Phosphorylation of DNA damage-recognizing proteins at heavy-ion track

T. Ohnishi(1), A. Takahashi(1), K. Nojima(2), Y. Furusawa(2) and K. Ohnishi(1)

(1)Dept. Biol., Nara Med. Univ. School Med., Nara, and (2)Heavy-ion Radiobiol. Res. Group, NIRS, Japan (tohnishi@naramed-u.ac.jp/Phone: +81-744-29-8812)

To identify the repair dynamics for high LET-radiation-induced DNA damage, we analyzed the focus formation after exposure to iron-ion beams (500 MeV/u, 200 KeV/um) using immunocytochemical methods. Since the focus formation of phospho-H2AX (gamma-H2AX), which is well understood to be activated at radiation-induced double strand breaks (DSBs), we performed the visualization of the tracks, spatial distribution of lesions from an aspect of dose dependency. The number of this track induced by iron-ion beams was well corresponded with the value of a calculation well. In addition, we demonstrate that DNA damage-recognizing proteins such as phospho-serine 1981 of ATM, phospho-threonine 2609 of DNA-PKcs, phospho-serine 343 of NBS1 and phospho-threonine 68 of Chk2 co-localized with gamma-H2AX at high LET-radiation-induced portion. These findings suggest that iron-ion beams were quite effective for detection of DNA damages of DSBs recognized with DNA repair enzymes used here after phosphorylation of them, because iron-ion beams can be used to generate extremely localized at DNA damages within restricted regions of the nuclei.