

AbstractID: 11363 Title: An Investigation of the Effect of Micro-CT Radiation Dose on Tumor Growth in Mice.

Purpose: This study is designed to determine the impact of longitudinal micro-CT imaging on tumor growth in mice.

Method and Materials: C57BL/6 mice were divided into four groups, a control group and 3 imaging groups. The control group received no imaging while each remaining group underwent a different imaging protocol. Each mouse received an inoculation of 2×10^5 B16F1 cells (murine melanoma), subcutaneously in the right hind flank. All imaging was performed on a fast volumetric micro-CT scanner (GE LocusUltra, London, Canada). The three imaging protocols were as follows: 1. 'Low dose' - An 8 second scan with tube settings of 80 kVp and 70 mA (~ 7 cGy entrance dose per scan), 2. 'Medium dose' - 30 second scan at 80 kVp and 50 mA (~ 17 cGy entrance dose per scan) and 3. 'High dose' - 50 second scan at 80 kVp and 50 mA (~27 cGy entrance dose per scan). The imaging was performed four times: once every four days, starting on the fourth day post inoculation. After the final imaging session each tumor was excised, weighed and imaged (to obtain the final tumor volume) and then processed for histology. Final tumor mass and volume are used to evaluate the impact of longitudinal micro-CT imaging on the tumor growth.

Results: Preliminary results have been obtained for n=8 mice per group. An ANOVA test indicates a significant difference in mean final tumor mass ($p = 0.049$), with the 'Low dose' tumors being largest on average.

Conclusion: These preliminary results indicate the 'Low dose' tumors have a faster growth rate than the tumors in the other groups, however the power of this test is low ($\beta = 0.49$). We are currently working to increase the sample size to n = 16, which should yield acceptable power ($\beta \approx 0.1$).