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**ELECTRON MICROSCOPIC STUDY ON THE EFFECT OF  
 $\gamma$ -IRRADIATION ON THE CHROMATIN STRUCTURE**

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This study was performed to determine the changes of the chromatin structure in the nuclei of irradiated cells. Mouse L cells were  $\gamma$ -irradiated with 1 Mrad at 0°C under various conditions, and then ultrathin sections of the cells were examined under an electron microscope. Diffused chromatin regions of the nuclei were selected for elucidating the radiation effects on the chromatin structure.

The distribution and diameter of the elementary chromatin fibers in the irradiated nuclei under an aerobic condition were essentially identical to non-irradiated control cells. On the other hand, an increase in the distance between the chromatin fibers was observed in the cells irradiated after bubbling them with oxygen gas for 20 minutes. In addition, a greater increase was shown in the cells bubbled with oxygen gas during irradiation. No changes were observed, however, in the presence of N-oxyl and Ro-07-0582, although these reagents have similar functions to oxygen. To resolve this discrepancy, Ca ions were utilized as agents, because it has been reported that Ca ions caused the structural labilization of chromatin by weakening the electrostatic bond between the protein and DNA upon exposure to radiation. Expectedly, an increase in the distance between the chromatin fibers was clearly demonstrated in the presence of excess Ca ions.

It, therefore, seems probable that oxygen as well as Ca ions have properties which weaken the bond between the protein and DNA in the chromatin, resulting in the visualization of structural changes of the nuclei following irradiation by electron microscopy.