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Evaluation of a high resolution x-ray imaging system for radiography of the mouse

Mouse imaging has become an important tool for genomic science. While high resolution PET and CR systems provide volume data information, projection radiography of the mouse can provide simple evaluation of mouse anatomy at significantly lower doses and much shorter imaging times than microCT systems. In tumor-bearing mice, contrast agent injection can lead to contrast agent pooling near the site of the tumor, due to the leaky vessels which often accompany cancer growth. To image anatomy and contrast-enhanced tumors, a radiographic system for mouse imaging has been designed and fabricated in our laboratory, and testing has begun. An x-ray tube with a 0.070 mm focal spot coupled with a 1024 x 2048 (0.050 mm pixel) CMOS indirect (Gd₂O₂S) digital x-ray detector are the primary components of the mouse radiography system. The image performance of this system has been measured, and the system sensitivity, linearity, MTF, NPS, and DQE will be presented. Radiation dose estimates for mouse imaging will also be presented. The design of the mouse imaging system will be demonstrated, and preliminary images of phantoms and specimens will be presented.