

21 **RBE and OER for Cell Killing upon V79 Cells by Heavy-Ion Beams at a Very High LET Region**

Yoshiya FURUSAWA¹, Mizuho SAITO¹, Tatsuaki KANAI¹, and Fumio YATAGAI²

¹Natl. Inst. Radiol. Sci., Inage, Chiba 263, ²Inst. Physical Chemical Research, Wako, Saitama 351-01.

The relative biological effectiveness (RBE) and oxygen-enhancement ratio (OER) of cell killing for 95 MeV/u ⁴⁰Ar and 90 MeV/u ⁵⁶Fe ion beams at a very high LET region (280 - 3900 keV/μm) was determined using the RIKEN ring cychrotron upon V79 cells.

From the results of a previous study for ²⁰Ne, ¹²C, and ³He beams, the so-called bell-shaped LET-RBE relationship had been found in the middle (10 - 400 keV/μm) LET region. The RBE for ⁴⁰Ar-ion beams at 280 keV/μm was 3.9, and decreased monotonously along with an increase in the LET to become 0.74 at 2520 keV/μm. A similar decreasing function was also found for ⁵⁶Fe-ion beams. The RBE at 630 keV/μm was 2.2, and decreased to 0.44 at 3900 keV/μm. The OER that monotonously decreased with the LET and to approximatly 1 at the high middle LET region above, showed no more change, or a slight increase again with the LET in very high LET region. This may have been caused by the effect of low-LET delta-rays.

22 **Sensitivity of Heavy-Ion Beam in Scid Mouse Lung Fibroblast Cells.**

Tatsuya SHIMASAKI¹, Makoto IHARA², Rikou OH², Kumio OKAICHI², Harumi OHYAMA³, Yoshiya FURUSAWA³, Akihiro KOJIMA¹, Kenshi KOMATSU⁴, Yutaka OKUMURA²; ¹RI Center, Kumamoto Univ., ²Nagasaki Univ. School of Med., ³NIRS, ⁴Hiroshima Univ.

We have studied the scid cell survival and repair kinetics of potentially lethal damage (PLD) after irradiation with wild type Balb/c and hybrid scid cells containing the fragment of human chromosome 8. Scid fibroblast cell line was established from lung tissue of scid mouse with SV40 virus transfection. Scid cells was highly sensitive to carbon-ion beam compared with Balb/c 3T3 cells. Scid cell containing human chromosome 8 have become as sensitive as Balb/c 3T3 cell. The repair of PLD after irradiation of carbon-ion beam did not exist in scid cells, Balb/c 3T3 cells and hybrid cells.

23 **Expression of VEGF mRNA by irradiation with X-ray and heavy-ion beam**

Soichiro ANDO¹, Kumie NOJIMA¹, Masao SUZUKI¹, Hiroshi YAMAGUCHI¹, Yoshiya FURUSAWA¹, Sachiko KOIKE¹, Koichi ANDO¹, Hiroshi ISHIHARA², and Takayuki KURIYAMA³

¹Space and Particle Radiation Science Reserch Group and ²Bioregulation Reseach Group

Natl Inst Radiol Sci, Chiba 263

³Division of Chest Medcine Chiba University School of Medicine , Chiba 260

Vascular endothelial growth factor(VEGF) is a multipotent cytokine , and particulary plays an important role in angiogenesis of normal tissue and tumor. To investigate the alteration of its mRNA expression after irradiation, we here examined the effect of X-rays and heavy-ion beams irradiation on human lung squamous carcinoma cells(RERF-LC-AI) using Northern blot analysis. The expression of VEGF mRNA by X-ray irradiation increased after 16 through 24 hours, maximum being 3.1-fold to control. Heavy-ion beams also increased the VEGF mRNA to 3.4-fold after 16 hours of irradiation. We are now investigating the dependency of VEGF expression on LET.