

(6-4) 光産物からデュワー産物への異性化を指標とした太陽光紫外線線量計の開発

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2001 Fiscal Year Final Research Report Summary

Establishment of a solar UV dosimeter based on the photoisomerization of (6-4)photoproducts to the Dewar isomers.

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展開研究

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環境影響評価(含放射線生物学)

Research Institution

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Research Abstract

We established a solar UV dosimeter measuring the UV intensity of wavelengths ranging from 300 to 340 nm.

The solar UV, especially UVB(290-320nm)induces cyclobutane pyrimidine dimers(CPD)and(6-4)photoproduct(64P) in cellular DNA. Furthermore, the UV wavelengths ranging from 300 to 340 nm in solar light are known to efficiently photoisomerize 64P to its Dewar isomer(DwP). The latter is said to be highly mutagenic. Thus, we need to establish a dosimeter measuring the accumulation of the DwP in DNA for the risk assessment of solar UV. However, none of dosimeters measuring the wavelengths

from 300 to 340 nm has been established so far. To establish a new UV dosimeter, we carried out the experiments mentioned below,

1) We blotted the DNA irradiated with 100 J/m² of UVC on a nylon membrane. The membrane was then exposed to various doses of monochromatic UV light from the Okazaki Large Spectrograph. After exposure, the membrane was treated with DEM-1 antibody immunohistochemically and the color intensity was assayed (immuno-dot-blot : IDB). The results obtained so far revealed the photoisomerization of DWP from 64P efficiently occurs at 320 nm.

2) By using the same method (IDB), we measured the UV doses from 300 to 340 nm emitted from the Mylar-filtered UVB lamp (Toshiba FL-20SE). The color intensity of the blotted DNA on the nylon membrane increased linearly with increasing doses of UVB. Thus, we succeeded to produce a new solar UV dosimeter measuring the wavelengths from 300 to 340 nm.

Research Products (30 results)

All Other

All Publications

[Publications] Otoshi, E.: "Respective role of cyclobutane pyrimidine dimers, (64)photoproducts, and minor photoproducts in ultraviolet mutagenesis of repair deficient xeroderma pigmentosum A cells"Cancer Res.. 60(6). 1729-1735 (2000) ▼

[Publications] Ide, F.: "In vivo detection of ultraviolet photoproducts and their repair in Purkinje cells"Lab. Invest.. 80(4). 465-470 (2000) ▼

[Publications] Horiki, S.: "Protective effects of sunscreens on photocarcinogenesis, photoageing, and DNA damage in XPA gene knockout mice"Arch. Dermatol. Res.. 292(10). 511-518 (2000) ▼

[Publications] Torizawa, T.: "DNA binding mode of the Fab fragment of a monoclonal antibody specific for cyclobutane pyrimidine dimer"Nucleic Acids Res., 28(4). 944-951 (2000) ▼

[Publications] Perdiz, D.: "Distribution and repair of bipyrimidine photoproducts in solar UV-irradiated mammalian cells. Possible role of Dewar photoproduct in solar mutagenesis"J. Biol. Chem., 275(35). 26732-26742 (2000) ▼

[Publications] Yokoyama, H.: "Crystal structure of the 64M-2 antibody Fab fragment in complex with a DNA dT(6-4) T photoproduct formed by ultraviolet radiation"J. Mol. Biol., 299(3). 711-723 (2000) ▼

[Publications] Cario-Andre, M.: "Studies on epidermis reconstructed with and without melanocytes : Melanocytes prevent sunburn cell formation but not appearance of DNA damaged cells in fair-skinne caucasians"J. Invest. Dermatol., 115(2). 193-199 (2000) ▼

[Publications] Ray, AJ.: "The spectrum of mitochondrial DNA deletions in a ubiquitous marker of ultraviolet radiation exposure in human skin"J. Invest. Dermatol., 115(4). 674-679 (2000) ▼

[Publications] Takeuchi, S.: "Formation of DNA lesions in cucumber cotyledons exposed to UV radiation"Environ. Sci., 13. 351-355 (2000) ▼

[Publications] Otschi, E.: "Respective role of cyclobutane pyrimidine dimers, (6-4)photoproducts, and minor photoproducts in ultraviolet mutagenesis of repair deficient xeroderma pigmentosum A cells"Cancer Res., 60(6). 1729-1735 (2000) ▼

[Publications] Ide, F.: "In vivo detection of ultraviolet photoproducts and their repair in Purkinje cells"Lab. Invest., 80(4). 465-470 (2000) ▼

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[Publications] Ray, AJ.: "The spectrum of mitochondrial DNA deletions in a ubiquitous marker of ultraviolet radiation exposure in human skin"J. Invest. Dermatol., 115(4). 674-679 (2000) ▼

[Publications] Takeuchi, S.: "Formation of DNA lesions in cucumber cotyledons exposed to UV radiation"Environ. Sci., 13. 351-355 (2000) ▼

- [Publications] Budiyanto, A.: "Protective effect of a topically applied olive oil against photocarcinogenesis following UVB exposure of mice" *Carcino-genesis*. 21(11). 2085-2090 (2000) ▼
- [Publications] Satou, K.: "Efficient chemical synthesis of a pynmidine (6-4)pyrimidone photo-product analog and its properties" *Tetrahedorn Letters*,. 41. 2175-2179 (2000) ▼
- [Publications] Sakamoto, A.: "Immunoxpression of ultraviolet photoproducts and p53 mutation analysis in atypical fibroxanthoma and supferficial malignant fibrous histiocytoma" *Modern Patol.*,. 14. 581-588 (2001) ▼
- [Publications] Kiyosawa, K.: "Amplified UvrA protein can ameliorate the ultraviolet sensitivity of an Eschrichia coli recA mutant" *Mutation Res.*,. 487. 149-156 (2001) ▼
- [Publications] Mone, M. J.: "Local UV-induced DNA damage in cell nuclei results in local transcription inhibition" *EMBO Rep.*,. 2. 1013-1017 (2001) ▼
- [Publications] Katsumi, S.: "In situ visualization of ultraviolet-light-induced DNA damage repair in locally irradiated human fibroblasts" *J. Invest. Dermatol.*,. 117. 1156-1161 (2001) ▼
- [Publications] Hayashi, S.: "The relationship between UVB screening and cytoprotection by microcorpuscular ZnO or ascorbate against DNA photodamage and membrane injuries in keratinocyte by oxidative stress" *J. Photochem. Photobiol., B.*,. 64. 27-35 (2001) ▼
- [Publications] Wakasugi, M.: "DDE stimulates the excision of cyclobutane pyrimidine aimers in vitro in concert with XPA and RPA" *J. Biol. Chem.*,. 276. 15434-15440 (2001) ▼
- [Publications] Tanaka, M.: "Effects of photoreactivation of cyclobutane pyrimidine aimers and pyrimidine (6-4) pyrimidone photopioducts on ultraviolet rhutagenesis in SOS-induced repair-deficient Escherichia coli" *Mutagenesis*,. 16(1). 1-6 (2001) ▼
- [Publications] Wakasugi, M.: "DDB accumulates at DNA damage sites immediately after UV-irradiation and directly stimulates nucleotide excision repair" *J. Biol. Chem.*,. 16(1). 1637-1640 (2001) ▼
- [Publications] Ishigaki, Y.: "Evidence for a pioneer round of mRNA translation : mRNAs subject to nonsense-mediated decay in mammalian Cells are bound by CBP80 and CBP20" *Cell*,. 106. 607-617 (2001) ▼
- [Publications] Katayama, S.: "Fission yeast F-box protein Pof3 is required for genomic instability and telomere function" *Mol. Biol. Cell*,. 13. 211-224 (2002) ▼

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