163 UVB-Irradiation of Hamster Cells: Formation of Long-Lived Radicals

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When hamster embryo cells are irradiated with UVB at room temperature, we found out the formation of long-lived radicals by ESR. The yields of radicals increase linearly with increasing irradiation time. A quantum yield of their formation is 2.8×10^{-5}. The amounts of the radicals decrease rapidly to a half of the initial yields at about one hour after the irradiation, and then decrease very slowly. When vitamin C is added to the cells at one hour after the irradiation, the radicals decay drastically by the reaction with vitamin C. The rate constant for the reaction was measured as 6.0×10^{-2} $dm^3mol^{-1}sec^{-1}$, which is much larger than that(7.0×10^{-2} $dm^3mol^{-1}sec^{-1}$) of vitamin C with long-lived radicals produced by γ-irradiation of hamster embryo cells.

164 **The Effect of Gamma Ray Irradiation and Ultraviolet Ray Irradiation on the Chaperone Activity of α-Crystallin**

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The mammalian lens protein consist mainly of α,β and γ-crystallin. Recently it has been reported that the heat aggregation of β or γ-crystallin is inhibited by the chaperone activity of α-crystallin. In the present study, we irradiated γ ray or ultraviolet (UV) ray on α-crystallin in order to evaluate the effect of radiation on the chaperone activity of α-crystallin. Alpha-and βL-crystallin were isolated from calf lenses. Alpha-crystallins (1mg/ml) were subjected to γ ray irradiation of 500Gy, 1000Gy, and 1500Gy. Then we evaluated the chaperone activity of the α-crystallin by inhibition of heat aggregation of βL-crystallin. Alpha-crystallins were subjected to UV (310nm) irradiation of 54J/cm^2,108J/cm^2, and 162J/cm^2 in order to investigate the loss of the chaperone activity of α-crystallin. Depending on the dose both in γ ray and UV irradiation, the chaperone activity of α-crystallin decreased. The activity of α-crystallin irradiated by γ ray of 3000Gy was reduced to 1/6, while that of α-crystallin subjected with UV irradiation of 162J/cm^2 decreased to 1/8 compared with that of non-irradiated α-crystallin. The results suggest that γ ray and UV irradiation to α-crystallin may cause changes of higher-order structure of protein and post-translational modifications in α-crystallin.

165 **An UV-B Action Spectrum of Apoptosis Induction on Mammalian Cells**

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To know mechanisms of skin damages through apoptosis caused by exposures of natural sunlight, dependency of wavelength for induction of apoptosis on mammalian cells was investigated.

L5178Y cells suspended in PBS$^-$ were exposed to different wavelengths of monochromatic UV lights that produced from the Okazaki Large Spectrograph (OLS) at the National Institute of Basic Biology (NIBB), Okazaki. The exposed cells that shows apoptotic changes as chromatin condensation were scored after a fixation and a fluorescent staining following 5 or 20 hours of post-incubation. Light doses that induce apoptosis in 10 % cells in UV-B region were 190 J/m^2 at 300 nm, and very high dose (2 MJ/m^2) was required for UV-A light at 365 nm. The action spectrum for induction of apoptosis was very similar to that for induction of erythema on human skin (CIE value) in UV-B region. This suggests that the erythemal action may caused through the apoptosis.

More over, morphological shapes and the time courses for apoptotic changes were different between shorter and longer wavelengths. Quick changes were observed in longer UV-B light (313 nm), but delayed changes were found in shorter UV-B (< 305 nm) region.