

AbstractID: 6476 Title: Absorbed Dose Estimates Obtained via PET imaging for I-124 Intact Antibody in Nude Mice

Purpose: To estimate tumor targeting and radiation dose in mice receiving I-124-labeled anti-CEA (Carcinoembryonic Antigen) intact monoclonal antibody. Use of I-124 as a PET emitter is complicated by high-energy photons (603 keV and 723 keV at 63% and 10% respectively) emitted along with the positrons (23%).

Method and Materials: Intact monoclonal antibody cT84.66 was labeled with I-124 and injected via tail vein into nude mice bearing LS174T human colon tumors (0.04 to 0.19 g). PET imaging was performed using the Siemens MicroPET RF scanner at seven time points out to 8 days post-injection. Standard energy window of 350- 750 keV was employed. Average voxel values from organ volumes of interest were used to determine relative magnitudes of activity in tumor, liver, heart (blood) and whole body. Absolute activities were calculated by normalizing these PET data to dissection results at the last time point. Bi-exponential functions were fitted to resultant activity vs time curves and integrated to establish \tilde{A} values and residence times. Organ-to-organ S factors were determined by Monte Carlo analysis of I-124 in a 20g digital mouse phantom. Organ dose was then estimated as the matrix product of $S\tilde{A}$.

Results: Tumors were visualized within one day of injection. Average residence times for blood, tumor, liver and whole body were 45, 6.5, 7.0 and 86 hours respectively. Mean dose for the tumors was 3.3 Gy/MBq; associated liver and whole body average values were only 0.60 and 0.31 Gy/MBq respectively.

Conclusions: Small colon tumors can be PET-imaged in nude mice receiving the I-124 anti-CEA antibody cT84.66. By normalizing voxel results to those obtained at sacrifice, quantitative I-124 uptakes can be measured and used to generate residence times. Ratios of tumor/liver and tumor/whole body dose were approximately 5 and 10 respectively.