

**AbstractID: 3120 Title: Comparison between two small animal imaging CT devices used for quantifying lung damage in mice in vivo.**

**Purpose:** Compare two x-ray computed tomographic approaches to non-invasively assess lung damage in mice: a commercially available micro-CT and a prototype flat panel CT (fpCT) system.

**Method and Materials:** The micro-CT system requires respiratory gating, has a fixed tungsten anode x-ray tube, and a CCD camera. A technique of 81 mA•sec at 80 kVp (0.16Gy) was utilized. The fpCT system accommodates a breath hold method, has a conventional CT x-ray tube, and two CsI flat-panel detectors. A technique of 800 mA•sec at 70 kVp (0.032Gy) with 200  $\mu$ L of IV contrast was used. In this pilot investigation a subset of ten C57Bl/6 mice were analyzed; these mice received either 3 U/kg of Bleomycin to induce lung damage or saline for the control group by intratracheal administration. Both groups were serially scanned with both devices at baseline, 10, 14, and 21 days. Lung volumes at each time point were calculated using Analyze 5.0 for both the micro-CT and fpCT image data sets.

**Results:** Analysis of micro-CT images resulted in smaller lung volumes than fpCT, most likely due to the gating procedure. Although the micro-CT images exhibited more detail, the fpCT images had less noise and more tissue contrast within the lung regions, enabling easier detection of lung damage. The net decrease in measured lung volume due to damage accumulation over 21 days was 40 % from micro-CT and 37 % from fpCT with respect to the average baseline lung volumes. Control mice lung volumes were stable to within 20% for both CT systems.

**Conclusion:** The use of IV contrast with the fpCT system more than compensated for the reduced spatial resolution in this study. These mice survived multiple CT sessions even though lung damage was quickly accumulating in some cases. Additional data will be presented representing the complete study (n=19 mice).