
Book reviews

de Serres, F. J.; Hollaender, A. (eds): Chemical Mutagens: Principles and Methods for Their Detection, vol. 7. New York: Plenum Press 1982. 500 pp., several figs.

Volume seven is the latest of the by now well known series of reviews on the principles and applicability of an ever increasing number of mutagenicity assay systems. The earlier volumes have earned a world-wide reputation because of the thoroughness and practical usefulness of the reviews they contain. Number seven is no exception to this statement. The inclusion of a number of chapters on assays for detection of genetic damage in mammals and man, and on the principles of indirect mutagen activation in test systems with bacteria and plants, one chapter on tests with a lower eukaryotic organism, and one on the toxicology of nitrite and nitrate gives an indication of the wide variety of subjects that this volume covers.

More or less central in the book is a review on comparative mutagenesis by Vogel and Natarajan, who investigated the relationship between chemical reactivity of simple alkylating agents and the magnitude of induced biological effects, such as gene mutations, chromosomal aberrations and cytotoxicity in various eukaryotic species. Such interspecies comparisons performed on the basis of expected or measured DNA damage are of importance in assessing the genetic risk due to exposure to chemicals, as the correlation between the wide variety of responses measured in different test systems becomes better understood. On the basis of data obtained so far, the authors conclude that a general correlation can be established between the extent of DNA alkylation and the magnitude of genetic effects induced, and that the pattern of alkylation is decisive about the predominant type of genetic alteration formed. A number of other chapters deal with assays designed to detect chromosomal damage and gene mutations induced in somatic and germinal cells of mammals and man. Adler and Brewen describe the effect of chemicals on the production of structural chromosomal aberrations in male and female germ cells of mammals *in vivo*, while Obe and Beek review the human leukocyte chromosome test system: in the latter assay, aberrations and sister chromatid exchanges can be measured simultaneously in cultured human leukocytes after exposure to chemical agents, for instance those commonly present in the human environment, such as drugs, alcohol and tobacco smoke. A standard protocol to perform this test is included in their chapter. The review by Segal and Sotomayer deals with the measurement of unscheduled DNA synthesis (UDS) in mouse male germ cells *in vivo* as representative of induced repairable DNA damage. This test has the great advantage of directly and rapidly measuring the consequences of DNA damage in germ cells of living animals, but its disadvantage is that no direct evidence about the occurrence and magnitude of persistent genetic damage can be obtained. Thus, the relevance of induction of UDS as a possible genetic risk remains to be assessed. Griffiths describes tests that measure aneuploidy in various eukaryotic organisms (mainly fungi). Since aneuploidy is also known in humans as being responsible for several pathological conditions, determination of

abnormal chromosomal segregation in off-springs of eukaryotic species may provide a simple and fast model system for a relevant type of chromosome abnormality. It remains to be determined, however, whether the mechanism(s) of non-disjunction or mal-segregation of chromosomes in diploid fungi are comparable to the aneuploidy events observed in mammals and man. A lengthy and quite interesting chapter by Anari and Malling is devoted to a new and potentially promising technique aimed at detecting specific mutations in somatic cells *in vivo* with the aid of immunological methods. Using specific antibodies against proteins, such as hemoglobin, lactate dehydrogenase and immunoglobins, differing in small amino acid chain sequence, specific mutants can be sensitively detected in blood and sperm cells of mammals. Mutation induction *in vivo* can now be monitored by scoring for protein variants in red cells, lymphocytes and spermatocytes of treated animals. These techniques are likely to provide a simple and faster substitute to the specific-locus methods for gene mutations *in vivo* presently available. Three chapters in the book deal with the principles of metabolism of indirect mutagens in test systems. Bartsch et al. discuss the various mutagen mammalian activation systems mainly used in short-term bacterial tests: subcellular fractions and whole cell preparations derived from mammalian organs and the host-mediated assay. Callen discusses the role that bacteria may play in the activation of mutagens, especially in view of the fact that many environmental compounds are now being tested for mutagenicity in bacteria. Although bacterial metabolism of certain mutagens has been recognized long ago, it is only now acknowledged that it may play a primordial role in the bioactivation of some chemicals. The third chapter on bioactivation by Plewa and Gentile is concerned with the metabolism of chemicals in plants, with emphasis on compounds frequently used in agriculture, e.g. pesticides.

Of direct practical use is a chapter by Scott and Käfer on *Aspergillus nidulans*, a fungal organism that can be used to detect both chromosomal aberrations and gene mutations induced by chemical agents. A lucidly written general methodology is included in their chapter. Finally, a lengthy and thorough review on the toxicology of nitrites and nitrates by Hartman completes volume seven. This chapter gives an exhaustive account of today's state of knowledge on the human exposure to these naturally occurring agents, and implications of their occurrence for mutagenic and carcinogenic effects observed in human population. For workers in this field, the length of the reference list (650 citations) should be stated.

In conclusion, the latest volume of the Chemical Mutagen series provides a number of widely varying subjects, with reviews (on the average of good quality and a single outstanding one) that should be of importance to those who work in the particular field, and including practical protocols for those who wish to start. This particular volume is certainly no exception to the tradition of high quality and practical usefulness of the earlier ones. There are hopefully more volumes to come.

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