AbstractID: 2972 Title: Comparison Between PET And Bioluminescence Imaging For Quantitative Assessment Of Tumor Burden

Purpose:
A number of imaging modalities have been described for the study of rodent models of human biology and disease. Several of these modalities are based on traditional clinical imaging approaches, such as MRI, CT, PET/SPECT, and can often serve as methods for validating some of the newer modalities such as bioluminescence imaging (BLI), which has shown to be a highly sensitive tool for visualizing tumors, neoplastic development, metastatic spread and response to therapy. In this report, the ability of BLI to noninvasively quantitate the growth of orthotopic rat neuroblastomas was investigated.

Method and Materials:
Male nude (nu/nu) mice 7 - 8 weeks of age were used in this study (N=6). Orthotopic rat neuroblastomas derived from N2A neuroblastoma cells genetically engineered to stably express firefly luciferase ($N2A^{Luc}$) were implanted subcutaneously by injecting 100 µl NaCl (0.9%) containing $3x10^6$ viable cells in the left hind flank of the mice. Tumor burden was monitored over time by quantitation of photon emission and viable tumor volume using a cryogenically cooled CCD camera and positron emission tomography (PET), respectively. Animals were injected 200uCi of ^{18}FDG one hour before PET imaging. The viable tumor boundary was delineated on PET images using an in-house software at each time point and the tumor volume was then calculated.

Results:
A comparison between the BLI findings and the PET-defined tumor volume revealed a good correlation (R^2=0.8) between detected photons and viable tumor volume.

Conclusion:
Before small animal imaging as a means to assess tumor growth and response to therapy in orthotopic tumor models, animal survival was used as the primary therapeutic end point. The ability of imaging to follow temporal changes in tumor volume and response to treatment in an individual animal provides an accurate and rapid method for assessment of experimental therapeutics.