Current Topics in Biophysics (Zagadnienia Biofizyki Współczesnej) vol. 16 (2), 1992, 53-61

Genome heterogeneity in mutagen – induced DNA repair

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On the basis of biphasic kinetics of DNA repair of damaged sites it has been hypothesized that the DNA repair process is not equally efficient in all regions of DNA. In the case of UV – induced damage it was proved that the active genes are repaired first. The lines of evidence were taken from experiments on DNA repair in repetitive DNA, unique sequences of active genes, active and non-active proto-oncogenes and from cells with DNA repair deficiency. The preferential repair of actively transcribed genes was correlated with the accessibility of chromatin to repair enzymes. These findings are now limited to physical agents-induced mutagenesis. Nevertheless, there is a strong line of evidence indicating for analogical preference for DNA repair induced by chemicals. On the other hand, damage caused by chemicals is not always randomly distributed which complicates DNA repair studies. Altogether DNA repair efficiency in a given cell is dependent on such factors as type of damage, its location in the genome and the cell cycle.