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Published in:
Journal of Radiation Research

Published: 01/03/2014

Document Version:
Final Published version, also known as Publisher's PDF, Publisher's Final version or Version of Record

Published version (DOI):
10.1093/jrr/rrt161

Publication details:
Choi, V. W. Y., NG, C. Y. P., KOBAYASHI, A., KONISHI, T., OIKAWA, M., CHENG, S. H., & YU, K. N. (2014). Roles of nitric oxide in adaptive response induced in zebrafish embryos *in vivo* by microbeam protons. *Journal of Radiation Research*, *55*(suppl_1), i114. https://doi.org/10.1093/jrr/rrt161

Journal of Radiation Research, 2014, 55, i114
doi: 10.1093/jrr/rrt161

Poster Session 08: Bystander and other Low Dose Effect

Roles of nitric oxide in adaptive response induced in zebrafish embryos *in vivo* by microbeam protons

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Radioadaptive response (RAR) was successfully induced in dechorionated (5 h post-fertilization, hpf) embryos of the zebrafish, *Danio rerio*, by 3.4 MeV protons from the microbeam irradiation facility (Single-Particle Irradiation System to Cell, acronym as SPICE) [1] at the National Institute of Radiological Sciences (NIRS), against a challenging exposure of 2 Gy of X-ray irradiation at 10 hpf. The RAR induction was corroborated by reduced apoptotic signals at 25 hpf revealed through terminal dUTP transferase-mediated nick end-labeling assay. If *de novo* synthesis of factors was required for RAR induction, these should have already been synthesized at 5 h after the priming dose.

Application of a nitric oxide scavenger 2-(4-Carboxyphenyl)-4,4,5,5-tetramethylimidazoline-1-oxyl-3-oxide (cPTIO) to the medium at 0, 1, 2, 3 or 5 h after application of priming exposure significantly suppressed RAR. The suppression of RAR with the application of cPTIO to the medium at 5 h after the priming dose irradiation, where *de novo* synthesis of factors should have been completed, suggested that NO scavenging impaired the repair machineries in the bystander cells. The suppression of RAR with the application of cPTIO to the medium at earlier than 5 h after the priming dose irradiation could be explained by the scavenging of bystander NO signals in the medium and thus deterring the *de novo* synthesis of factors.

Keywords: protons; adaptive response; nitric oxide; zebrafish embryos

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