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Effects of Pulsed X-rays on Cancer Cells compared with Conventional X-rays Irradiation.¹ JALAJ JAIN, JOSE MORENO, SERGIO DAVIS, DIANA MORALES, BISWAJIT BORA, CRISTIAN PAVEZ, GONZALO AVARIA, LEOPOLDO SOTO, Comision Chilena de Energia Nuclear, RODRIGO ANDAUR, KATHERINE MARCELAIN, Universidad de Chile, COMISION CHILENA DE ENERGIA NUCLEAR TEAM, UNIVERSIDAD DE CHILE TEAM — It is demonstrated that pulsed X-rays (~ 15 ns) from a kJ plasma focus (PF-2kJ) device produce larger amount of cell death than conventional continuous X-rays in colorectal colon cancer line, DLD-1, for the similar amount of doses. At first, PF-2kJ was optimized for the maximum X-rays emission. Doses were characterized using thermoluminescent detectors (TLD-600). It was found that 60 pulses of X-rays provide about 0.7 Gy at a distance ~ 10.0 cm from the top of the PF-2kJ anode. Experiments were performed to irradiate (60 pulses of X-rays) DLD-1 cell line in vitro. Results show that 60 pulses of X-rays induce a significant cell death at 48 h post irradiation, which was ~ 3 -fold greater than that was induced at 0.6 Gy obtained from a conventional continuous X-rays irradiation, and similar to the cell death evoked at 12 Gy (continuous X-rays). Dose rate for pulsed X-rays from PF-2kJ, was found $\sim 10^7$ Gy/min that was larger than the conventional X-rays source (0.5 Gy/min). Thus, kJ plasma focus have potential applications in the area of cancer research. Results are encouraging to study the pulsed X-rays effects on different cancer cell lines, to study as a possible alternative of conventional radiation therapy.

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