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DNA Repair and Genetic Stability

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The chemical instability of the covalent structure of DNA appears incompatible with the role of DNA as carrier of stable genetic information, especially in cells with large genomes such as human cells. DNA undergoes decomposition by hydrolysis, reactions with active oxygen species, and adduct formation with reactive metabolites at significant rates under in vivo conditions. The solution to this paradox is that DNA continuously undergoes DNA repair to prevent deterioration of the genetic material, and mutagenesis. The most important defence against endogenous DNA damage is the base excision-repair pathway, and this mode of DNA repair will be described.

The intrinsic lability of DNA makes it difficult to isolate DNA sequences from fossil material, because of the time-dependent decay of DNA. It is still possible to recover short DNA sequences from ancient sources up to 100 000 year old, such as bones from mammoths and a Neandertal species, but dinosaur DNA now only occurs as science fiction.

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