V
LEIDEN, THE NETHERLANDS

USE OF \textit{lacZ} TRANSGENIC MICE
FOR \textit{in vivo} MUTATION ANALYSIS
I. BIOLOGICAL RESPONSE
TO MUTAGEN CHALLENGE/
DNA REPAIR
Salons A & B
Conveners: Wai Nang Choy
David Jacobson-Kram
Sponsor: Allied Signal, Inc.

1:00
INTRODUCTION

1:05
Comparison of Genotoxicity Assays and Microcell Electrophoresis with Single Cells for the Detection of DNA Damage

D K Monteith, J Vanstone (Introd. by V Ciaravino); Parke Davis Pharmaceutical Research, Division of Warner Lambert Co, Ann Arbor, MI

1:20
A Pharmacokinetic Study of Ethanol Inhibition of Micronuclei Induction by Urethane in Mouse Bone Marrow Erythrocytes

W N Choy, W Black, G Mandakas, E J Mirro, H E Black; Schering-Plough Research Institute, Lafayette, NJ, St Lawrence Univ., Canton, NY

1:35
Interindividual Variation in Urine Mutagenicity of Cigarette Smokers Caused by Genetic Factors


II. CYTOGENETICS
Salons C & D
Conveners: Gopala Krishna
Joginder Nath
Sponsor: Glaxo, Inc.

1:00
INTRODUCTION

1:05
Analysis of Restriction Enzyme Induced Chromosomal Aberrations in the Interstitial Telomeric Repeat Sequences of Chinese Hamster Ovary (CHO) Cells by FISH

A S Balajee, H J Oh, A T Natarajan, State University of Leiden, The Netherlands

1:20
Estimation of Radiation Induced Chromosome Aberrations in Mouse Splenocytes by FISH Technique Using Chromosome Specific DNA Libraries and Telomere Specific DNA Probes

J Boei, A S Balajee, A T Natarajan, State University of Leiden, The Netherlands

1:35
The Development of Dual Color and Multiple Painting Probes for the Mouse and Rat

J W Breneman, R R Swiger, M J Ramsey, J L Minkler, G G Eveleth, R Langlois, A L Brooks, J D Tucker; Lawrence Livermore National Lab, Batelle NW, Richland, WA
III. MOLECULAR MECHANISMS

Salon E
Conveners: Ursula Hennig
Toby Rossman
Sponsor: Glaxo, Inc.

1:00 INTRODUCTION

1:05 A Role for Zinc in Spontaneous Mutagenesis
E I Goncharova, T G Rossman; NYU Medical Center, NY, NY

1:20 Late-Arising Spontaneous Revertants Are Allele Specific
R C von Borstel, Q Wang, U G Hennig, R G Ritzel, C M Steinberg; Univ. of Alberta, Edmonton, Canada, Basel Inst. for Immunology, Basel, Switzerland

1:35 ICR-170 Induces an Exceptionally High Frequency of Multiple-Locus Mutations with Closely Linked Sites of Recessive Lethal Damage in the ad-3 Region of Neurospora crassa
F J de Serres, H V Malling; RTI and NIEHS, Research Triangle Park, NC

IV. GERM CELL DAMAGE/HUMAN STUDIES

Salon F
Conveners: Jack Bishop
Alec Morley
Sponsor: Environmental Health Research & Testing Inc.

1:00 INTRODUCTION

1:05 Mutation Spectra Dependence on Lesion Spectra and the Structure and Function of Protein Encoded by the Adh Mutant Alleles of Drosophila melanogaster
N G Fossett, S Chenevert, S Chang, W R Lee; Louisiana State Univ., Baton Rouge, LA

1:20 Effects of Retinoic Acid upon Pregastrulation Mouse Embryos
J B Bishop, W M Generoso, J E Polifka, J C Rutledge; NIEHS, RTP, NC, Oak Ridge National Lab, Oak Ridge, TN, Univ of Washington School of Medicine and Childrens Hospital and Univ. of Washington, Seattle, WA

1:35 Treatment of Mouse Zygotic or Pregastrulation Stages to 5-Azacytidine Produced Embryonic Death and Fetal Anomalies
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<th>Session Title</th>
<th>Presenters</th>
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<tr>
<td>1:50</td>
<td><strong>I. BIOLOGICAL RESPONSE TO MUTAGEN CHALLENGE/DNA REPAIR</strong></td>
<td>P Morales-Ramírez, T Vallarino-Kelly, R Rodríguez-Reyes; Instituto Nacional de Investigaciones Nucleares, Mexico</td>
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<td>2:05</td>
<td><strong>II. CYTOGENETICS</strong></td>
<td>E V Nutley, X R Lowe, M E van Beek, M Ma, A Tcheong, J Bishop, A J Wyrobek; San Jose State Univ, CA, Lawrence Livermore Natl Lab, CA, Univ. CA, Davis, NIEHS, RTP, NC</td>
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<td>2:35</td>
<td><strong>Selective Detection of Deoxyadenosine-4-Animobiphenyl Adduct in DNA Following Nuclease P1 Enrichment and ^32^P-Post Labelling Analysis</strong></td>
<td>J F Hatcher, S Swaminathan, Univ. of Wisc., Madison, WI</td>
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III. MOLECULAR MECHANISMS

Salon E

1:50
The Effect of IPTG Induction of the Lac Operon on the Mutational Specificity of Adriamycin in E. Coli

M L Veigl, L Akst, J Rakow, C E Sedwick, R D Anderson, W D Sedwick; Case Western Reserve Univ, Ireland Cancer Center of Univ Hosps and Vet Adm Hosp, Cleveland, OH

2:05
Site Specific Mutagenic and Synergistic Effects of the Tumor Promotor Phenobarbital in Salmonella typhimurium TA 100

S Knasmüller, E Zöhrer, R Schulte Hermann; Univ of Vienna, Austria

2:20
Quantitative Enriched PCR (DEPCR) — A Sensitive Screening Method for Early Detection of Specific Point Mutations

S Gradia, Z Ronai (Intro by G Williams); American Health Foundation, Valhalla, NY

2:35
DNA Sequence Effects on the Formation of Deoxyadenosine Adducts by (+)-BcPhDE-1

A M Cheh, H Yagi, D M Jerina; American Univ, Washington, DC, NIDDK, NIH, Bethesda, MD

IV. GERM CELL DAMAGE/HUMAN STUDIES

Salon F

1:50
Identification of Genes Essential for Normal Mammalian Development: Their Induction in a Saturation Mutagenesis Scheme and Effects of One of these Mutations on Embryonic Development in the Mouse

S Lewis, C Connelly, W Dove, A Shedlovsky, RTI, RTP, NC, Univ Wisc Medical School, Madison, WI

2:05
Expression of Human Protamine P1 in Sperm of Transgenic Mice

A J Wyrobek, C Keith, G Anderson, J Stilwell, X Lowe; Lawrence Livermore National Lab, CA, University of California, Davis, CA

2:20
Induction of Aneuploidy in the Sperm of Hodgkin’s Disease Patients Treated with NOVP Chemotherapy (Detection by Multi-Chromosome Fluorescence in situ Hybridization)

W A Robbins, M J Cassel, D H Blakey, M L Meistrich, A J Wyrobek; Lawrence Livermore National Lab, CA, Health Canada, Ottawa, Univ of Texas M D Anderson Cancer Ctr, Houston, TX

2:35
Mutagenic Effects of Mitomycin and Bleomycin on Human Lymphocytes

R Zotti, A A Morley; Flinders Medical Center, Bedford Park, Australia
CONTRIBUTED PAPERS I & II
Monday, May 9, 1:00PM–5:15PM

I. BIOLOGICAL RESPONSE TO MUTAGEN CHALLENGE/DNA REPAIR
Salons A & B

2:50 COFFEE BREAK
Exhibit Hall

3:20
Targeted Recombination at the Endogenous Adenine Phosphoribosyltransferase Locus in DNA Repair-Proficient and Deficient Chinese Hamster (CHO) Cells

G M Adair, D G Smith, A Salim, S Mason, M Zabelshansky, K A Crow; Univ. of Texas, M D Anderson Cancer Center, Smithville, TX

3:35
Repair of Bulky DNA Adducts via Base Excision Repair

W B Mattes, T R O’Connor; CIBA Agricultural Division, Farmington, CT, Institute Gustave-Roussy, France, City of Hope, Beckman Research Institute, Duarte, CA

3:50
The Human ERCC4 DNA Repair Gene is Homologous to RAD1

K W Brookman, L H Thompson, J E Lamerdin, A V Carrano; Lawrence Livermore National Lab, Livermore, CA

4:05
Cloning of the Multifunctional Rat Apurinic/Apyrimidinic Endonuclease (rAPEN)/Redox Factor from a T Cell Line

T M Wilson, J P Carney, S Rivkees, W A Deutsch, M R Kelley; Indiana Univ. School of Med., IN, Loyola Univ. Med. School, IL, Louisiana State Univ, LA

II. CYTOGENETICS
Salons C & D

2:50 COFFEE BREAK
Exhibit Hall

3:20
Delayed Chromosomal Instability Induced by DNA Damage

W F Morgan, B A Marder, J P Day; University of California, San Francisco, CA

3:35
Scoring Micronuclei in Multiple Blood Samples by Flow Cytometry

A M Tometsko, D K Torous, S D Dertinger; Litron Laboratories, Rochester, NY

3:50
Silica-Induced Micronuclei in Chinese Hamster V79 and Human Lung Hel 299 Cells

R Nagalakshmi, J Nath, T Ong, W-Z Whong; West Virginia University, Morgantown, WV, NIOSH, Morgantown, WV

4:05
Concurrent Micronucleus (MN) and Structural Chromosome Aberration (SCA) Assessment in the Rat: Studies with Chlorambucil and Acrylamide

G Krishna, G Urda, F Moore, J Theiss; Warner Lambert Co, Ann Arbor, MI
### III. MOLECULAR MECHANISMS

**Salon E**

#### 2:50 COFFEE BREAK
Exhibit Hall

#### 3:20
The Effect of T-Lymphocyte "Clonality" on the Calculated hpert Mutation Frequency Occurring In Vivo in Humans

J P O'Neill, J A Nicklas, T C Hunter, O B Batson, M Allegretta, M T Falta, R F Branda, R J Albertini; University of Vermont, Burlington, VT

#### 3:35
Pulsed Field Analysis of Human hpert Large Deletion Mutants

M J Lippert, J A Nicklas, R J Albertini; University of Vermont, Burlington, VT

#### 3:50
The Influence of Sequence Context on Ultraviolet Mutational Hotspots

M M Seidman, D D Levy, C N Parris; Otsuka, Rockville, MD, NCI, Bethesda, MD

#### 4:05
The Effect of UVC, UVB, UVA and a Solar Stimulator on the Survival of Mouse Melanoma Cell Lines Differing in Melanin Content

H Z Hill, G J Hill, K Cieszka, M Azure, New Jersey Med. School, Newark, NJ

### IV. GERM CELL DAMAGE/ HUMAN STUDIES

**Salon F**

#### 2:50 COFFEE BREAK
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#### 3:20
Development of Methods for Characterizing Fetal and Adult Somatic Mutations Detected in Human Erythroid Precursor Cells

R G Langlois, D K Manchester; Lawrence Livermore National Laboratory, CA, The Children's Hospital, Denver, CO

#### 3:35
Biomarkers of Genetic Damage in Humans Exposed to Benzene


#### 3:50
Mitotic Index and Lymphocyte Proliferation Kinetics Used as Additional Biomarkers in Human Biomonitoring

P Ostrosky-Wegman, R Montero, M E Gonsebatt, E Rojas, L A Herrera, G Elizondo, L Vega, A M Salazar; UNAM, México

#### 4:05
The Effect of Various Antioxidants and Other Modifying Agents on Oxygen Radical Generated DNA Damage in Human Lymphocytes in the COMET Assay

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**Urinary Excretion Kinetics and DNA Damage in Normal and Choline Deficient Male B6C3F1 Mice Treated Once by Oral Gavage with Sodium Arsenite**

J W Yager, M T Schmitt, P W Andrews, R R Tice, E Crecelius, Electric Power Research Institute (EPRI), Palo Alto, CA, Integrated Laboratory Systems, RTP, NC, Batelle Marine Sciences Laboratory, Sequim, WA

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C Keshava, T Ong, J Nath; West Virginia University, Morgantown, WV, National Institute for Occupational Safety and Health, Morgantown, WV

### 4:35

**$O^6$-Alkylguanine-DNA Alkyltransferase: Inhibition of Methylation Induced Chromosome Aberrations and of Lesion Persistence into Later Cell Cycles**

C L Bean, C I Bradt, S K Greenwood, R B Hill, T E Johnson, M V Stallworth, S M Galloway; Merck Research Labs, West Point, PA

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**Inhibition of 7,12-Dimethylbenz(a)anthracene (DMBA)-Induced Sister Chromatid Exchanges (SCE) by Soya Isoflavone Genistein but not Daidzein in Female ICR Mice**

A K Giri, L-J W Lu, (intro M A Sognier); The University of Texas Medical Branch, Galveston, TX
III. MOLECULAR MECHANISMS

Salon E

4:20
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A A Oroskar, B A Sedita, J L Schwartz; Argonne National Laboratory, IL, The University of Chicago, IL

4:35
Chronic Treatment with "Non-Genotoxic" Carcinogens Leads to Induction of Non-Reciprocal Recombination in Yeast

R Fahrig; Fraunhofer-Institut für Toxikologie und Aerosolforschung, Hannover, Germany

4:50
Chrysotile Asbestos Fibers Can Induce Lac I Mutations in Rat2α Cells by a Novel Mechanism Involving Homologous Recombination

T M Fasy, K Lezon, H Uehara, J H Goldbold, C M Jaime, A Hope, Z M Dzmitry, S A Kheir, E F Savransky, E M Johnson; Mount Sinai School of Medicine, NY, NY

IV. GERM CELL DAMAGE/ HUMAN STUDIES

Salon F

4:20
Characterization of hprt Mutants in T-Cells from 5 Cosmonauts Prevoiusly Flown in Space

M Khaidakov, H Erfle, B W Glickman; Centre for Environmental Health, Department of Biology, University of Victoria, BC, Canada

4:35
Human Lung Morphometry and Radon Risk Estimation

C R Geard, D J Brenner; Center for Radiological Research, Columbia University, NY, NY

4:50
Derivation of Potency Factors for Carcinogenic Initiation by Propylene Oxide

B Molholt; ERM, Inc., Exton, PA
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J Singh, E T Snow; NYU Medical Center, Tuxedo, NY

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E T Snow, L-S Xu, P L Kinney; NYU Medical Center, Tuxedo, NY

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S Liu, K Dixon; University of Cincinnati, Cincinnati, OH

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K-M Li, R Todorovic, E G Rogan, E L Cavalieri; Univ. of Nebraska Medical Center, Omaha, NE

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B D Thrall, D L Springer, MA Kennedy; Pacific Northwest Laboratory, Richland, WA

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Salons E & F  

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One of the basic tenets of biology is that mutations occur at random (without regard to phenotypic outcome) and that the environmental conditions merely select for those chance events that are beneficial to the organism. This scientific "fact" is based on the seemingly secure underpinnings of the classic experiments of Luria and Delbrück (fluctuation analysis), Newcombe (redistribution), the Lederbergs (replica plating) and Cavalli-Sforza and Lederberg (sib-selection). Yet, as John Cairnes and colleagues have pointed out [J Cairnes, J Overbaugh, S Miller. The origin of mutants. Nature 335:142-145, 1988], an experimental "glitch" (lethal selection) may have prejudiced these time-honored conclusions. Can bacteria (and perhaps other organisms), if given a "fair shake"(non-lethal selection conditions), actually opt for "favourable" rather than either "unfavourable" or neutral mutations, as John Cairnes and colleagues propose? If so, then a "sacred cow" of science is about to collapse. Will it stand, crumble, or crumble? Find out when you join us for a lively discussion on: Are mutations random or adaptive?

8:00  Introductory Remarks  
T Cebula, Food and Drug Administration  

8:05  Antecedents and Adaptive Mutations  
J Cairnes, Radcliffe Infirmary, UK  

8:40  Adaptive Mutation in E. coli  
P Foster, Boston University School of Medicine  

9:10  Effects of Prolonged Starvation on Mutation Spectra  
M Prival, Food and Drug Administration  

9:30  Coffee Break, Exhibit Hall  

10:15  Could Duplications Explain Selection-Induced Mutations?  
J Roth, University of Utah  

10:50  Summary and Comments  
F Stahl, University of Oregon
NOTES
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Tuesday, May 10

EMS Business Meeting
11:30 AM—1:00 PM

Salons E & F

ALL EMS MEMBERS ARE INVITED AND ENCOURAGED TO ATTEND

SPECIAL LECTURE II
2:00 PM—3:00 PM

Salons E & F

POLYMERASE CHAIN REACTION STRATEGIES

Norman Arnheim
University of Southern California

Presiding:
Paul Lohman
Leiden University

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A. CYTOGENETICS

1 Arsenic as an Aneuploidogen in Human Cultured Lymphocytes
L Vega, M E Gonsebatt, P Ostrosky-Wegman; UNAM, Mexico

2 Induction of Sperm Abnormalities and Alterations in Reproductive Patterns of Male Mice by Exposure to Vanadium Pentoxide
M Altamirano-Lozano, F Basurto, E Roldán-Reyes; UNAM, México

3 Quantitative Localization of Chromatid Breaks Induced by Alu I in the Long Arms of Chromosomes Number 1 of Chinese Hamster Ovary (CHO) Cells by Microphotometric Scanning

4 Failure of N-Acetylcysteine to Protect the Mouse Bone Marrow Against the Clastogenicity of 7, 12-Dimethylbenzanthracene
C E Doyle, J M Mackay, J Ashby; Zeneca Cent. Toxicology Lab., England

5 Influence of Organomercurials on the Induction of Chromosome Alterations in CHO Cells
T S Kochhar, A Wilson, A Anderson; Kentucky St. Univ., Frankfort, KY

6 Preliminary Evaluation of an Automated Metaphase Finder
A F McFee, L G Littlefield; Oak Ridge Inst. for Science and Education, Oak Ridge, TN

7 Ethylation Induced Chromosome Aberrations and Lesion Persistence in Repair Deficient CHO Cells
M J Armstrong, S M Galloway; Merck Research Labs, West Point, PA

8 Variations Between Laboratories in the Classification of Chromosome Aberrations
N Danford; Microptic, Ltd, Swansea, UK
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**Environmental Mutagen Society**

RENEWAL/APPLICATION FORM

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A New Nomenclature for Structural Aberrations Detected by Chromosome Painting

The Accumulation of Stable Cytogenetic Rearrangements with Age Determined by Chromosome Painting
M J Ramsey, D A Lee, J R Senft, J F Briner, D H Moore II, J D Tucker; Lawrence Livermore National Laboratoty, Livermore, CA

Analysis of Radiation-Induced and Naturally Occurring Breakpoint Locations in Painted Human Chromosomes
J D Tucker, J R Senft; Lawrence Livermore Nat. Lab., Livermore, CA

Detection of Chromosome Aberrations in the Rat by Fluorescence in situ Hybridization
J M de Stoppelaar, J Essers, G R Mohn, B Hoebee; National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands

Evaluation of Benomyl for Structural and Numerical Chromosome Aberrations in BDF1 Mouse Bone Marrow
A M Sarrif, K S Bentley, L-J Fu, R M O'Neil, V L Reynolds, R G Stahl; E I du Pont de Nemours and Co., Newark, DE

Phenolphthalein: Induction of Micronucleated Erythrocytes in Mice
K L Witt, M D Shelby, D K Gulati, P Kaur; Oak Ridge Inst. for Science and Education, Oak Ridge, TN, NIEHS, RTP, NC, EHRT, Lexington, KY

Combined Approach of Flow Cytometry, Flow Sorting and Fluorescence in situ Hybridization (FISH) to Study Micronuclei
B M Miller, M Nüsse, (Intro by E Gocke); Pharma Research, Hoffmann-LaRoche, Basel Switzerland, GSF-Institut für Biophysikalische Strahlenforschung, Oberschleissheim, Germany

In situ Monitoring of Animal Micronuclei Before the Operation of Daya Bay Nuclear Power Station
Y N Cai, H Y He, L M Qian, G C Sun, J Y Zhao; S. China Sea Inst. of Oceanology, Guangzhou Teachers College, Guangzhou College of Education, Guangzhou, PR China
17 Role of Adrenal Gland Secretions in the Genotoxicity of Morphine
S G Sawant, D B Couch; Univ. of Mississippi Med. Center, Jackson, MS

18 Concurrent Induction of Micronuclei and Gene Mutations in Rat
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M A Khan, R F Jostes, F T Cross, A L Brooks; Pacific Northwest
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19 Immunofluorescent Detection of Kinetochores in V79 Chinese Ham-
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G Krishna, G Urda, D A Brott, N D Lalwani; Parke-Davis Pharmaceutical
Research, Division of Warner-Lambert, Co., Ann Arbor, MI

20 An In Vivo/In Vitro Model for the Assessment of Cytotoxicity and
Micronucleus Induction in Rat Bone Marrow and Spleen
F R Moore, G Urda, G Krishna, J D Theiss; Parke-Davis Pharmaceutical
Research, Division of Warner-Lambert, Co., Ann Arbor, MI

21 Comparative Studies on the Induction of Micronuclei in Bone Mar-
row Polychromatic Erythrocytes Between Wistar HsdCpbi WU and
Sprague Dawley Rats after Oral Administration of Cyclophospha-
mide, 5-Fluorouracil and Ethyl Methanesulfonate
P Kwanyuen, R D Guest, K A Walch, J A Campbell, J S Allen; Glaxo
Research Institute, RTP, NC

22 Induction of Micronuclei in Mouse Keratinocytes by Polycyclic Aro-
matic Hydrocarbons and N-Heterocyclic Aromatics
S P Krishnan, D Warshawsky; University of Cincinnati, Cincinnati, OH

23 Genotoxicity Assessment of Crude and Refined Red Palm Oil
S V Oliveira, D M Salvadori, A C Rios, M C Sales, L R Ribeiro; Lab.
Genética Toxicológica, EMV-UFBA, Salvador-BA-Brazil

24 Antimutagenic Property of a Chinese Herb Polygonum multiflorum
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H Zhang, T-H Ma, B-S Jeong, C-D Won; Shandong Academy of Medical
Sciences, Shandong, PRC, Western Illinois University, Macomb, IL

25 Clastogenicity of Two Water Chlorination Byproducts in the Trades-
cantia Micronucleus Assay
C Helma, S Knasmüller, R Schulte-Hermann, T-H Ma; Univ. Vienna,
Austria, Western Illinois University, Macomb, IL
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26 Modified Nick Translation Assay for Detection of 8-Hydroxy-Deoxyguanine Formation in DNA
S Czene, M Harms-Ringdahl (Intro by A T Natarajan); Cancer Research Inst., Bratislava, Slovakia, Stockholm Univ., Stockholm, Sweden

27 Development of Mammalian Cell Lines Stably Expressing Mouse Prostaglandin Synthase 1 and 2
P C Chulada, V D Winn, D A Young, H F Tiano, K R Tindall, C D Loftin, T E Eling, R Langenbach; N C State Univ., Raleigh, N C, Univ. of Rochester School of Medicine and Dentistry, Rochester, NY, NIEHS, RTP, NC, U N C, Chapel Hill, N C

28 Detection of Aneuploidy-Inducing Carcinogens in the Syrian Hamster Embryo (SHE) Cell Transformation Assay

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D L Wyborski, S Malkhosyan, J Moores, J M Short; Stratagene, La Jolla, CA

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A-H Ma, R D Anderson, M L Veigl, W D Sedwick; Case Western Reserve Univ., Cleveland, OH, Veterans Adm. Med. Cntr., Cleveland, OH

31 Epigenetic Control of gpt Expression in G12 Cells
C B Klein, New York Univ. Medical Center, Tuxedo, NY

32 Chemical Carcinogenicity May Be Predicted by Induced Histone Modification

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D K Monteith, (Intro by J C Theiss); Parke-Davis Pharmaceutical Research, Div. Warner-Lambert Co., Ann Arbor, MI

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C J Rudd, SRI International, Menlo Park, CA

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V O Wagner III, J E Sly, M L Klug, T L Staton, M K Wyman, S Xiao, R H C San; Microbiological Associates, Rockville, MD

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V S Houk, L D Claxton; US EPA, Research Triangle Park, NC

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M S Diehl, H J Morse, F L Fort; Abbott Laboratories, Abbott Park, IL

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K S Bentley; E I duPont de Nemours and Co., Newark, DE

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J S Vergnes, I M Pritts; Union Carbide Corp., Export, PA

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R C Murthy, S Benion, D Hileman; Central State Univ., Wilberforce, OH

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Reduced Genotoxicity of BMS-182248 (Chimeric BR96-Doxorubicin Conjugate) Compared to Free Doxorubicin in the Rat Micronucleus Assay
S M Getman, R J DuFrain, S A Thelen, T J Davidson; Bristol-Myers Squibb Co., Syracuse, NY

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P W Andrews, R R Tice, M T Schmitt, JW Yager; Integrated Laboratory Systems, RTP, NC, Electric Power Research Institute (EPRI), Palo Alto, CA
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**Tuesday, 3:00PM–5:30PM**

Exhibit Hall

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**DNA Damage in Normal and Choline Deficient Male B6C3F1 Mice Treated on Four Consecutive Days by Oral Gavage with Sodium Arsenite**
R R Tice, M T Schmitt, P W Andrews, J W Yager; Integrated Laboratory Systems, RTP, NC, EPRI, Palo Alto, CA

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J G Burkhart, R N Winn, R Van Beneden, H V Malling; NIEHS, RTP, NC, University of Maine, Portland, ME

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S C Sisk, R J Preston, L Recio, CIIT, RTP, NC

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L Recio, K Meyer, L Pluta, J Bond, S C Sisk, CIIT, RTP, NC

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D A Ardourel, P L Kretz, M A Alting-Mees, J M Short; Stratagene, LaJolla, CA

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X B Zhang, K S Tao, C Urlando, J A Heddle; York Univ., Ontario, Canada

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G S Provost, B J Rogers, M J Dycaico, J C Mirsalis, J M Short; Stratagene, LaJolla, CA, SRI International, Menlo Park, CA

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G R Douglas, J D Gingerich, L Soper, J-L Jiao, J Gossen; Health Canada, Ottawa, Medscand Ingery, Leiden, The Netherlands, Harvard Medical School, Boston, MA

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J A Monforte, R A Winegar, C J Rudd; SRI International, Menlo Park, CA

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Spontaneous Mutant Frequency in Germinal Cell DNA From Lambda/lacI Big Blue™ Transgenic Mice  
R R Young, G S Provost, J M Short, D L Putman; Microbiological Associates, Inc., Rockville, MD, Stratagene, LaJolla, CA

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Tissue Specificity of Mutation in Ethynitrosourea (ENU)-Treated Big Blue™ Mice  
J A O'Kelly, R R Young, D L Putman, D P Gibson, M J Aardema, N J Gorelick; The Procter & Gamble Co., Cincinnati, OH, Microbiological Associates, Inc., Rockville, MD

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Frequency and Spectrum of Ethynitrosourea Induced Mutation at the hppt and lacI Loci in Splenic T-Cells of Exposed Big Blue™ Mice  
V E Walker, N J Gorelick, J A O'Kelly, T R Craft, J deBoer, B W Glickman, T R Skopek; Univ. of North Carolina, Chapel Hill, NC, Procter & Gamble Co., Cincinnati, OH, Univ. of Victoria, Victoria, BC
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Symposium III

Wednesday, May 11
8:00 AM - 11:30 AM
Salons E & F

Varied Human Response to Mutagen Challenge

The Alexander Hollaender Symposium

Presiding:
John Ashby
ZENECA

Sponsor:
Sterling Winthrop

In addition to the list of well-documented chemical mutagens, a number of other factors are associated with increased risk for humans to mutagen challenge. These factors include individual genetic variations known to occur within populations as well as such factors as increased dietary fat, absence of dietary fiber, the presence of viruses and parasites, and such cultural or behavioural patterns as age at first marriage or at first pregnancy. Although our understanding of the mechanisms involved is far from complete, it is likely that this multiplicity of additional risk factors can be accounted for in terms of current mutational theories since increasing evidence exists that multiple mechanisms interrelate in the promotion, enhancement, and inhibition of individual human responses to mutagen challenge and provide a background that will allow us to more fully appreciate and understand the impact of multiple, seemingly unrelated actors on mutagen susceptibility and potential disease prevalence in human populations.

8:00 Introduction and Overview
John Ashby, ZENECA

8:10 Individual Variability in Response to Drugs: The Role of Metabolic Polymorphisms
D Davies, Royal Postgraduate Medical School

8:50 Genetic Variability in Human Surveillance Studies
K Hemminki, Karolinska Institute

9:30 Coffee Break, Exhibit Hall
Symposium III

Wednesday, May 11
8:00 AM - 11:30 AM
Salons E & F

10:00  Individual Variations in \textit{bcl-2} Mutations Among Smokers
G Cortopassi, University of Southern California

10:40  Individual Response of Humans to the Genomic Challenges of Some Pesticides
V Garry, University of Minnesota
SPECIAL LECTURE III
Wednesday, May 11

11:30 AM—12:30 PM

Salons E & F

DNA POLYMERASE
STRUCTURE-FUNCTION STUDIES:
IMPLICATIONS FOR MUTAGENESIS
IN HUMAN DISEASE

Thomas Kunkel
NIEHS

Presiding:
Sheila Galloway
Merck Research Laboratories

Sponsor:
Merck Research Laboratories
Wednesday, May 11

Free Afternoon

Organized Optional Trips
(Arranged by Ewe-Me and Co., Portland, Oregon)

Bus Tour—Columbia River Gorge

Paddlewheel Boat Cruise—Willamette River

6:00 PM—10:00 PM

Twenty Fifth Anniversary Celebration

Oregon Museum of Science and Industry

Coordinators:
Rosalie Elespuru
Julian Preston

Buses begin departing from hotel main entrance at 5:30 PM
Symposium IV

Thursday, May 12
8:00 AM—11:30 AM

Salons E & F

SEQUENCE SPECIFIC DNA DAMAGE

Presiding
Veronica Maher
Michigan State University

Several studies employing plasmid DNA exposed in vitro to DNA-damaging agents have failed to demonstrate good correlation between the location of the initial damage induced in the target gene of interest at the DNA sequence level and the ultimate biological outcome of mutation induction in the target cells. Part of the explanation for this may be differences in the efficiency of repair of DNA damage from particular sites in the targeted gene after it has been introduced into the cell. Until recently, studies quantifying the extent of damage (level of adduct formation) at specific locations in the sequence of DNA has been limited to DNA treated in vitro. However, new techniques are now available that allow one to determine the frequency of the initial adduct or photoproduct formation at individual sites in endogenous DNA, as well as the frequency of such damage remaining after the cell has carried out DNA repair. This symposium will concentrate on describing the methods and techniques used for such analysis. The speakers will give correlations obtained between the sites of initial damage, gene-specific and site-specific repair rates, and the ultimate biological effect (mutation spectra) of the exposure of cells to the agents.

8:00 Introductory Remarks
Veronica Maher, Michigan State University

8:05 New Approaches to Studying Damage Distribution in DNA
B Glickman, University of Victoria

8:25 Use of Reiterative Primer Extension Methodology to Map UV-Induced Photoproducts at the Nucleotide Level in the lac I gene from Genomic DNA
B Van Houten, University of Texas Medical Branch
Symposium IV

Thursday, May 12
8:00 AM—11:30 AM

Salons E & F

9:00   Excision Repair of Cyclobutane Pyrimidine Dimers at Individual Bases of E. coli Genes
       S Kunala, Yale University

9:30   Coffee Break, Ballroom Foyer

10:00  Slow Repair of Pyrimidine Dimers at p53 Mutation Hot Spots in Skin Cancer
       G P Pfeifer, City of Hope

10:35  Repair Rate Maps of Cyclopyrimidime Dimers Along the Human pgk-1 Gene
       G P Holmquist, City of Hope

11:00  Use of LM-PCR to Determine the Relationship Between Adducts and Mutations Induced by BPDE in Specific Sequences in the Human hprt Gene
       V Maher, Michigan State University
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POSTERS III

Thursday, 11:30 AM–1:30 PM
Exhibit Hall

(Boxed lunches will be available for purchase in the Exhibit Hall)

A. TESTING AND TEST STRATEGIES

1. Analysis of Gene Expression Following Low Dose \( \gamma \)-Irradiation
S J Thurston, K Groch, A Brooks, J Saffer; Pacific Northwest Laboratory, Richland, WA

2. Low Dose Radiation Induced Adaptive Response in Human T- and B-
Lymphocyte Cell Lines
J D Shadley, G Dai; Medical College of Wisconsin, Milwaukee, WI

3. Fluorescent Light Irradiation and Its Mutagenic Potential in Cultured Mammalian Cells
K Pant, A Thilagar; SITEK Research Laboratories, Rockville, MD

4. Fluorescent Light Irradiation and Its Mutagenic Potential in Microorganisms and Cultured Mammalian Cells
A Thilagar, P V Kumaroo, J Xu; SITEK Research Laboratories, Rockville, MD

5. Mutagenic Evaluation of a Highly Energetic Castable Explosive Chemical: 1,3,3-Trinitroazetidine (TNAZ)
I J Paika, G B Fitzgerald, D E Dodd, D J Caldwell; Toxikon Corp., Woburn, MA, ManTech Environmental Technology, Inc./Wright-Patterson AFB, OH, Armstrong Laboratory, WPAFB, OH

6. Genotoxicity Testing of N-Vinylformamide
R H San, C A Bigger, D L Putman, B Drozdowicz; Microbiological Associates, Inc., Rockville, MD, Air Products and Chemicals, Inc., Allentown, PA

J A Campbell, J S Allen, D G Perkins, R H San, CA Bigger, PV Kumaroo, J Xu, K L Pant; Glaxo Research Institute, RTP, NC, Microbiological Associates, SITEK Res. Lab., Rockville, MD
Development of a "Spot Test" for the Detection of Bacterial Mutagens
R H Neubauer, M A Gorko; The DuPont Merck Pharmaceutical Co., Newark, DE

Qualitative and Quantitative Performance of Short-Term Tests in the Identification of Germ Cell Mutagens and Non-Mutagens
M A Jackson, H F Stack, B A Bridges, I-D Adler, M D Waters; ILS, RTP, NC, Univ. of Sussex, UK, GSF-Institut für Saugetiergenetik, Germany, US EPA, RTP, NC

TAP Computer Program for Display of Toxicity Activity Profiles

B. METABOLISM OF XENOBIOTICS

Clastogenic and Immunostimulatory Effects of Metronidazole Treatment and Individual Susceptibility: A Possible Mechanism of Action
G Elizondo, M E Gonsebatt, A Salazar, J Herrera, E Hong, P Ostrosky-Wegman; UNAM, México, CINVESTAV, México

Parasite-Associated Cancers: Studies with the Liver Fluke Fasciola hepatica
L Frederick, M Johnson, G J Gentile, J M Gentile; Hope College, Holland, MI

Induction of Benzo(a)Pyrene Metabolism in Human Mammary Epithelial Cells by Manufactured Gas Plant Residues
R Goth-Goldstein, G Levine, S A Leadon, K Chaloupka, S Safe; Lawrence Berkeley Lab, Berkeley, CA, Univ. North Carolina, Chapel Hill, NC, Texas A & M Univ., College Station, TX

Alcohol Dehydrogenase as a C-Nitroso and Quinone Reductase: Comparison of Human ββ- and Πι-ADH with Horse Liver ADH
Z Maskos, B F Dudley, G W Winston; LA St. Univ., Baton Rouge, LA

Atrazine Potentiation of 2,6-Dinitrotoluene Bioactivation in Fischer 344 Rats
Further Studies on the Activation of 4-Nitro-O-Phenylenediamine by
Plant Systems: Mechanisms of Activation
L Wilson, T Williamson, J Gronowski, G Gentile, J M Gentile; Hope
College, Holland, MI

C. DNA DAMAGE AND REPAIR

The Effects of Herbimycin A, a Tyrosine Kinase Inhibitor, on BALB/
3T3 Cells: Absence of Transforming Activity and Reversion of Trans-
formed Morphology
C W Sheu, I Rodriguez, J K Lee; CFSAN/FDA, Washington, DC

Correction of DNA Insertion/Deletion Mispairs in Yeast
J J Miret, B O Parker, R S Lahue; Univ. of Massachusetts Medical Center,
Worcester, MA

Inducibility of Intrachromosomal Recombination by Carcinogens in
Yeast Cells Synchronized at Different Phases of the Cell Cycle
A Galli, R H Schiestl; Harvard School of Public Health, Boston, MA

Do Non-Mutagenic Carcinogens Induce Oxidative Stress in Yeast?
R J Brennan, R H Schiestl; Harvard School of Public Health, Boston, MA

The Yeast RADI8 Protein Functions in the Repair of 8-
Hydroxyguanine
T Y-K Chow, B A Kunz; Montreal General Hospital, Quebec, Canada,
University of Manitoba, Winnipeg, Manitoba, Canada

Naturally-Occurring Single Nucleotide Loops are Corrected More
Efficiently than Base Mismatches in Yeast
Y Yang, B A Kunz; University of Manitoba, Winnipeg, Manitoba, Canada

Evidence that a DNA Precursor Imbalance Causes the Normally
Error-Free Repair of EMS and MNNG-Induced Apurinic Sites to
Become Error-Prone
B A Kunz, S A McQueen, C A Scott, W Xiao; University of Manitoba,
Winnipeg, Manitoba, Canada, University of Saskatchewan, Saskatoon,
Canada
24  Role of O6-Methylguanine (O6-MeG) and Mutations Induced in the p53 Gene in the Transformation of Human Fibroblasts  
S Boley, A Zaccagnini, K Craig, V M Maher, J J McCormick, R Iggo; Michigan State Univ., East Lansing, MI, Institut Suisse de Recherches Experimentales sur le Cancer, Lausanne, Switzerland

25  Removal of Cyclobutane Pyrimidine Dimers From a UV-Irradiated Shuttle Vector Introduced into Human Cells  
A K Ganesan, P C Hanawalt; Stanford Univ., Stanford, CA

26  Transcription-Coupled DNA Repair in Extracts from Human Cells  
G Spivak, R D Wood, P C Hanawalt; Stanford Univ., Stanford, CA, Imperial Cancer Research Fund, Clare Hall Laboratories, UK

27  Repair Rate Maps of Cycropyrimidine Dimers Along the Human pgk-1 Gene  
S Gao, R Drouin, G P Holmquist, City of Hope Med. Center, Duarte, CA

28  Chromosome 11 Protects Against DNA Damage by Reactive Oxygen Species (ROS)  
L J Hofseth, M P Rosin; Simon Fraser Univ., Vancouver, BC, Canada

29  Identification of the NLS Sequence in the ERCC5/XP-G Protein  
J A Knauf, M S Park, M A MacInnes; Los Alamos National Lab, NM

30  Sub-Cellular Pharmacologic Profile of Cadmium Chloride in Human Ovarian Cancer Cells  
R J Parker, K B Lee, E Reed; National Cancer Institute, Bethesda, MD

31  Lack of Chloroform-Induced DNA Repair In Vitro and In Vivo in Hepatocytes of Female B6C3F1 Mice  
J L Larson, C S Sprankle, B E Butterworth; CIIT, RTP, NC

32  Analysis of the Repair of Anti-Benzo[a]Pyrene-7,8-Diol-9,10-Epoxide-DNA Adducts in Mammalian Cells by Laser-Induced Strand Cleavage  
C A Smith, G Spivak, J Hunt, P C Hanawalt, R J Mauthe, M A Gregory, W M Baird (Intro by A D Burrell); Stanford Univ., Stanford, CA, Purdue Univ., West Lafayette, IN
33  
**Strand Bias of UV-Induced Mutation at the Adenine Phosphoribosyltransferase Locus in DNA Repair-Proficient Versus Deficient CHO Cells**  
D G Smith, A Pao, C S Brown, M-S Tang, G M Adair; The Univ. of Texas M D Anderson Cancer Center, Smithville, TX

34  
**CXPD: Cloning and Characterization of the Chinese Hamster XPD Gene**  
J M Kirchner, E P Salazar, J E Lamerdin, A V Carrano, C A Weber; Lawrence Livermore National Laboratory, Livermore, CA

35  
**Cloning and Characterization of a DNA Repair Enzyme from Chinese Hamsters with Putative Uracil DNA Glycosylase Activity**  
H Leathers, P Arenaz; Univ. of Texas, El Paso, TX

36  
**Normal Temporal Modulation of DNA Repair Processes in an EM9 Cell Line Stably Transfected with the xrcR Gene**  
P Gonzalez, R Hewitt, P Areaz; Univ. of Texas, El Paso, TX, Univ. of Texas, Smithville, TX

37  
**Correlation Between Xenobiotic-Mediated DNA Damage and DNA Repair in a Human Hepatoma Cell Line**  
B M Hasspieler, M Alipour, F Naji-Ali, G D Haffner, K Adeli; University of Windsor, Ontario, Canada

38  
**In Vitro and In Vivo Mapping of Copper/H₂O₂ Induced Oxidative DNA Damage Along Human Genes**  
R Drouin, H Rodríguez, G P Holmquist, T O'Connor, S Boiteux, J Laval, J H Doroshow, S A Akman, City of Hope, Duarte, CA, Inst. Gustav Roussy, France

39  
**A Model for Mutation Response of Cells to Repeated Exposure to X-Radiation**  
M L Veigl, S Donover, M Howard, H H Evans, W D Sedwick; Case Western Reserve Univ., Cleveland, OH

40  
**Differential Stereoselective Binding of Antibodies to (+)- and (-)-Enantiomer Base Adducts of Anti-Benz[a]Pyrene DioI Epoxide**  
S Venkatachalam, A A Wani; The Ohio State University, Columbus, OH

41  
**Development of Analytical Scripts for the Single Cell Gel (SCG) Assay Using IPLAB**  
K M Mottus, A D Kligeraman; U of N Carolina, Chapel Hill, NC, US EPA, RTP, NC
42
A Correlation of Salmonella Mutagenicity with DNA Adducts Induced by the Cooked-Food Mutagen 2-Amino-1-Methyl-6-Phenylimidazo[4,5-b]Pyridine
M A Malfatti, N H Shen, R W Wu, K W Turteltaub, J S Felton; Lawrence Livermore National Laboratory, CA

D. COMPLEX MIXTURES / ANTIMUTAGENS

43
Mutagen Formation in Three Popular Colombian Cooked Foods: Effect of Supplemental Creatine and Corn Bran
M Zuleta, C Valencia, L Posada, C M Muñeton, O Arango, I Melendez; Universidad de Antioquia, Medellín, Colombia

44
Mutagenic and Antimutagenic Effects of Air-Borne Particulate Extracts in Salmonella typhimurium Strains
A S Sideropoulos, S M Specht; Duquesne Univ., Pittsburgh, PA

45
The Genotoxicity of Industrial Wastes and Effluents: A Review of the Literature
V S Houk; U S EPA, RTP, NC

46
Evaluation of an Ethanol Extract of Polypropylene (PP) in an In Vitro Genotoxicity Battery
F J Mastrocco, R T Przygoda, M G Bird, B C Myhr, D A Stringer; Exxon Biomedical Sciences, Millstone, NJ, Hazleton Laboratories, Vienna, VA, European Centre for Ecotoxicology and Toxicology, Brussels, Belgium

47
Mutagenicity of Drinking Water Samples Prepared Using UV-TiO₂ Technology
K Schenck Patterson, J Ireland, L Garner; U S EPA, Cincinnati, OH

48
Mitotic Alterations in Allium cepa Following Exposure to DDT-Contaminated Soil Before and After Fungal Remediation
J R Meier, S Jacobs, L Belthoff, J Torsella, M K Smith, S Saffer; U S EPA, Cincinnati, OH, Technology Applications, Inc., Cincinnati, OH, Oak Ridge Institute of Science and Education, Cincinnati, OH

49
DNA Damage Due to Vanadium Pentoxide Measured by the Comet Assay
E Rojas, M Altamirano, M Valverde, L A Herrera, P Ostrosky-Wegman; UNAM, México
50
Nicotine and Cotinine Inhibit the Mutagenicity of N-Nitrosamines Present in Tobacco Smoke
C K Lee, C Fulp, E R Bombick, D J Doolittle; R J Reynolds Tobacco Co., Winston-Salem, NC

51
Effects of Aminothiols on the Genotoxicity of Bleomycin and β-Propiolactone in Yeast

52
Prevention of Drug Resistance by Polyamines
S Pillai, D M Shankel; University of Kansas, Lawrence, KS

53
Evaluation of the FM3A Reversion Assay for the Detection of Potential Mutagens and Antimutagens
E M McGhee, D M Shankel; University of Kansas, Lawrence, KS

54
Clastogenic Effects of Cooked Food Mutagens in a Metabolically Competent Human Hepatoma Cell Line and Their Modification by Naturally Occurring Flavourings
R Sanyal, W Parzefall, R Schulte-Hermann, S Knasmüller; University of Vienna, Austria

55
A Mutagenicity Detection of TNT Using the Micronucleus Test in Vicia faba Root and Leaf Tip Cell
M Dai, R Chen, Q Wu, B Li; Hygienic Institute of Ordnance Industry, PR China, Guangxi Institute of Botany, P R China
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Sister chromatid exchange (CHO cells or human lymphocytes)

Cell transformation (BALB/c-3T3)

Photomutagenicity studies in bacteria and mammalian cells

In Vivo Assays

Mouse micronucleus

Rodent chromosomal aberrations (bone marrow cells)

Rodent SCEs (bone marrow)

Cell proliferation (BrdU labeling or PCNA)

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### V. MUTATIONAL SPECTRA

**Salons A - D**  
Conveners: Larry Thompson  
Malcolm Lippert

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>1:30</td>
<td><strong>INTRODUCTION</strong></td>
<td></td>
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<tr>
<td>1:35</td>
<td>Sequence Analysis of the <em>aprt</em> Gene in PhIp Induced CHO UV5P3 Mutants</td>
<td>R W Wu, I M Jones, L H Thompson, J S Felton; Lawrence Livermore National Laboratory, Livermore, CA</td>
</tr>
<tr>
<td>2:05</td>
<td>Spectrum of Somatic Mutations at the Hypoxanthine Phosphoribosyltransferase (<em>hprt</em>) Gene of Healthy People</td>
<td>K Burkhart-Schultz, C B Thomas, B Tucker, J C Fuscoe, C L Thompson, C L Strout, I M Jones; LLNL, Livermore, CA, NIEHS, Integrated Laboratory Systems, RTP, NC</td>
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### VI. CYTOGENETICS

**Salon E**  
Conveners: Patricia Ostrosky-Wegman  
Andrew Kligerman

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>1:30</td>
<td><strong>INTRODUCTION</strong></td>
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<tr>
<td>1:35</td>
<td>The Influence of Internally Deposited Alpha (239Pu) or Beta-Gamma (144Ce) Emitting Radionuclides on the Sensitivity of Chinese Hamster Bone Marrow Cells to 60Co Induced Chromosome Aberrations</td>
<td>A L Brooks, K E McDonald, R M Kitchin; Pacific Northwest Laboratory, Richland, WA; Univ. of Wyoming, Laramie, WY</td>
</tr>
<tr>
<td>1:50</td>
<td>Chromosomal Loss and The Involvement of Chromosomes X, Y, and 7 in Spontaneous Micronuclei (MN) Formed in Binucleated Lymphocytes of Non-Smoking Females and Males</td>
<td>D S Rupa, L Hasegawa, D A Eastmond; University of California, Riverside, CA</td>
</tr>
<tr>
<td>2:05</td>
<td>Cytogenetic Characterization of a Metabolically Competent Human Lymphoblast Cell Line (MCL-5)</td>
<td>C M Lippoli, G K Livingston, B L Schumann, A K Srivastava; University of Cincinnati College of Medicine, Cincinnati, OH</td>
</tr>
</tbody>
</table>
VII. TESTING/COMPLEX MIXTURES

Salon F
Conveners: Hank Holden
Jay Means

1:30  INTRODUCTION

1:35  Effect of Partial Hepatectomy on the Mutant Frequency of Benzo[a]Pyrene in the Liver of C57BL/6 Transgenic Mice

B S Shane, K R Tindall; NIEHS, RTP, NC

1:50  Effects of EthylNitrosourea on LacI Mutant Frequency and c-Ha-ras Mutations in Transgenic Mice

G Lacks, A Johnson, R W Tennant, J E French; Integrated Laboratory Systems, NIEHS, RTP, NC

2:05  Identification of Intra- and Inter-Individual Genetic Variation in the White Pine Genome by RAPD Analysis

V S Prasad, K W Hutchison, C L Sidman; University of Cincinnati, Cincinnati, OH, University of Maine, ME
<table>
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<tr>
<th>V. MUTATIONAL SPECTRA</th>
<th>VI. CYTOGENETICS</th>
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<td><strong>Salons A - D</strong></td>
<td><strong>Salon E</strong></td>
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<tr>
<td><strong>2:20</strong></td>
<td><strong>2:20</strong></td>
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<tr>
<td><strong>Mutational Spectrum of Etoposide at the hprt Locus of Cancer Patients</strong></td>
<td><strong>Nonrandom Breakage in Centromeric Heterochromatin of Mouse Bone Marrow Cells Following Administration of Hydroquinone In Vivo</strong></td>
</tr>
<tr>
<td>L Karnaukhova, G Bebb, H Martins, B W Glickman; Univ. of Victoria, BC, Canada</td>
<td>H W Chen, D A Eastmond; University of California, Riverside, CA</td>
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<td><strong>2:50</strong></td>
<td><strong>2:35</strong></td>
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<td><strong>Mutant Frequency on the hprt Gene in T-Lymphocytes from Brazilian Children Accidentally Exposed to Cesium-137 Ionizing Radiation and Controls</strong></td>
<td><strong>Phosphine Inhalation by Rodents Produces No Detectable Clastogenic Effects in their Hematopoietic Cells</strong></td>
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<tr>
<td>V Saddi, A Nohturfft, W C Kusser, B W Glickman; Univ. of Victoria, BC, Canada, Universidade Catolica de Goias, Brazil</td>
<td>A D Kligerman, G L Erexson, D L Morgan, E Zeiger, U S EPA, RTP, NC, EHRT, Inc., RTP, NC, NIEHS, RTP, NC</td>
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<tr>
<td><strong>Monitoring Somatic Mutation Over Time in vivo in the hprt Gene of Lymphocytes of People Accidentally Exposed to High Doses of Ionizing Radiation</strong></td>
<td><strong>Indirect Genotoxic Action of Praziquantel in Lymphocytes from Patients with Neurocysticercosis</strong></td>
</tr>
<tr>
<td>A D da Cruz, B W Glickman; University of Victoria, Victoria, BC, Canada</td>
<td>R Montero, D Valencia, L A Herrera, E Rojas, P Ostrosky-Wegman; UNAM, México</td>
</tr>
</tbody>
</table>
VII. TESTING/COMPLEX MIXTURES

Salon F

2:20
Evaluation of Nevirapine, an Anti-AIDS Drug, in a Battery of Genetic Toxicity Assays

H E Holden, J Ellenberger, D Jacobson-Kram, D L Putman, J B Majeska; Boehringer Ingelheim Pharmaceuticals, Inc., Ridgefield, CT, Boehringer Ingelheim KG, Germany, Microbiological Associates, Rockville, MD

2:35

JC Means, L A Reily, D J McMillin; Louisiana State University, Baton Rouge, LA

2:50
Bioassay-Based Risk Assessment of Complex Mixtures

K C Donnelly, S H Safe, K Randerath, E Randerath; Texas A & M University, College Station, TX, Baylor College of Medicine, Houston, TX
V. MUTATIONAL SPECTRA

Salons A - D

3:05
Correlation of the UV-Induced Mutational Spectra and the DNA Damage Distribution of the Human hprt Gene: Automating the Analysis

G Kotturi, H Erfle, B F Koop, J G de Boer, B W Glickman; University of Victoria, BC, Canada

VI. CYTOGENETICS

Salon E

3:05
Centromere DNA and Centromere Function in Viral Transformed Rat Cells

B K Vig, K Sternes; University of Nevada, Reno, NV

3:20
Landfill or Incineration—Which is the Better Way to Treat our Solid Wastes?

T-H Ma, Western Illinois University, Macomb, IL

3:30
COFFEE BREAK, Ballroom Foyer

3:30
COFFEE BREAK, Ballroom Foyer
VII. TESTING/COMPLEX MIXTURES

Salon F

3:05
Genotoxic Effects of Naturally Occurring Isothiocyanates and Crude Extracts of Cruciferous Vegetables

FKassie, G Sonntag, GLamprecht, R Sanyal, S Knasmüller; University of Vienna, Austria

3:20
Mutagenic Activity and Heterocyclic Amine Content of Heated Foods

MG Knize, M Johansson, AL Jones, M Blakley, JS Felton; Lawrence Livermore National Laboratory, Livermore, CA, University of Lund, Lund, Sweden

3:30
COFFEE BREAK, Ballroom Foyer
Minisymposia
Thursday, May 12
4:00 PM - 6:00 PM

Session I
Salon A-D

Sensitive Methods for Detection and Mapping of DNA Lesions and Mutations

Presiding:
Gerry Holmquist, City of Hope
Barry Glickman, University of Victoria

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Recent methods for lesion detection with emphasis on lesion mapping will be discussed. These include Ligation-Mediated PCR mapping of breaks induced at DNA adducts by repair endonucleases and mapping by extension of fluorescence tagged primers to adducted positions. Advances in mapping mutations without natural selection (SNUPE, Single Strand Conformation Polymorphisms, Allele Specific PCR) will be discussed to illuminate future directions linking damage to mutations.

Session II
Salon E

Diet, Mutagens and Antimutagens

Presiding:
Lynn Ferguson, University of Auckland
James Felton, Lawrence Livermore National Lab

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The effect of known dietary mutagens and carcinogens on human health is not well understood. This is primarily because of the complexity of the diet and the presence of antimutagens and/or anticarcinogens. This mini-symposium will examine the relationships between several well-known food mutagens and antimutagens. Specifically, a database showing the effect of numerous antimutagens and aflatoxin B1 and a second database showing the effect of synthetic antioxidants on numerous dietary mutagens will be discussed. These selected examples will illustrate that antimutagenic effects are often specific to certain classes of mutagen and/or certain test systems. Many chemicals which prevent or reduce mutagenesis of one type of chemical may have either no effect or can enhance mutagenesis of other types. The level of heterocyclic amines and antimutagens in the diet and the mechanism of their mutagenicity will be related to the effectiveness of different types of antimutagen. Finally, chlorophyllin and some types of dietary fiber will be discussed as antimutagens with a wide spectrum of activity.
Minisymposia
Thursday, May 12
4:00 PM - 6:00 PM

Session III
Salon F

Radiation, Chemicals and
the Definition of Mutation

Presiding:
Charles Waldren, Colorado State University
James Tucker, Lawrence Livermore National Lab

Sponsor:
R W Johnson Pharmaceutical Institute

The term "Mutation" has sometimes been very narrowly defined to mean intragenic or point mutations, yet it is clear that changes in DNA which are important to cancer and genetic disease assume different forms and they may arise by a wide variety of mechanisms. This symposium will provide an overview of the spectrum of changes, ranging from an alteration of a single nucleotide to loss of entire chromosomes. Emphasis will be on large scale events (especially those larger than can be readily sequenced[the 1 mb range]) and on the complexity of aberrations observed by chromosome painting. We will also introduce the newly developed nomenclature and systematics, Protocol for Aberration Identification and Nomenclature Terminology "PAINT", which has been developed to describe both simple and complex aberrations detected by fluorescent in situ hybridization painting.

Council Meeting

Thursday, May 12
7:00 PM - 10:00 PM
Portland Room
EXHIBITS

Exhibits Hall

Sunday, May 7 – Tuesday, May 10

There will be a variety of interesting, informative exhibits in the Exhibits Hall. Exhibitors will present information about the latest in laboratory instrumentation, supplies, computer capabilities, publications, and a broad range of research and testing services. Exhibit booths will be open from 8:00 to 10:00PM on Sunday, from 9:30AM to 7:30PM on Monday, from 9:30AM to 5:30PM on Tuesday. Company representatives will be available to answer your questions and discuss products and services with you. The exhibits will be conveniently located in the same area as poster sessions. Coffee will be available in the exhibits area during breaks and poster sessions, and there will also be a cash bar and soft drinks during the afternoon poster sessions. Support of the exhibits is appreciated by the EMS.

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ARE CORDIALLY INVITED TO THE EXHIBITS

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Hazleton Washington
9200 Leesburg Pike, Vienna, VA 22182
703-893-5400
Hazleton offers a complete set of genotoxicity assays designed to meet regulatory requirements around the world for safety testing. Standard assay designs are used for all genotoxicity endpoints in vitro and in vivo. In addition, a number of cytotoxicity tests are offered to meet FDA and Tripartite guidelines. Protocols may be modified to meet client requirements, and investigative studies may be conducted as desired, such as studying cell proliferation and in vivo mutagenesis. These testing capabilities may be discussed at our booth. Genotoxicity studies are performed at laboratories in Vienna, VA and Harrogate, UK.

Integrated Laboratory Systems
PO Box 13501, Research Triangle Park, NC 27709
919-544-4589 FAX 919-544-1380
Integrated Laboratory Systems (ILS), located in Research Triangle Park, NC, provides customized toxicological and environmental research and testing services to the public and private sector. Corporate Representatives:
Dr. Raymond Tice and Dr. T. K. Rao 919-544-4589
Microptic, Ltd.
University Innovation Centre, Swansea, UK
44-(0) 792-295745  FAX 44-(0) 792-295613
Microptic Limited, a UK based company, specialises in microscopy in genetic
toxicology. The package offering a system of recording and analysing
cytogenetic data from initial observation to the production of report-ready
tables will be on display, in addition to simpler coordinate recorders.

Microbiological Associates
9900 Blackwell Road, Rockville, MD  20850
301-738-1000
Microbiological Associates is the leading provider of sophisticated, short-term
biological safety testing of chemical and biotechnology products and processes.
Our *in vitro* testing program offers alternative methods for acute toxicology.
MA's services maximize safety information, client R&D productivity, and regu-
latory compliance while minimizing time and expense.

Optomax
9 Ash Street, P O Box 840, Hollis, NH  03049
603-465-3385
Optomax in conjunction with its associate UK company Perceptive Instru-
ments will be exhibiting TV camera based Image Analysis instrumentation
having custom software packages designed for Ames Mutagenicity Testing.
Mouse Lymphoma Assay analysis, Unscheduled DNA Synthesis and Comet
Micro Gel Electrophoresis.

Pharmakon Research International
P.O. Box 609, Waverly, PA  18471
717-586-2411
Pharmakon is an independent testing laboratory providing a variety of toxicology,
pharmacology, and pharmacokinetic services to evaluate safety and efficacy of
pharmaceuticals, medical devices, biotechnology products, industrial chemicals,
cosmetics, food additives, and pesticides. A multidisciplinary approach evaluates
adverse health effects at the molecular, cellular, organ or whole animal levels.

SITEK Research Laboratories
12111 Parklawn Drive, Rockville, MD  20852
301-984-2301
SITEK Research Laboratories provides a wide variety of *in vitro* and *in vivo*
assays for the evaluation of genotoxicity. We offer state-of-the-art protocols,
expertise staff, regulatory advice, and full GLP compliance. See us at our
booth for information on our testing services and our custom-made agar plates and
S-9 for research.
SRI International
333 Ravenswood Avenue, Menlo Park, CA 94025
415-859-2220
SRI International provides comprehensive toxicology research and testing services. Specific programs include mammalian and molecular & genetic toxicology, pathology, pharmacokinetics, comparative metabolism, human cell research, carcinogenesis, inhalation, neurotoxicology and immunotoxicology. Safety evaluations of products for regulatory compliance are augmented by leading-edge research in investigations of mechanisms of toxicity and development of new biological test systems.

Stratagene
11099 North Torrey Pines Road, La Jolla, CA 92037
513-792-4700
Stratagene's Big Blue\textsuperscript{TM}Transgenic Mouse and Transgenic Rat Mutagenesis Assay Systems are cost-effective, \textit{in vivo}, short term, whole animal systems for tissue specific mutagenesis screening and testing. These systems, which use the highly sensitive lacI target gene and are under evaluation by regulatory agencies, are used by over 85 institutions worldwide. Also shown will be the Big Blue Transgenic Rat cell line as well as TSG-\textit{p53}\textsuperscript{TM}/Big Blue\textsuperscript{®} double transgenic C57BL/6 mice.
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1. Please DO NOT FORGET to bring your PROGRAM BOOKLET or ABSTRACT ISSUE of the Journal to the meeting. Extra copies will cost $5.00 each.

2. The Registration Desk will be on Lower Level 1. It will be open Saturday 12:00 NOON–7:00 PM; Sunday 7:30AM–4:00PM; Monday 7:15AM–4:00PM; Tuesday 7:00AM–4:00PM; Wednesday 7:30AM–12:30PM; Thursday 7:30AM–12:00PM.

3. PLEASE REMEMBER to check the MESSAGE BOARD in the registration area for changes in the program, changes in room assignments, and special announcements. You may leave messages for other attendees on the message board, but if you wish to post any other material, please check at the Registration Desk first.

4. Coffee breaks will be in the Exhibits Area and the Ballroom Foyer.

5. The phone number of the Portland Marriott is 503-226-7600. The FAX at the Portland Marriott is 503-221-1789.

6. Smoking is not permitted in the meeting rooms or exhibits area.

7. Council Meetings are scheduled on:
   Saturday, May 7, 6:00 PM to 10:00 PM, in the Portland Room.
   Thursday, May 12, 7:00 PM to 10:00 PM, in the Portland Room.

8. A slide preview area will be available in which speakers can check their slides and carousels in advance. Check bulletin board for location

9. POSTERS are in the Exhibit Hall. Set-up times are as follows:

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