Expression and fixation of ultraviolet light-induced DNA damage through cell cycle progression of human cells in culture.

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Expression and fixation of ultraviolet light-induced DNA damage through cell cycle progression of human cells in culture.

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放射線5生物学

Research Institution

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monoclonal antibody / UV-induced DNA damage / (6-4) photoproduct / thymine dimer / xeroderma pigmentosum cells / 色素性乾皮症亜型 / 除去修復

Research Abstract

Previously we reported that the cells irradiated with ultraviolet (UV) light at S phase revealed the highest transformation and mutation frequencies over various cell phases. In order to understand the mechanisms underlying these high frequencies, we developed an immunological method allowing us to follow the excision kinetics of UV-damage in single cells. Consequently, we established two monoclonal antibodies differentially recognizing each specified UV-damage.
At first, the hybridomas between spleen cells from a mouse immunized with UV-DNA and myeloma cells were screened in their binding to UV-DNA and a hybridoma producing antibody against (6-4) photoproduct in DNA was isolated. A further characterization of the antibosy, 64M-1 revealed that it recognizes

(6-4) photoproduct of thyminethymine or thymine-cytosine sequence in UV-DNA.
Secondary, by the fusion between the spleen cells from a mouse immunized with 313 nm UV-DNA in the presence of acetophenone, a hybridoma secreting antibody d irected against thymine-thymine dimer was isolated. The antibody TDM-1 bond to DNA irradiated with 313 nm UV in the presence of acetophenone and to UV-irradiated oligo(dT)_8.
The excision of (6-4) photoproduct and thymine dimer in UV-irradiated normal human, xeroderma pigmentosum(XP) and its variant (XPV) cells were compared by the enzyme linked immunosorbent assay(ELISA) using two monoclonal antibodies. The results obtained so far indicate that (1) (6-4) photoproduct was excised from DNA faster than thymine dimer in normal cells, (2) XP cells excised neither (6-4) photoproduct nor thymine dimer, and (3) XP cell were deficient in the excision of (6-4) photoproduct but proficient in the excision repair of thymine dimer. The defective repair of (6-4) photoproduct in XPV cel may explain their highly mutable and transfomable nature.
The labelling of the 64M-1 and TDM-1 antibodies with radioisotopes or fluorescence dyes made it possible to reace the excision kinetics of (6-4) photoproduct and thymine dimer in single cell. The experiment to follow the excision kinetics of such damage given at S phase in a cell through various phases is now in progress.▲ Less

Research Products (11 results)

All | Other

All | Publications (11 results)

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