

3 - 83 Study of Relationship between Telomerase Activity and Radiosensitivity in Human Cancer Cell Line MCF-7

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Telomeres are specific DNA structures at the end of chromosomes, which have possible functions including prevention of chromosome degradation, end-to-end fusions, rearrangements, and chromosome loss. Reports showed that telomere structure was particularly susceptible to oxidative stress (von Zglinicki, et al. 1995, 2000). So we tested our hypothesis that telomerase inhibition combined with heavy ion irradiation may lead to an radiosensitizing effect in cancer cells. According to our data, MCF-7 incubated with 2 μ M MST312 exhibited significantly reduced clonal survival after 2~3 Gy carbon-ion irradiation as compared to irradiation alone (Fig. 1). Carbon-ion irradiation alone induced mostly G2-M cell cycle arrest (Fig. 2). G2-M phase arrest was pronounced 24 h after carbon-ion irradiation. The G2-M arrest was alleviated in the subsequent 48 h but was still elevated versus control. G2-M arrest shifted to S phase arrest with the MST-312 incubation (Fig. 2, bottom panel). With the addition of MST-312, irradiated cells exhibited S phase arrest instead of G2-M arrest. Cell population in S phase was about two fold compared to irradiation alone (27.35% vs 14.69%), the increase proportion of S phase cells continued in the later 48 h.

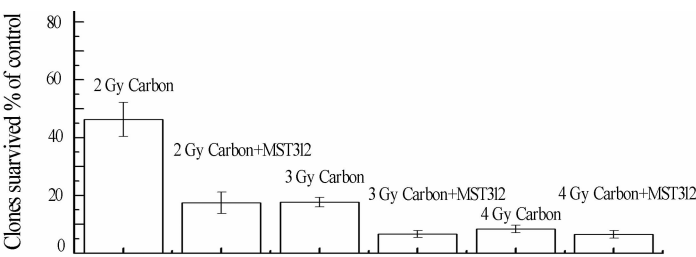


Fig. 1 Radiosensitivity of MCF-7 cells as measured by clone survival after carbon-ion irradiation and/or 2 μ M MST312 treatment.

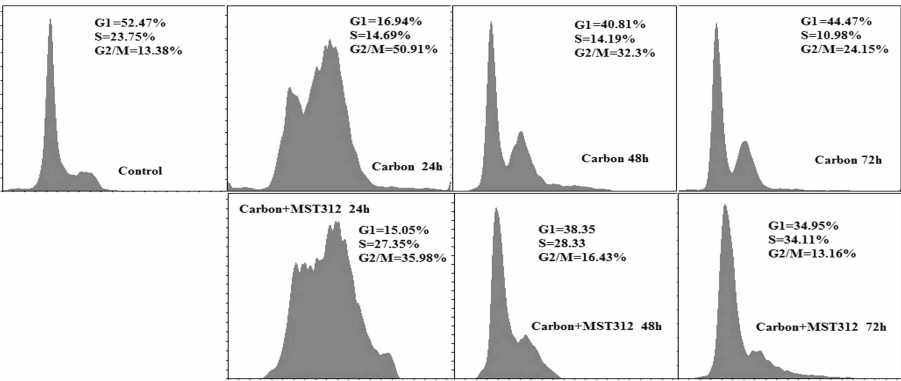


Fig. 2 Cell cycle distribution in MCF-7 Cells after carbon-ion irradiation and/or MST312 treatment.

Reference

[1] Thomas von Zglinicki, Violeta Serra, Mario Lorenz, et al. , Lab. Invest. , 80(2000)1739.