Synopsis of Original Research Paper

DNA damege and its repair in human cells exposed to solar light

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We analyzed the induction and repair of various kinds of DNA damage in human cells exposed to a solar UV-simulator, by means of an enzyme-linked immunosorbent assay or an immunoslot blot conjugated with enhanced chemiluminescence (ISB-ECL) system. When we irradiated normal human cells with up to 10 J/m^2 of UVC (germicidal lamps, predominantly 254nm), we could detect the induction of both cyclobutane thymine dimers (TT-dimers) and (6-4) photoproducts (64Ps) in their cellular DNA in dose-dependent manners. Normal human cells completely excised 64ps by 8hr after the exposure, whereas the cells excised only 50% of initial amount of TT-dimers by 24hr. On the other hand, the xeroderma pigmentosum cells beloging to complementation group A (XPA) could not excise both TT-dimers and 64ps.

We succeeded to detect the induction of the Dewar isomers of (6-4) photoproducts in human cells exposed to a solar UV-simulator (Oriel) by using a monoclonal antibody DEM -1 specific for Dewer photoproducts (Dewer-P) in DNA. Normal human cells excised Dewer-P from their DNA faster than TT-dimers, but slower than (6-4) photoproducts. However XPA cells defective in DNA repair could not excise any kinds of DNA damage at all.