Results: Irradiation with low doses enhanced the motility of the cells. Slit2 as well as Robo1 was extremely low expressed in the cell line with higher motility (U87). Irradiation reduced the expression even more. On the other hand, a stable overexpression of Robo1 decreased significantly the migration of the cells and suppressed the increase in motility observed after irradiation. In contrast, the siRNA mediated knockdown of Robo1 increased the migratory potential of the cells. The analysis of FAK, a key player in cellular migration, revealed a decreased expression in Robo1-overexpressing cells.

Conclusion: Our data indicate a role for Robo1 in the migration of malignant GBM cells. The expression of Robo1 reduced the migration of these cells and was also able to impede the increase in motility observed after irradiation with photons.

Poster: Radiobiology track: Radiobiology of protons and heavy ions

PO-0999

Reduced side effects by proton minibeam radiotherapy in a mouse ear model

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Purpose or Objective: Proton minibeam radiotherapy aims to minimize normal tissue damage in the entrance channel while keeping tumor control through a homogeneous tumor dose due to channel widening with increasing track length. Side effects of proton minibeam irradiation were examined in an in-vivo mouse model to account for immune system, vasculature and higher complexity. Here, we report on our comparative study of minibeam and broad beam irradiation in the ear of Balb/c mice, to prove this hypothesis of reduced adverse effects in normal tissue.

Material and Methods: At the ion microprobe SNAKE, 20 MeV protons were administered to the right ear of 2-3 months old, female Balb/c mice, using an average dose of 60 Gy in a field of 7.2 x 7.2 mm2 in the central part of the ear, in two irradiation modes, homogeneous and minibeams. The 4 x 4 minibeams of 180 x 180 µm2 size were set in a distance of 1.8 mm, resulting in a dose of 6000 Gy in the channels, but with negligible dose in between. Inflammatory response, i.e. ear swelling and skin reactions were monitored for 90 days following irradiation, as well as genetic damage and release of inflammatory proteins.

Results: No ear swelling or other skin reaction was detected after the minibeam irradiations, while significant ear swelling (up to 4-fold), erythema and desquamation (crust formation) developed in homogeneously irradiated ears 3-4 weeks after irradiation. Loss of hair follicles was only detected in the homogeneously irradiated fields after 4-5 weeks.

Conclusion: Our results prove that proton minibeam radiotherapy leads to reduced side effects compared to conventional broad beam irradiation and could become an option in clinical proton and/or heavy ion therapy.
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PO-1000

Effect of X-rays and carbon ions on cell survival and expression of Hh pathway genes in cancer cells

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Purpose or Objective: Metastasis is an important cause of mortality in cancer patients and evidence shows that irradiation could actually increase the formation of metastasizing cells. An important pathway implicated in the process of metastasis is the Hedgehog (Hh) signaling pathway. Recent studies demonstrated that activation of this pathway can lead to radioresistance. So far, the impact of high-LET radiation on the Hh pathway is still unknown. In the present study the impact of different radiation qualities (e.g. X-rays and carbon ions) on Hh gene expression was investigated in prostate cancer cells (PC3) and medulloblastoma cells (DAOY).

Material and Methods: *In vitro* models used for prostate cancer and medulloblastoma were PC3 and DAOY, respectively. Colony survival assays were performed to analyze the effect of radiation on cell survival. The impact of radiation on the expression of the different Hh signaling pathway components (SHH, PTCH, SMO, GLI1, GLI2, GLI3 and SUFU) was investigated by means of RT-qPCR. Experiments with X-rays were performed at SCK•CEN (Mol, Belgium) whereas carbon ion irradiation (LET = 33.7 KeV/µm) experiments were performed at the Grand Accélérateur National d'Ions Lourds (GANIL) (Caen, France).

Results: Colony survival assays showed that DAOY cells were more radioresistant than PC3 cells (respectively D10=5.3 Gy and D10=4.2 Gy). Evaluation of the Hh signaling pathway showed that basal gene expression is present in both PC3 and DAOY, although very low. However, basal gene expression of the Hh components differed between both cell lines. Moreover, the more radioresistant cell line DAOY had higher expression levels of Gli1 compared to the PC3 cells. Preliminary RT-qPCR results show that different radiation qualities induce different changes in the expression of the Hh signaling components.

Conclusion: In conclusion, radiation exposure can induce changes in the Hh pathway. Future experiments will address whether modulation of the Hh pathway also affects the radio-responsiveness of cancer cells.

Poster: RTT track: Strategies for treatment planning

PO-1001

Dosimetric impact of flattening filter and flattening filter-free beams on IMRT planning of NSCLC

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Purpose or Objective: This retrospective study aimed to compare and determine the potential dosimetric benefits of intensity-modulated radiotherapy (IMRT) treatment plans with (FF) and without flattening filter (FFF) as well as to explore the dosimetric differences in 6MV FFF and 10MV FFF plans for non-small-cell lung carcinoma (NSCLC).

Material and Methods: Ten cases of CT data were selected from NSCLC patients. 4 sets of 5-field-IMRT plans were computed with FFF beams (X6FFF, X10FFF) and flattened beams (X6FF, X10FF) with the prescription of total 60Gy in 30 fractions. Planning constraints were based on the Radiation