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Genetic toxicology: An important monitor for food safety

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Genetic Toxicology is a true tapestry of basic and clinical sciences. It is defined as the study of any agent which can damage the genetic structure of living organisms and thus cause problems such as diseases disorders (i.e. mutations, cancer) and birth defects. This estimate is often expressed as individual or population risk rates. Genetic toxicology approaches are utilized to examine the quantitative risk of specific areas include bacterial and chemical contamination of food, food additives, veterinary drug & pesticide residues in food, and dietary supplements. Emerging issues, such as nanomaterial additions to food, also are being assessed.

Evaluation of the hazards of food safety have been successfully employed by detecting the clastogenic and mutagenic effects of possible risks on human health using genotoxic assay such as germ cells changes, micronucleus & chromosomal aberration frequencies, sister chromatid exchange, DNA fragments techniques and comet assay. Changes that affect the structure of chromosomes can cause problems with growth, development, and function of the body's systems.

Toxicogenomic is a new development in molecular biology which provides a rational basis for risk assessment. The relationship between the structure and activity of the genome and the adverse biological effects of exogenous agents could be conducted by toxicogenomic techniques, which endeavors to elucidate molecular mechanisms involved in the expression of toxicity, and to derive molecular expression patterns (i.e., molecular biomarkers) that predict toxicity or the genetic susceptibility to it. These techniques are more accurate for monitoring the hazard materials in food which could not be assessed by traditional assay applied for food safety.

Biography

Sahar Ahmed completed her under graduated studies in the faculty of Veterinary Medicine, Cairo University. She received her M.Sc. (Gynecology and genetics) and Ph.D. (Molecular genetics) degree from Faculty of Veterinary Medicine, Cairo University. She worked as Assistant Researcher in Faculty of Veterinary Medicine, Utrecht University, Netherlands. She occupied the current position since 2007 as a Professor of Biotechnology and Molecular genetics, NRC, Cairo, Egypt. Her research field areas: Cytogenetic assay and molecular toxicology of drugs, food and medical plants, environmental genetics and molecular toxicology animal biotechnology, genetic diversity and molecular genetics and attenuated and DNA vaccine.