AbstractID: 13261 Title: Multi-modal MRI, SPECT and CT Imaging of Theranostic Nanoplatforms

**Purpose:** The development of non-invasive imaging techniques for the assessment of cancer treatment is rapidly becoming highly important. Magnetic Cationic Liposomes (MCL) that carry a cargo of anti-cancer drugs and magnetic nanoparticles, that will selectively target primary and metastatic cancer tumors, deliver drugs to them, and visualize their effects through magnetic resonance imaging (MRI), single photon emission computed tomography (SPECT) and fluorescence spectroscopy. The aim of the present study is to evaluate MCL as a versatile theranostic nanoplatform for enhanced drug delivery, imaging and monitoring of cancer treatment.

**Materials and Method:** Poly-ethyleneglycol (PEG) coated cationic liposomes are loaded with superparamagnetic iron oxide nanoparticles (SPIONS) and tagged with the radioisotope Indium-111. MCL was administered to SCID mouse with metastatic (B16-F10) melanoma grown in the right flank. Pre-injection and post-injection MR and SPECT/CT images were used to assess response to magnetic targeting effects and tumor and organ distribution.

**Results:** Tumor signal intensities in T2 weighted images decreased an average of 20±5% and T2* values decreased and average of 14±7ms in the absence of magnetic targeting. This compares to an average signal decrease of 57±12% and a decrease in T2* relaxation times of 27±8ms with the aid of external magnet showing up to 2-fold greater accumulation by magnetic targeting. SPECT/CT images showed the localization and distribution of MCL in the tumor.

**Conclusion:** MR, SPECT/CT and biodistribution analyses clearly show the efficacy of MCL as MRI contrast agents, prove the use of magnetic guidance, and demonstrate the potential of MCL as agents for imaging, guidance and therapeutic delivery.