

AbstractID: 12644 Title: Monitoring the response to photodynamic therapy in murine tumours with contrast-enhanced micro-CT

Purpose: To identify if contrast-enhanced micro-computed tomography (micro-CT) can be used as a non-invasive imaging device to detect the vascular response of murine tumours following photodynamic therapy (PDT).

Method and Materials: A solution of RIF-1 cells (10^5) was injected subcutaneously in the posterior flank of C3H mice, 3 weeks prior to the treatment. Two groups of treated mice and two control groups were used (n=5 per group). The two PDT-groups were treated with fluences of 150 J/cm^2 and 50 J/cm^2 . The photosensitizer dose was kept constant in both groups. One control group was exposed to light only (no photosensitizer was administered), while the other did not receive any type of treatment. The imaging procedure consisted of 10 eight-second scans: 2 pre-PDT (before and after contrast agent administration) and 8 post-PDT (at various time-points up to 24 hours). The tumours removed after the last scan were prepared for histology. The PDT response was quantified by finding the ratio of blood-to-tumour volume from the micro-CT images. The ratios were compared at each time-point among the four groups in order to identify the group and time-point showing the strongest PDT response detectable with micro-CT.

Results: A significant vascular response was detected at 8 and 24 hours after treatment when using a light fluence of 150 J/cm^2 ($p < 0.01$). Hematoxylin and eosin staining confirmed the treatment effects at the cellular level.

Conclusion: Our results indicate that contrast-enhanced micro-CT can be used as a non-invasive imaging tool to detect the vascular response of tumours following PDT.