scans were from the mid-brain to proximal femora using a dedicated Philips Gemini GXL PET/CT scanner. If a patient underwent more than one FDG-PET/CT scan, the most recent available study was used for analysis. All FDG-PET/CT data was reviewed on OsiriX (version 5.1.2). All metabolically active disease regions on FDG-PET/CT studies were manually contoured by consensus between a nuclear medicine physician and a radiation oncologist. Spatial overlap between MTV and GTV was measured using the Dice similarity coefficient (DSC) which was calculated in Matlab with CERR and in house scripts. The value of a DSC ranges from 0, indicating no spatial overlap between two volumes in spaces, to 1, indicating complete spatial overlap. Other geometric descriptors were also calculated including volume, centre of mass and dimension. Univariate Cox regression was used to determine whether DSC was associated with OS and PFS.
Forty three patients were included in the study with a median age of 69 years (51-91). Median follow-up was 1.8 years (0.6-6.1) with 29 patiens experiencing relapse, there were 13 patients alive at the time of analysis and 30 deceased. The median value for the treated GTV volumes and the DSC was 77.4 (3.7-387.3) and 0.63 (0.18-0.86) respectively. The DSC was not found to be associated with PFS (p=0.85) or OS (p=0.70).

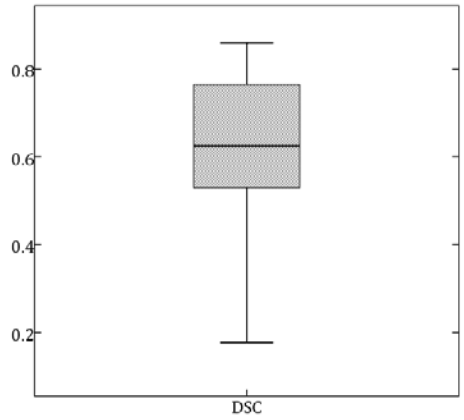

Figure 2 Boxplot displaying values of Dice similarity coefficient for MTV and GTV

Results in a small cohort show a moderate overlap between GTV and MTV, as represented by the DSC and that there is limited correlation between this and OS or PFS. Further investigation in a larger sample with modern treatment techniques (i.e. IMRT, VMAT and SBRT) will aid in clarifying the relationship, if any, between known clinical prognostic factors, novel metabolic parameters and the end-points of progression-free survival and overall survival.

Keywords: GTV, MTV, NSCLC

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Radiation induced DNA damage in human uveal melanoma cells.
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Purpose: Biological effects of proton beam irradiation, despite their wide clinical use, are not well understood. In recent years some differences in DNA repair mechanisms[1][2], angiogenesis and metastatic potential between proton beam and X-ray radiation were described[3,4].
Materials/methods: Mel270 human uveal melanoma cells, derived from primary tumor, were irradiated with 1 – 5 Gy of X ray (300 kVp Phillips, 1Gy/min) or proton beam (58 MeV) from Proteus C-235 cyclotron. Cells were analysed for survival using both rate of proliferation and clonogenic assay. DNA damage was evaluated after 4 and 8 hours using immunofluorescence staining of γ-H2AX, 53BP1 (for double strand breaks) and XRCC1 (for single strand breaks) and detection with confocal microscopy.
Results: Mel270 proliferation was slightly inhibited after 1 Gy, and strongly inhibited after 5 Gy. RBE value for Mel270 cells was determined. Staining of proteins showing DNA damage present several distinctive features.The foci of γ-H2AX were bigger than the others. Two kinds of foci could be distinguished:1) with high colocalization preference, below 1μm between foci; 2) random distribution, above 1μm between foci. The number of SSBs foci is higher at 4 than at 8 h after irradiation.
Conclusions: Low doses of proton beam irradiation and X rays damage DNA affecting the formation of foci indicating single and double strand breaks. The number of SSBs decreases with time.

Keywords: biology, melanoma, proton beam irradiation, DNA damage

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Production of and research on medical radioisotopes at the heavy ion laboratory, University of Warsaw
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Two charged particle accelerators are currently in operation at the Heavy Ion Laboratory, University of Warsaw (HIL UW): a K=160 isochronous cyclotron accelerating gaseous ions from He to Ar to energies from 2 to 10 MeV/nucleon and a high current medical p/d cyclotron, accelerating protons to an energy of 16 MeV and deuterons to an energy of 8 MeV. The alpha particle beam from the isochronous cyclotron and protons and deuterons from the medical cyclotron are currently used to produce research quantities of therapeutic and diagnostic radioisotopes. Occasionally, the C30 proton cyclotron at Świerk at National Centre for Nuclear Research is also employed.
The present research program includes the production of the Targeted Alpha Therapy isotope ^{211}At, the prospective PET radioisotopes ^{43}Sc,^{44}Sc and ^{44m}Sc and the positron generator