Supplemental Digital Content 2

Topographic Distributions of Regional ^{18}F-FDG Kinetics Parameters

The regional ^{18}F-FDG net uptake rate (K_i), fractional volume of distribution (F_e), and phosphorylation rate (k_3) were dependent on gravitational position, with largest gradients observed in the High-Strain LPS group (Figure S6).

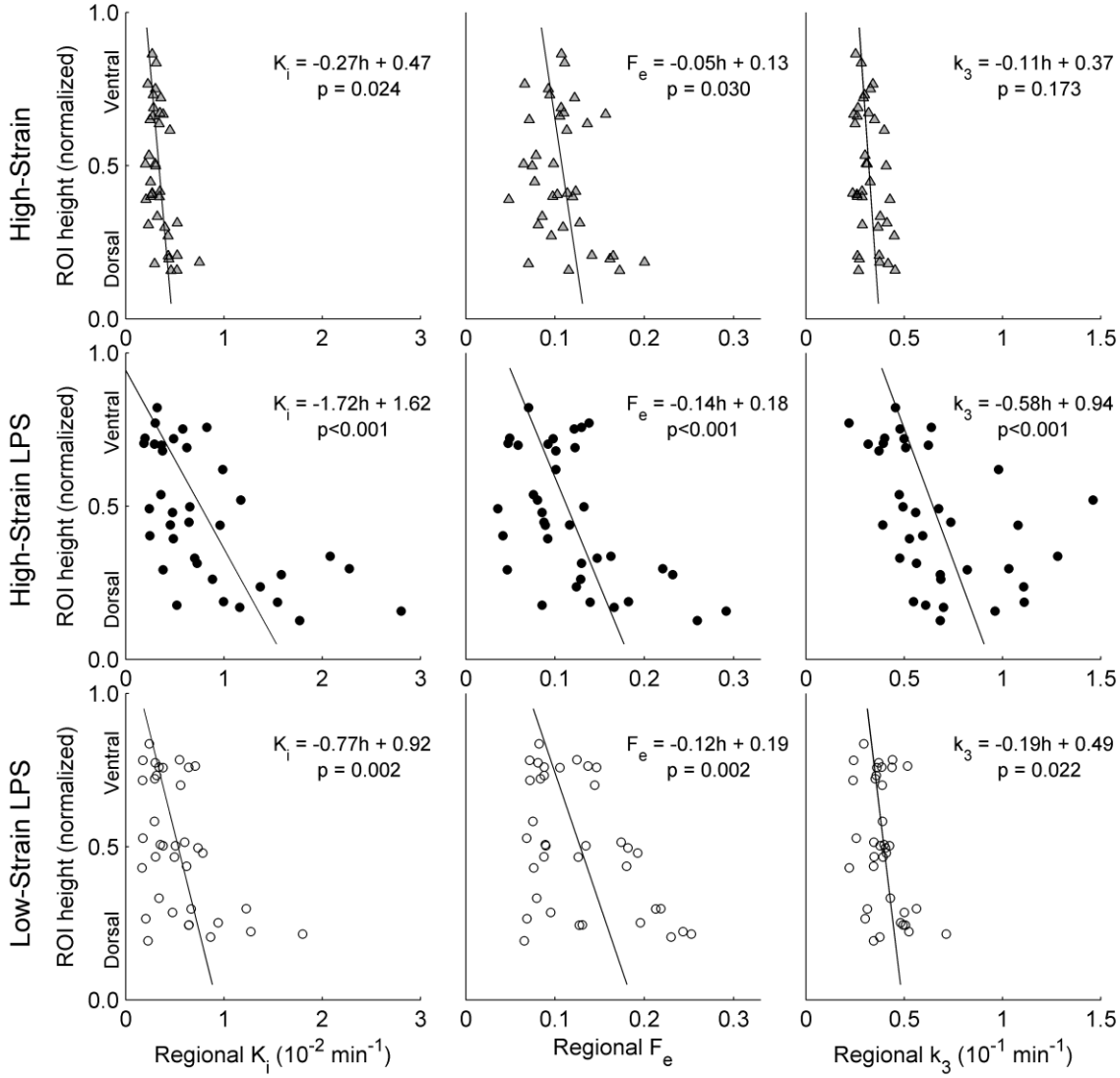
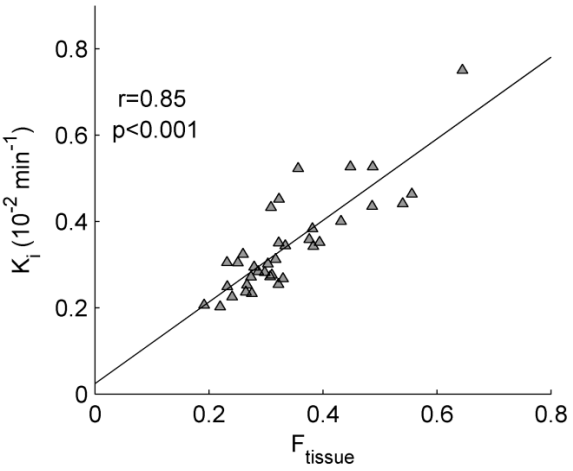
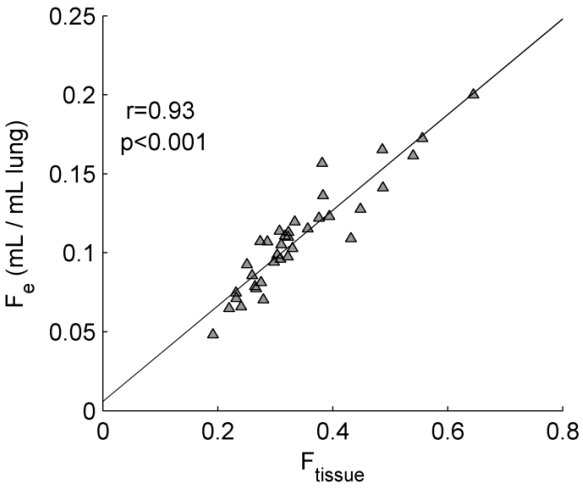


Figure S6. Distributions of ^{18}F-FDG net uptake rate (K_i), fractional volume of distribution (F_e), and phosphorylation rate (k_3) as a function of gravitational position. All parameters showed a dependence on gravitational position, with highest values in dorsal, dependent lung regions. Mixed-effects model fit and significance are shown.

Dependence of Regional ^{18}F-FDG Kinetics Parameters on Tissue Density

In order to study the dependence of ^{18}F-FDG kinetics parameters on tissue density, we analyzed the associations of K_i, F_e, and k_3 with fractional tissue density in the High-Strain group (Figure S7). We focused this analysis only on the High-Strain group because the lungs in this group were closest to "normal" lung conditions out of the three groups studied, and thus exhibited a higher degree of heterogeneity in tissue density than in metabolic activity. We found that both K_i and F_e showed strong linear associations with fractional tissue density ($F_{tissue} = 1–F_{GAS}–F_B$), supporting that these parameters are direct functions of tissue density. In contrast, k_3 showed no dependence on F_{tissue} over a wide range of values of F_{tissue}, suggesting that k_3 is not a direct function of tissue density.





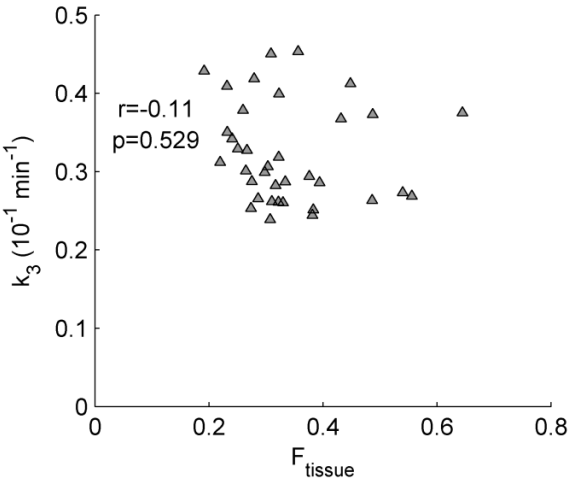


Figure S7. Dependence of ^{18}F-FDG kinetics parameters K_i, F_e, and k_3 on regional fractional tissue density ($F_{tissue} = 1 – F_{GAS} – F_B$) in the High-Strain group. Whereas both K_i and F_e showed a strong linear dependence on tissue density, k_3 was not associated with tissue density in these conditions.