

**Supplementary Figure 1:** Diagram of data analysis for the time-series HPX-MRI. The segments of lung lobes from the high resolution CT in (a) are applied to HPX-MRI images in (b). Signal for each time-step in (c) are fitted to the HPX signal decay equations in (d). Knowing  $T_1$ : Longitudinal magnetization decay time constant and;  $\alpha$ : Flip angle, the signal is corrected in (e).