



Copyright: A Statistical Atlas of the Mouse Trunk Region

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SUMMARY

Researchers at the University of California, Los Angeles (UCLA) have developed a comprehensive statistical atlas of the mouse trunk anatomy for use in preclinical imaging.

BACKGROUND

Small animal imaging modalities, such as micro-CT, micro-PET, and micro-MR, are frequently used in preclinical studies. The laboratory mouse is the most widely used small animal model for cancer, immunology, neurodegenerative, and metabolic disease studies. In order to extract anatomical information from mouse images, it is necessary to perform organ segmentation from the 3D images. Human operator-based processing of 3D images is tedious and subject to bias. Therefore, it is desirable to develop a computerized approach to accomplish this task. A promising solution involves registration of a digital mouse atlas to an acquired image. Organ labeling by the atlas can define organ regions in the mouse image. With this strategy, an atlas can give a more accurate, more reliable, and easier estimation of organ region of a preclinical mouse subject.

INNOVATION

Researchers at UCLA have developed a novel digital atlas of the mouse trunk region, which contains most of the major organs for preclinical pharmaceutical studies. This computerized atlas is distinct from other anatomical models in that it accounts for anatomical variances in size, age, and strain of mice. The atlas uses two independent statistical methodologies to contour the mouse anatomy and therefore allows highly accurate co-registration of the atlas to preclinical images from either micro-CT or micro-PET.

APPLICATIONS

Preclinical Mouse Study

- Positron Emission Tomography (PET) and micro-CT
- CO-registration of anatomical atlas with PET images eliminates the need for PET/CT studies
- Pharmacology & Toxicology: Accurate estimation of probe uptake into specific atlas-defined organ regions
- Anatomical CO-registration allows statistical quantification of preclinical micro-CT data between different subjects and between different organs

ADVANTAGES

- The statistical atlas is constructed based on many subjects, allowing anatomical variations in the mouse population to be accounted for.
- Two statistical methods are used to endow the atlas with statistical knowledge of mouse anatomy. These methods account for inter-mouse anatomical variations and shape correlations between different organs.
- A registration method is designed to register the statistical atlas to preclinical images like micro-CT and micro-PET.

STATE OF DEVELOPMENT

The researchers have developed a functional prototype of the mouse trunk atlas. The atlas has been studied for statistical effectiveness by CO-registration with micro-CT and micro-PET images. Micro-PET testing used three distinct probes. Co-registered images have been color coded in probability maps to confirm the accuracy of organ alignment.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

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OTHER INFORMATION

KEYWORDS

Research & Drug Discovery Tools,

Imaging, CT, MRI, Digital imaging,

Preclinical

CATEGORIZED AS

- **Imaging**
 - Medical
 - Molecular
 - Software
- **Sensors & Instrumentation**
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