AbstractID: 6853 Title: Novel microCT Imaging Techniques for In Vivo Quantification of Vascular Volume in Murine Tumor Models

Purpose: Growing interest in angiogenesis and anti-angiogenic tumor therapy has created a demand for vascular imaging techniques. This work describes a method for *in vivo* quantification of vasculature in murine tumor models using contrast enhanced μCT.

Method and Materials: Mice from a prostate tumor line were imaged over a span of three weeks to measure growth, and SCC xenograft mice undergoing anti-angiogenic therapy with Avastin™ were imaged over eleven days to monitor tumor response. Mice were injected with 0.4 mL of a μCT blood pool contrast agent and scanned using a Siemens Inveon μCT/PET scanner. CT images were manually segmented into tumor and vascular volume in a commercial software package (Amira 4.0, Mercury Computer Systems) and tumor volume was compared to vascular volume.

Results: Over the span of three weeks, the prostate model increased in tumor volume by a factor of four and the vascular volume increased by a factor of 15. The ratio of vascular volume to tumor volume increased from 1.5% to 6%. In the xenograft models, a measurable decrease in tumor and vascular volume was seen in both mice, but the ratio of vascular volume to tumor volume stayed relatively constant (approximately 4% in the 400 mm^3 tumor and 17% in the 100 mm^3 tumor).

Conclusion: This work demonstrates the capability for *in vivo* quantification of tumor vasculature with a minimally invasive procedure. In particular, the technique was sufficiently sensitive to monitor vascular growth and to determine a therapeutic effect from molecular therapy over the span of eleven days. This technique may be useful as a tool to better understand the process of tumor-induced angiogenesis and evaluate the efficacy of targeted molecular therapies.