

AbstractID: 10969 Title: Radiosensitization of endothelial cells model using gold nanoparticles for microbeam radiotherapy

**Purpose:** Microbeam radiotherapy (MRT) is a technique that use array parallel thin (<100µm) slices of synchrotron generated x-ray beam. In this study, we investigated the radio-sensitizing effects of gold nanoparticles (AuNps) on endothelial cells culture model in combination with irradiation of MRT. **Method and Materials:** : Bovine aortic endothelial cells (BAECs) were cultured as a confluent monolayer on a 2 well chamber slides with 0mM, 0.5 mM and 1.0mM of AuNps. The cells were irradiated with 10 Gy of synchrotron generated x-ray beam of median energy 150 kVp. Each microbeam is approximately 30 microns wide with a spacing of 200 microns between adjacent microbeams. Gafchromic films were attached to the cells culture slide to verify the dose received by the cells. The experiments were performed on the BL28B2 beamline at the SPring8 Synchrotron Japan. The cells were then fixed at 6, 12 and 24 hours after irradiation and were imaged using phase contrast microscope. Cells viability assays using tryphan blue exclusion method were performed after 24 hours of irradiation. **Results:** The observations under phase contrast microscopy show all the cells were dead at the area of irradiation. Samples with AuNps clearly showed the path of microbeam which is visible as a straight line compared to the samples without AuNps. There are some neighbouring cells start to migrate to the irradiated area, filling the gap for both samples. The cells viability results showed the dose enhancement effects where only 52% cells survived for 0.5 mMol AuNps and only 18% survive for 1mMol AuNps when irradiated with microbeam. These results were expressed as percentage relative to the control samples. **Conclusion:** The results demonstrate that the AuNps are effective radiosensitizer that will increase the therapeutic efficacy of MRT.