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| Comparing lung ventilation using x-ray velocimetry across various mammals |
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| **Introduction:** Preclinical lung function assessments using animal models play a crucial role in enhancing our understanding of the underlying mechanism of pulmonary disease. However, a significant drawback of conventional lung function methodologies is considering the lung as a single unit, leading to global measurements. The location and level of ventilation throughout the lung is not available. X-ray Velocimetry (XV) provides lung ventilation data, quantifying air movement throughout the lung during breathing, in high detail. Drawing on our emerging XV analysis experience in animal models, we present here XV findings from normal mice, rats, ferrets, sheep and pigs.  **Methods:** Small animals: For XV scans, mice, rats and ferrets were anaesthetised, tracheostomized, and then secured in a custom 3D-printed holder, and a single XV image acquisition performed in a Permetium XV scanner (4DMedical). Large animals: Anaesthetised sheep and pigs had XV imaging performed according to 4DMedical standard fluoroscopic procedures as used in humans, on a Siemens Artis Zee fluoroscope. All XV scans were analysed by 4DMedical to provide measurements of mean specific ventilation (MSV), ventilation heterogeneity (VH) and ventilation defect percentage (VDP).  **Results:** MSV was significantly different between the various animal species: mice had the highest MSV (0.36 ml/ml), while ferrets had the smallest MSV (0.09 ml/ml). Sheep had the highest VH of 68%, which was significantly different from all other animal species, except ferrets. Comparing the ventilation maps of each animal species revealed ventilation distributions that appeared to be related to lung shape, body form, and body orientation.  **Conclusion:** These emerging data sets provide the first information on how XV-based lung ventilation heterogeneity differs across species. Detail that underlies simple airflow heterogeneity metrics is also revealed. XV lung ventilation analyses have clear potential for tracking disease development and treatment targeting in human or veterinary medicine.  **Acknowledgements:** MRFF.  **Key words:** x-ray velocimetry, lung function, animal models |