

Risk assessment of genotoxic and non-genotoxic carcinogens

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Carcinogens are socially concerned chemical agents in many countries. Chemical carcinogens are ubiquitously present in the environment such as air, soil, food, industrial chemicals and so on. Currently, chemical carcinogens are classified into two groups: genotoxic carcinogens and non-genotoxic carcinogens. Genotoxic carcinogens are agents that induce cancer in humans or rodents by genotoxic mechanisms such as mutations. They are interactive with DNA and regulated under the assumption that some degree of risk may exist at any level of exposure. These substances are considered not to be acceptable for use as food additives, pesticides or veterinary drugs. In contrast, non-genotoxic carcinogens are agents that induce cancer via non-genotoxic mechanisms such as hormonal effects, inflammation or cell toxicity. These agents have threshold doses and can be used in the society below the threshold levels. Actually, however, it is not easy to classify chemicals into either genotoxic or non-genotoxic partly because various in vitro and in vivo genotoxicity assays sometimes provide conflicting results on particular chemicals. In this Educational Course, I will talk about risk assessment and regulation of genotoxic and non-genotoxic carcinogens and discuss the current issues on risk estimate of chemical carcinogens at low doses.