Abstract

DOSIMETRY AND RADIOBIOLOGY
OF SYNCHROTRON-PRODUCED ULTRASOFT X-RAYS

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Ultrasoft X-rays provide a unique tool to study the mechanism of radiation damage in biological systems. Experimenters have used X-ray tubes with titanium, copper, silver, magnesium, aluminum and carbon targets to generate characteristic X-rays of these materials to irradiate a variety of mammalian cell lines. Limitations in the photon intensity and the available energies from X-ray tube sources prevent definitive characterization of a relationship between photon energy and biological damage. Synchrotron radiation is a useful alternative source of low energy photons since it is available with high intensity over a continuous spectrum. A system was established including an appropriate dosimetry protocol and a workable system for conducting biology studies. A characterization of the system including spectral and intensity properties of the photon beam is presented. Cell survival curves for C3H/10T1/2 show increased efficiency for cell killing for 1-4 keV photons with respect to 250 kVp X-rays.

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