

Anthropomorphic Mouse Phantoms and Accurate Small Animal Radiation in Cabinet Irradiators

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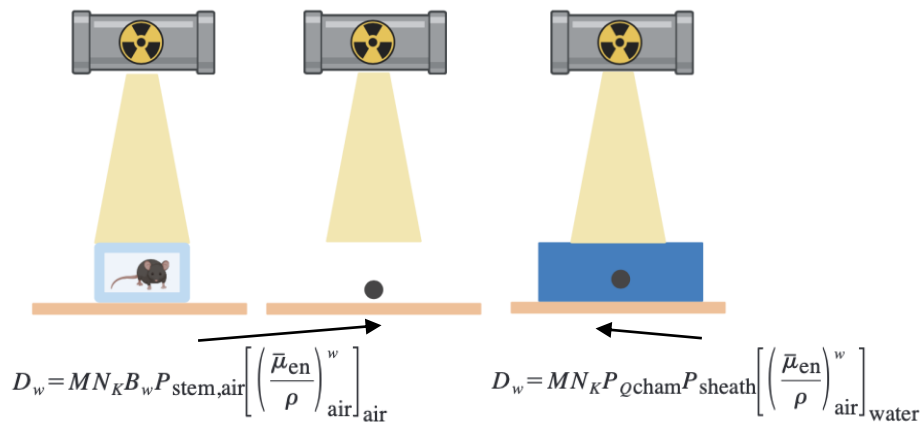
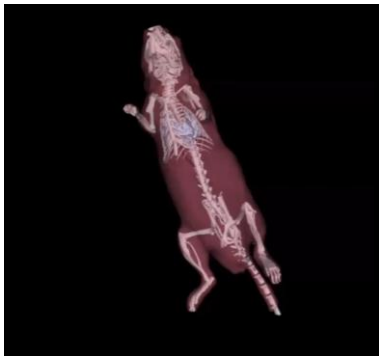
Introduction & Motivation:

1. Preliminary animal studies found 10% RBE between orthovoltage x-ray and 137-Cs in mice
2. *In vitro* work found no biological difference
3. Animal studies calibrate x-ray sources with TG-61 in-air method
4. Monte Carlos simulations of cabinet irradiators found up to 50% dose errors when geometry is not considered during calibration



Methods:

- Assess dose in mouse phantom for various calibration procedures
- Characterize external factors on dose (temp/pres, collimator, etc.)



Results:

- Higher potential for dose variability (daily fluctuations, duration of use, collimator, heel)
- Potential for small buildup at high HVL beams ($d_{max} \approx 0.2$ cm)
- Large difference in dose measured depending on in-air and in-water calibration protocol. In-water more accurate.