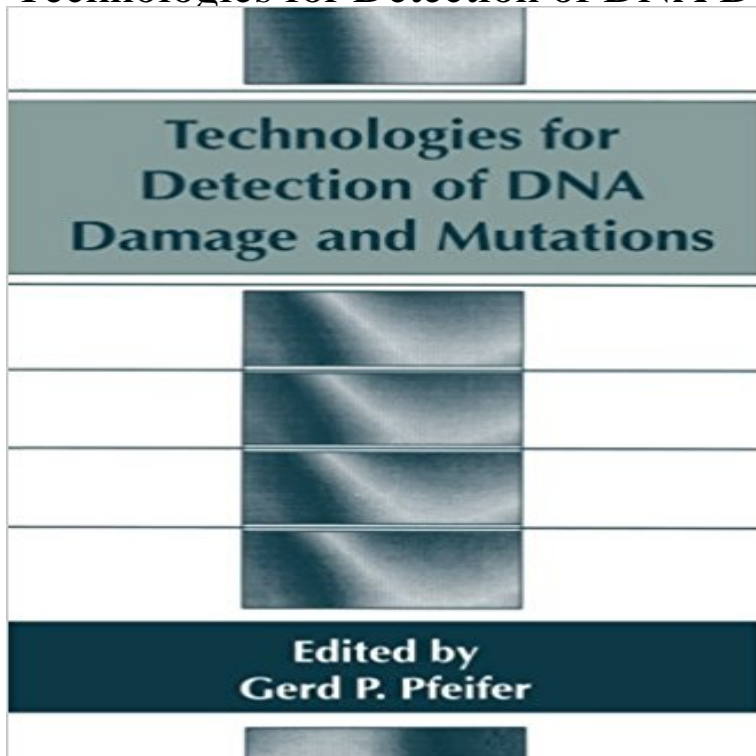


Technologies for Detection of DNA Damage and Mutations



Man-made carcinogens, natural genotoxic agents in the environment, as well as ionizing and ultraviolet radiation can damage DNA and are a constant threat to genome integrity. Throughout the evolution of life, complex DNA repair systems have developed in all living organisms to cope with this damage. Unrepaired DNA lesions can promote genetic alterations (mutations) that may be linked to an altered phenotype, and, if growth-controlling genes are involved, these mutations can lead to cell transformation and the development of malignant tumors. Proto oncogenes and tumor suppressor genes may be critical targets for DNA damaging agents. In a number of animal model systems, correlations between exposure to a carcinogen, tumor development, and genetic changes in tumor DNA have been established. To understand mutagenesis processes in more detail at the molecular level, we need to know the type and frequency of DNA adducts within cells, their distribution along genes and specific DNA sequences, as well as the rates at which they are repaired. We also need to know what types of mutations are produced and which gene positions are most prone to mutagenesis. This book provides a collection of techniques that are useful in mutagenesis research. The book is divided into three parts. In Part I, methods for DNA damage and repair analysis are provided.

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