Chemical Mutagenesis

Principles and Methods for Their Detection Volume 4
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The Effects of Chemical Mutagenesis on the Adaptive Behavior of Vesicular Stomatitis Virus
Handbook of Mutagenicity Test Procedures

LESTER BROOKLYN

Principles and Methods for Their Detection Volume 4
Springer Science & Business Media
The ready acceptance and wide demand for copies of the first two volumes of Chemical Mutagens: Principles and Methods Jar Their Detection have demon strated the need for wider dissemination of information on this timely and urgent subject. Therefore, it was imperative that a third volume be prepared to include more detailed discussions on techniques of some of the methods that were presented from a theoretical point of view in the first two volumes, and to update this rapidly expanding field with current findings and the new developments that have taken place in the past three years. Also included is a special chapter by Dr. Charlotte Auerbach giving the historical background of the discovery of chemical mutagenesis. Methods for recognizing mutagenic compounds in vitro are a necessary preliminary step toward arriving at satisfactory solutions for recognizing significant mutation rates in man, which must be done before our test tube methods of detection can be considered reliable. Two chapters in this volume make important contributions to this problem. Due to the increasing activity in efforts to perfect techniques for detecting chemical mutagens and their effects on man, it is planned to continue this series of volumes as necessary to keep abreast of current findings.
Mutagenic Effects of Environmental Contaminants Springer Science & Business Media
Frederick J. de Serres, Ph. D. Office of the Associate Director for Genetics National Institute of Environmental Health Sciences Research Triangle Park, North Carolina (U. S. A.) 27709 The Workshop on Comparative Chemical Mutagenesis was orga nized to begin the process of problem identification and resolution concerning our needs to evaluate the data on test chemicals arising from assays for mutagenic activity on laboratory organisms. In the past, data on chemical mutagens has been generated and published in the scientific literature on a more or less random basis. Individual chemicals enjoy a brief period of "popularity" that leads to a burst of publications in the same or sometimes related assay systems. The incompleteness of the data base, in many of these cases, makes comparative mutagenesis difficult or impossible. In our attempts to compare the genetic effects of a given chemical over a wide range of assay systems, we are often interested in making quantitative as well as qualitative compari sons. To restate the first comparison: is the chemical under ques tion a weak, moderate or potent mutagen over a wide range of assay systems--or alternatively, does the level of response vary markedly? To make the second comparison, what is needed is information on the spectrum of genetic alterations produced as well as whether this spectrum is consistent over a wide range of organisms.
Mutagenesis of the Mouse Genome Springer Science & Business Media
And conclusions; Introduction; A primer on genetics, mutation, mutagens, and the implications of mutagenesis; Metabolism and pharmacologic disposition of mutagens and promutagens; The nature of test systems; Strategies for risk assessment: the choice and use of test systems to estimative human germinal mututation; Strategies for risk assessment: relation between mutation rate and human welfare; Testing and monitoring human populations; A mutagen assessment program; Some additional issues and research suggestions.
A Survey of the 1973 Literature Springer
Volume 8 of Chemical Mutagens covers a wide range of topics in this continuously changing field. This volume includes chapters on the detection of genetic damage in mammalian sperm both at specific loci and over the entire genome. The discussion of in vitro techniques for working with mammalian cells covers not only specific locus assays but also cellular activation systems. Another chapter extensively discusses the need for a revised protocol for the micronucleus assay. Structure activity relationships are investigated in a chapter dealing with hair dye constituents. One of the most comprehensive chapters deals with problems associated with the detection of mutagenic effects in defined human populations. Finally, there is a detailed presentation of a comprehensive study tabulating the genetic bioassay data on some known or suspected human carcinogens. In keeping with our policy of publishing important legislation in the area of chemical mutagens, we have also included the Council of the European Communities Directive of 18 September 1979. Frederick J. de Serres Research Triangle Park, North Carolina vii Contents Chapter 1 Detection of Effects of Mutagens in Human Populations George R. Hoffmann 1. Introduction . . . . . 1 2. Monitoring Progeny for Evidence of Germ-Cell Mutations. . . . . 3 2. 1. The Classical Approach: Phenotypic Monitoring . . . . . 3 2. 2. Monitoring for Changes in Gene Products . . . . . 7 3. Detection of Gene Mutations in Somatic Cells. . . . . 9 3. 1. Drug-Resistant Lymphocytes . . . . . 9 3. 2. Hemoglobin Variants . . . . . 17 4. Nongenetic Indicators of Mutagen Exposure . . . . . 21 4. 1. Alkylation of Proteins . . . . . 21 4. 2. DNA Damage . . . . . .
Induction of Azaguanine-resistant Mutants Comparative Chemical Mutagenesis
We demonstrate that hydrogen production can be increased by random mutagenesis using N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) and that hydrogen production can be further increased in the chemically-mutagenized strain by targeted gene deletion and overexpression of genes related to formate metabolism. Chemical mutagenesis of Escherichia coli BW25113 hyaB hybC hycE::kan/pBS(Kan)-HycE to form strain 3/86 resulted in 109 +/- 0.5- fold more hydrogen; 3/86 lacks functional hydrogen uptake hydrogenases 1 and 2, has hydrogenproducing hydrogenase 3 inactivated from the chromosome, and has constitutively active hydrogenase 3 based on expression of the large subunit of hydrogenase 3 from a high copy number plasmid. Deleting fdoG, which encodes formate dehydrogenase O, (that diverts formate from hydrogen), from chemical mutagen 3/86 increased hydrogen production 188 +/- 0.50-fold (relative to the unmutagenized strain), and deletion of hycA, which encodes the repressor of formate hydrogen lyase (FHL), increased hydrogen production 232 +/- 0.50-fold. Deleting both fdoG and hycA increased

hydrogen production 257 +/- 0.50-fold, and overexpressing fhlA along with the fdoG hycA mutations increased hydrogen 308 +/- 0.52-fold. Whole-transcriptome analysis of chemical mutagen 3/86 revealed 89 genes were induced and 31 genes were repressed. In an effort to identify chromosomal mutations in chemical mutagen 3/86, we performed comparative genome sequencing and identified two chromosomal loci with mutations in coding regions of ftnA and yebJ; however, neither gene was related to the increased hydrogen production as determined by the close vial (short) hydrogen assay. In addition, transposon mutagenesis, which is one of the most efficient strategies for creating random mutations in the genomic DNA, was performed in two different strains: E. coli BW25113 hyaB hybC hycA fdoG::kan/pCA24N-FhlA and E. coli MG1655 to identify beneficial mutations for hydrogen production. As a result of screening 461 E. coli BW25113 hyaB hybC hycA fdoG::kan/pCA24N-FhlA transformants and 1000 E. coli MG1655 transformants, three interesting mutations have been discovered in E. coli BW25113 hyaB hybC hycA fdoG::kan/pCA24N-FhlA transformants (gpsA, dipZ, glgP) and 1 beneficial mutation in E. coli MG1655 transformants (malT). When any of these genes gpsA, dipZ, or glgP is disrupted by Tn5 insertion, hydrogen production decreases 17, 3 and 8-fold, respectively. Additionally, when malT gene is disrupted by Tn5 insertion, hydrogen increases 3.4-fold.

Proceedings of the Symposium on Dose-Response Relationship for Genetic Effects of Environmental Chemicals, Keidanren Kaikan, Tokyo, May 7-9, 1984 Springer Science & Business Media

Frederick J. de Serres, Ph. D. Office of the Associate Director for Genetics National Institute of Environmental Health Sciences Research Triangle Park, North Carolina (U. S. A.) 27709 The Workshop on Comparative Chemical Mutagenesis was orga nized to begin the process of problem identification and resolution concerning our needs to evaluate the data on test chemicals arising from assays for mutagenic activity on laboratory organisms. In the past, data on chemical mutagens has been generated and published in the scientific literature on a more or less random basis. Individual chemicals enjoy a brief period of "popularity" that leads to a burst of publications in the same or sometimes related assay systems. The incompleteness of the data base, in many of these cases, makes comparative mutagenesis difficult or impossible. In our attempts to compare the genetic effects of a given chemical over a wide range of assay systems, we are often interested in making quantitative as well as qualitative compari sons. To restate the first comparison: is the chemical under ques tion a weak, moderate or potent mutagen over a wide range of assay systems--or alternatively, does the level of response vary markedly? To make the second comparison, what is needed is information on the spectrum of genetic alterations produced as well as whether this spectrum is consistent over a wide range of organisms.

Chemical Mutagens Springer

Mutagenic Effects of Environmental Contaminants investigates the mutagenic consequences of environmental contaminants, such as pesticides, industrials, food additives, drugs, and biologicals, as well as the possible relationships between mutagenesis and carcinogenesis. It describes the monitoring of chemical mutagens in the environment and the ways that genetic mutations cause disease in humans. Organized into 14 chapters, this volume begins with an overview of the current burden of human genetic disease and the biochemical mechanisms of mutation. It then discusses practical and feasible methods that use a variety of organisms to screen potential mutagenic agents, increased mutation rates in human populations, mutagens that are currently used commercially, and the interrelationships between mutagenicity, carcinogenicity, and teratogenicity. The reader is also introduced to genetic toxicology, detection of chemically induced mutations in experimental animals, and chromosome and somatic mutations in humans. This book is a valuable resource for scientists, policymakers, and administrators of environmental programs.

Principles and Methods for Their Detection Cambridge Scholars Publishing

An important question facing our society is the impact of numerous chemical insults on the health of man and his environment. Faced with a staggering array of chemicals and enormous testing costs, only a few chemicals can be tested for possible carcinogenic effects. Recent results with the Salmonella/mammalian microsome mutagenesis bioassay system demonstrate a striking correlation between carcinogenicity and mutagenicity of many chemical compounds and offer the possibility that mutagenesis assay systems can provide a quick identification of potential carcinogens. Results from microbial assays can serve as a guideline for further mutagenesis testing as well as identify those compounds requiring more extensive analysis in mammalian systems. Reliance on the results from a single mutagenic assay system is rather risky. It would be preferable to use a battery of tests (the tier approach) which would include the rapid microbial assays as well as mammalian systems. Also the use of Drosophila as a bridge between the microbial and mammalian assays has many desirable features which are discussed.

Problems of Threshold in Chemical Mutagenesis Elsevier

Over 350 references to books and journal articles published during 1928-1973. Also covers foreign-language literature. Arranged under citation index, Agent index, Chemical abstracts registry number index, Organism index, KWIC index, Author index, First author index, and Addendum. Entries in Citation index and First author index provide essential bibliographical information.

Comparative Chemical Mutagenesis Springer Science & Business Media

The Second Georgia Genetics Symposium was held color. Soon after, he joined the sta? of The Jackson in September 2000, and the development of this Laboratory in Bar Harbor, Maine. book took place over the nearly 4 years that ensued. Much of Bill’s research at the lab was centered During this time, many advances in the Genome around investigating phenotypic variability within Project and mouse mutagenesis were made. In the highly inbred strains, and in that connection he book overview, we discuss the development of the developed the technique of ovarian transplanta- Genome Project (which is the context for the sym- tion (even using embryonic donors) and a genetic posium), the role the mouse was playing at that scheme whereby graft compatibility could be time, how that role has evolved, and how the combined with the ability to distinguish o?spring chapters of the book address issues in mouse func- from donor and regenerated host ovaries. His tional genetics. Many of the chapters in this book work was in?uenced by the second World War, will provide useful resources for years to come. ?rst because The Jackson Laboratory turned into Of greater impact, our keynote speaker, the a production colony for the military, primarily to mutagenesis pioneer William L. (Bill) Russell, produce

mice for typhoid testing, and secondly, passed away on July 23, 2003.

Chemical Mutagens Springer Science & Business Media
Induced mutagenesis is a common and promising method for the screening of new crops with improved production methods, and has made a tremendous contribution to crop improvement. Now, as the techniques of molecular biology become more widely adopted by plant breeders, this comprehensive summary sets mutation breeding within a contemporary context and relates it to other breeding techniques. This book opens a new chapter of inducing mutations at the gene level, and details techniques that can be used to harvest and exploit such mutation to improve the productivity of crops, particularly cereals, grains and vegetables. The chapters within this volume are supported by diagrams, tables and graphs to make the content more comprehensible. The book will be extremely useful for advanced undergraduates, graduates, postgraduate students, and research scientists of botany, agriculture, horticulture, genetics, biotechnology, biochemistry and agronomy.

Principles and Methods for Their Detection Volume 1 LAP Lambert Academic Publishing
The compilation of this book was prompted by the necessity of a bench volume which could provide the necessary background information on materials, experimental design, pitfalls and dificulties, in order to perform a particular test in an acceptable way with a minimal need for additional expert help. This Second Edition updates this information, providing: - a comprehensive bench guide - methods known to be reliable - a broad spectrum of approaches - tips to avoid pitfalls when using unfamiliar techniques - data from population records - safety aspects of mutagens and carcinogens - basic statistical concepts for experiment design This `on the bench' methodological text provides the necessary information for most of the common assays for genetic damage in use. The book includes methods which have been sufficiently used and tested to make their use reliable, but also presents methods which are not widely used at present, but which might prove most useful in screening for mutagenic effects.

Principles and Methods for Their Detection Volume 8 Elsevier
As editor I want especially to thank Dr. Ernst Freese for helpful co operation in preparing these volumes, and to express my appreclatlOn to Drs. Kurt Hirschhorn and Marvin Legator, the other members of the editorial board. Alexander Hollaender January 1971 Preface The purpose of these volumes is to encourage the development and ap plication of testing and monitoring procedures to avert significant human exposure to mutagenic agents. The need for protection against exposure to possibly mutagenic chemicals is only now coming to be generally realized. The recently issued Report of the Secretary's Commission on Pesticides and Their Possible Effects on Health (the Mrak Report-U.S. Department of Health, Education and Welfare, December 1969) has made an important start. Its Panel on Mutagenicity recommends that all currently used pesticides be tested for mutagenicity in several recently developed and relatively simple systems. Whether recommendations such as these are actually put into effect will depend on convincing government, industry, and the public that the problem is important, that the proposed tests would be effective, and that they can be conducted at a cost that is not prohibitive. Why is it important to screen environmental agents for mutagenic activity? To those who will read this book, the answer is self-evident. The sine qua non of all that we value and all that we are is our genetic heritage.

Chemical Mutagenesis Springer
Comparative Chemical MutagenesisSpringer
Chemical Mutagens Amsterdam : Elsevier Biomedical Press
Chemical Mutagenesis in Chicory: A Tool For Crop Improvement Chicory is a well known medicinal herb used for treatment of liver ailments. The herb grows wild and it still has low genetic variability being self pollinated. This opens an ample room for mutation breeders to improve the crop. Mutation in plants for improvement of potential agronomic traits is a buzz word of today and had become one of the most important tools in generating new varieties. Mutation breeding employing varieties of physical and chemical agents is in use to explore the possibilities of developing new varieties, especially in crops having narrow genetic base. The present study describes the effect of chemical mutagens in induction of mutations in Cichorium intybus (L.) since genotype of the plant is homozygous with limited genetic variability, hence induced mutagenesis proved to be an effective tool in induction of mutations and further improvement in the crop via selection.

Chemical Mutagenesis in BW5147 Mouse Thymoma Cell Line
Rutgers University Press
Honorable Mention from the Outstanding Publication Award committee from the American Sociological Association Section on Environment and Technology and Co-winner of the Robert Merton Professional Award given by the American Sociological Association section in Science and Technology Studies Hereis the first historical and sociological account of the formation of an interdisciplinary science known as genetic toxicology, and of the scientists' social movement that created it. After research geneticists discovered that synthetic chemicals were capable of changing the genetic structure of living organisms, scientists began to explore how these chemicals affected gene structure and function. In the late 1960s, a small group of biologists became concerned that chemical mutagens represented a serious and possibly global environmental threat. Genetic toxicology is nurtured as much by public culture as by professional practices, reflecting the interplay of genetics research and environmental politics. Drawing on a wealth of resources, Scott Frickel examines the creation of this field through the lens of social movement theory. He reveals how a committed group of scientist-activists transformed chemical mutagens into environmental problems, mobilized existing research networks, recruited scientists and politicians, secured financial resources, and developed new ways of acquiring knowledge. The result is a book that vividly illustrates how science and activism were interwoven to create a discipline that remains a defining feature of environmental health science.

A Survey of the 1972 Literature
Volume 9 of Chemical Mutagens consists mainly of chapters discussing the development and validation of short-term assays to detect the mutagenic effects of environmental chemicals. These chapters include an assay with the grasshopper neuroblast, a comparison of mutagenic responses of human lung-derived and skin-derived diploid fibroblasts, a forward-mutation assay in Salmonella, a multigene sporulation test in Bacillus subtilis, a specific locus assay in mouse lymphoma cells, a study of the induction of bacteriophage lambda, and the granuloma pouch assay. In addition, there are two chapters on the identification of mutagens in cooked food and in human feces. Frederick 1. de Serres Research Triangle Park, North Carolina vii Contents Chapter 1 The Grasshopper Neuroblast Short-Term Assay for

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