Correction
1-P-097 Different Responses of Malignant Melanomas and Squamous Cell Carcinomas to X-rays and Heavy-Ion Beam-III
KOAIKI, Mitsho 1, SHINO, Yaya 1, NIE, Jing 1, FURUSAWA, Yoshiha 1, ANDO, Koich 1 1(Heavy-Ion Radiobiol. Res. Gr. Natl. Inst. Radiol. Sci.)

It has been reported that malignant melanomas (MM) are resistant to conventional radiotherapy with low-LET radiations, but surprisingly sensitive to the carbon-ion-beam therapy at HIMAC. On the other hand, it is also known that squamous cell carcinomas (SCC) are resistant to both radiation therapies. To make clear the difference and utilizing the heavy-ion radiotherapy, the difference in the survival curves between the cell lines of MM and SCC were measured. Moreover, the radio-responses for the MM cell lines were in the previous year, and that for SCC were added. The MM and SCC cell lines exposed to carbon-ion beams (220 MeV/u) at the center of 6 cm SOSB at HIMAC, alpha/beta ratio and other survival parameters of the survival curves were analyzed. In case of MM, alpha/beta ratio increased when carbon beam was used compared with that for X-ray. But, in case of SCC, no clear difference was observed between carbon and X-rays. It means that carbon beam has an advantage for MM on radiotherapy.

1-P-088 Radiation sensitivity of 51 human cancer cell lines

Radiation sensitivities of the cultured cell lines established from 51 human esophageal squamous cell carcinoma (ESCC) and 29 other human cancer tissues were investigated with the colony-formation assay. There was a large variation in radiosensitivity among the 51 cell lines. MRE11 and BRCA1 genes were involved in the homologous recombination (HR) pathway. Radiosensitivities of BRCA1- or MRE11-defective cell lines were higher than those of other cell lines. Twenty-two of 29 ESCC lines tested had mutations in the p53 gene. Variance in radiosensitivity was not explained according to the status of p53. Unusual radiosensitivity was observed in one ESCC cell line. DNA-PKcs protein had low levels and was not phosphorylated after X-irradiation. DNA-PKcs is involved in the non-homologous end-joining (NHEJ) pathway. Our data suggest that genes which are involved in the HR or NHEJ pathways on DSBRs are mutated in cells having unusual radiosensitivity.

1-P-099 p53 and bak Mutations in Oral Cancers Associated with Betel Quid Chewing in Vietnam

Betel quid chewing is very common in India and other Southeast Asian countries, and it is an important risk factor in oral carcinogenesis. To know the underlying mechanisms and the response to radiotherapy, we have analyzed 50 primary oral squamous cell carcinomas for mutations in the p53 gene (exons 4-8) and bak gene (exons 3,4,6) by PCR-Cold SSCP and direct sequencing. The incidence of p53 mutation was 38% (9 of 50), while it was only 10-18% in betel quid-related oral cancer. Most mutations (80%) were transition mutations. Furthermore, mutations were found predominantly in codon 249 and codon 284 (12%, and 12%, respectively), and 33% of the amino acid changes were Pro to Ser. Mutations were also found in the bak gene, and poor prognosis was observed in cancer patients with bak mutation, although there were no differences between p53 mutation (+) and (-) patients.

1-P-100 Evaluation of Quality of Life (QOL) during concurrent chemoradiation therapy for Head and Neck cancer using an EF-2001

Purpose: Chemoradiation therapy for head and neck cancer may cause some normal tissue toxicity and affecting quality of life of patients during and after treatment. Method: We prospectively studied 40 patients with advanced head and neck cancers who received concurrent chemoradiation therapy. Patients were divided into two groups consecutively: BRK group received concurrent chemoradiation therapy with 1000 mg of EF-2001 three times per day during whole treatment schedule of concurrent chemoradiation therapy. Results: 33 patients were evaluated. There was no statistical difference comparing BRK group against NBRK group at first treatment week. The most remarkable change during the treatment was QOL score of the gastrointestinal symptom and the appetite in BRK group was reported. Conclusion: The use of EF-2001 as nutritional supplement may be proposed as a means of improving the worsening in quality of life for head and neck cancer patients during chemoradiation treatment.

1-P-101 Development of an accurate dose calculation system for remotely supporting radiotherapy
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For conducting radiotherapy properly, accurate dose distributions in a patient body is inevitable. Therefore, it is desired that basic technology for evaluating accurate dose application to various cases in order to promote the quality of radiotherapy generally. Further, it is important to reduce the load and time consumed in advanced therapy like IMRT. We started a project to develop a system for providing accurate patient doses utilizing a sophisticated human model and the Monte Carlo calculation. In the system, CT pictures and therapy procedure data are sent from the hospital to the dose calculation center through a network; a human model is constructed rapidly; the accurate dose distribution is calculated on parallel computers and sent back to the hospital.

1-P-102 Comparison of Biological Dose Calculation of Therapeutic Carbon Beam by GSI and NiRS Scheme

Therapeutic carbon ions and target nuclei are broken up into fragment particles when colliding with each other. The biological effect to a cell depends not only on dose, but also the beam quality, i.e., the LET and particle species. At NiRS, the beam is treated as a cohort of monoenergetic carbon ions that have sole dose-averaged LET value. The response of HSG cells to such monoenergetic carbon ions is applied for the estimation. On the other hand, GSI uses the Local Effect Model that takes radial dose structure of each ion and resultant deposited local dose to a CHO-K1 cell nucleus into account for the estimation. The comparison of the two models was carried with elemental LET spectra of therapeutic carbon beam to make an intercomparison of both clinical results possible. It was found that both models produced almost identical biological dose distribution; however, NiRS scheme shows slightly shallower biological effect around the distal edge of SOBP region.
Evaluation of Quality of Life (QOL) in concurrent chemoradiation therapy for Head and Neck cancer using a EF-2001 Lactic Acid Bacteria (BeRMKAIN®)

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# Table 1. Characteristics of Patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
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<td>Number of Patients</td>
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</tr>
<tr>
<td>Age (Yr)</td>
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<tr>
<td>Average</td>
<td>57</td>
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<tr>
<td>Range</td>
<td>35 - 78</td>
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<tr>
<td>Gender</td>
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<tr>
<td>Female</td>
<td>7</td>
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<tr>
<td>Male</td>
<td>33</td>
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<tr>
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<td>II</td>
<td>4</td>
</tr>
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<td>III</td>
<td>36</td>
</tr>
</tbody>
</table>
Table 2-1. Scoring of Quality of Life (QOL)

- Nausea?
  1 = None, 2 = A little, 3 = A lot, 4 = A great deal

- Feel any urinary difficulty? (urinary Sx.)
  1 = None, 2 = A little, 3 = A lot, 4 = A great deal

- How much pain?
  1 = None, 2 = A little, 3 = A lot, 4 = A great deal

- Feel any anxiety?
  1 = None, 2 = A little, 3 = A lot, 4 = A great deal
**Table 2-2. Scoring of Quality of Life (QOL)**

- **Describe your appetite**
  1 = Very good, 2 = Good, 3 = Fair, 4 = Bed

- **How about your gastric discomfort? (GI Sx.)**
  1 = None, 2 = A little, 3 = A lot, 4 = A great deal

- **How did you do today? (activity)**
  1 = Full active, 2 = A light work, 3 = Got up, did not nothing, 4 = in bed.

- **Toleration of your therapy?**
  1 = Very well, 2 = Fairly well, 3 = Bad, 4 = Very bad
Fig. 1. Average QOL change in BRK & NBRK group
Fig. 2. QOL change in NBRK group

- Nausea
- Urinary Sx
- Pain
- Anxious
- Appetite
- GI Sx
- Activity
- Tx Tolerance

Legend:

Bad QOL

Good QOL

1st week
4th week
Last day of Tx
Fig. 3. QOL change in BRK group

Bars indicate QOL change over time:

- Nausea
- Urinary Sx
- Pain
- Anxious
- Appetite
- GI Sx
- Activity
- Tolerance

Graph shows QOL change from 1st week to Last day of Tx.
Fig. 4. Remarkable changed QOL items in BRK group.