

ID 09.3

Recent achievements in micronuclei characterization

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Among numerous genotoxicity assays, the micronucleus (MN) test is especially recommended to evaluate the genotoxic effects of chemical and physical agents. MN test is less time-consuming and easier to perform compared to the chromosomal aberrations (CA) assays. An analysis of the MN frequency is the basis for genotoxicity assessment.

Although the knowledge on different aspects of the origin, structure, genetic activity of micronuclei in plants has been explored in recent years, there is still much less that is known in humans and animals. Over the past years, distinct approaches have allowed an understanding the mechanisms of formation of the micronuclei. Especially modern cytogenetics techniques have revolutionized knowledge on the chromatin that is involved in micronuclei. From the data that are available for animals and humans, micronuclei can be lost from the cells and incorporated into the nucleus. Thus the issues of the fate of micronuclei will be considered.

The latest methodological developments in the field of molecular cytogenetics to describe the fate of micronuclei, with particular attention to plants will be present. We provide a comprehensive overview of the current knowledge on MN characteristics in plants focuses on critical scientific problems: Is the distribution of DNA damage that led to micronuclei formation random? What is the origin of plant micronuclei? Are epigenetic processes involved in micronuclei formation? How could there be a role of the genetic activity of chromatin in the formation of micronuclei? The technical innovations that have been developed and used for human research is shown.

Keywords:

cytogenetics; DNA damage; micronuclei; mutagenesis.