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131 Biological Effectiveness of Ultrasoft X-rays from the Characteristic X-ray Generator of Radiation Biology Center, Kyoto University

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Biological effectiveness or radiation weighting factor of low-energy photons still remains as a matter of discussion. Monoenergetic ultrasoft X-rays provide useful probe for the microdosimetric insight into the energy dependent biological effectiveness. Recently, a characteristic X-ray generating system was established in Radiation Biology Center, Kyoto University. The system includes carbon K, aluminium K, molybdenum L, iron K, chromium K, cupper K and cupper L shell X-rays. The beam characterization was made and chromosomal effectiveness was studied in quiescent mouse m5S cells. The chromosomal maximum RBE was dependent on photon energy and showed the highest value at around 10 keV: approximately 5 times higher than that of Co-60 gamma-rays. The observations were comparable to the results previously obtained in human peripheral blood lymphocytes irradiated with synchrotron orbit radiations, and were consistent with the binary misrepair of chromosomal DNA breaks in chromosome exchange aberration formation with a spatial restriction between breaks.

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