4 - 51 Sensitizing Glioma Cells to Heavy Ions by Genistein is Related to the Expression of DNA-PKcs

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The previous studies have reported that DNA-dependent protein kinase catalytic subunit (DNA-PKcs) plays a major role in radiosensitivity of cancer cells[1,2]. We used colony formation assays to investigate the effects of genistein on isogenic cell lines expressing different levels of DNA-PKcs after exposure to heavy ions. As shown in Fig. 1, genistein increased the radiosensitivity of DNA-PKcs positive (M059K) but not negative (M059J) glioma cells to heavy ions. To further determine whether sensitizing glioma cells to heavy ions by genistein is related to DNA-PKcs, we treated cells with Nu7026, a specific inhibitor of DNA-PK, and siRNA assays to interfere the expression of DNA-PKcs, both of which increased the radiosentivity of DNA-PKcs proficient cancer cells (M059K) as almost the same level as the genistein-treated group. Moreover, the data appears at 48 h after irradiation in M059K cells. The total apoptotic cells 48 h after irradiation, the total apoptotic cells in both genistein and Nu7026 pretreated groups were 38.42%±0.04 and 40.89%±0.05, respectively. Thus, we concluded the expression of DNA-PKcs is related to the sensitization of glioma cells to heavy ions by genistein. The detailed mechanisms underlying this phenomenon remain to be further studied.

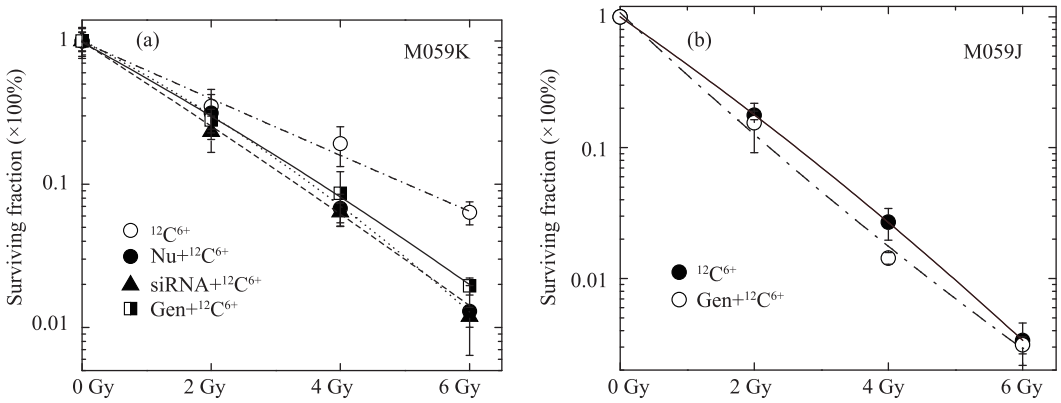

Fig. 1 Results of the colony formation assays. (a). M059K cells; the experiment was divided into different groups as follows:$^{12}C^{6+}$: heavy ion radiation; Nu+$^{12}C^{6+}$: 10 μmol/L Nu7026 pre-treated cells for 12 h before irradiation; siRNA + $^{12}C^{6+}$: 10 μmol/L genistein pre-treated cells for 24 h before irradiation. (b) M059J cells.

References

[1] W. Zhuang, B. Li, L. Long, et al., Brain Res., 1371(2011)7.

[2] DA Dungl, EN Maginn, EA Stronach, et al., Front Oncol., 5(2015)240.