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MnSOD downergulation induced by extremely low 0.1 mGy single and fractionated X-rays and microgravity treatment in human neuroblastoma cell line, NB-1

Indo H., Tomiyoshi T., Suenaga S., Tomita K., Suzuki H., Masuda D., Terada M., Ishioka N., Gusev O., Cornette R., Okuda T., Mukai C., Majima H.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Copyright © 2015 JCBN. A human neuroblastoma cell line, was treated with 24 h of microgravity simulation by clinostat, or irradiated with extremely small X-ray doses of 0.1 or 1.0 mGy using single and 10 times fractionation regimes with 1 and 2 h time-intervals. A quantitative real-time reverse transcription polymerase chain reaction (qRT-PCR) examination was performed for apoptosis related factors (BAX, CYTC, APAF1, VDAC1-3, CASP3, CASP8, CASP9 P53, AIF, ANT1 and 2, BCL2, MnSOD, autophagy related BECN and necrosis related CYP-40. The qRT-PCR results revealed that microgravity did not result in significant changes except for a upregulation of proapoptotic VDAC2, and downregulations of proapoptotic CASP9 and antiapoptotic MnSOD. After 0.1 mGy fractionation irradiation, there was increased expression of proapoptotic APAF1 and downregulation of proapoptotic CYTC, VDAC2, VDAC3, CASP8, AIF, ANT1, and ANT2, as well as an increase in expression of antiapoptotic BCL2. There was also a decrease in MnSOD expression with 0.1 mGy fractionation irradiation. These results suggest that microgravity and low-dose radiation may decrease apoptosis but may potentially increase oxidative stress.

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Keywords

Extremely small dose, Microgravity, NB-1, Neuron, Space radiation