Comparison of microCT measurements to quantitative histology and gene expression and histology in COPD:

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Background

Methods
Whole lungs donated by patients with severe COPD treated by lung transplantation and lungs donated for transplant and released for research when no suitable recipient is identified within the required time frame serve as controls. These specimens are inflated with air and held at a constant transpulmonary pressure while they are rapidly frozen in liquid nitrogen vapour and kept frozen on dry ice while they are cut into 2cm thick slices from lung apex to base. Companion samples located in close proximity to each other are removed from each slice and kept at –80°C. One of these samples is fixed at –80°C by placing it in a 1% solution of gluteraldehyde in pure acetone (freezing point -93°C) over night and then warming to room temperature before processing it for microCT. Portions of companion cores cut from each slice are warmed to -1°C and vacuum-embedded in solution of optimal cutting temperature compound (OCT) (Sakura Finetek USA Inc, Torrance, CA, USA) immediately refrozen on dry ice and mounted in a cryostat. A total of 200 serial sections cut from each frozen block are alternatively assigned for either gene expression profiling or quantitative histology.

Purpose
To review the procedures briefly described above and present data relating microCT measurements of lung structure to both gene expression and quantitative histology.

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