

**Assessment of pulmonary physiological changes caused by
aging, cigarette smoking, and COPD with hyperpolarized
 ^{129}Xe magnetic resonance**

Electronic Supplementary Material (ESM)

| Parameter | Mean ± Standard Deviation | | | Significant differences (<i>p</i> value) | |
|-----------------------------|---------------------------|------------------------|------------------------|---|----------|
| | HY (<i>n</i> = 20) | YAS (<i>n</i> = 5) | AS (<i>n</i> = 28) | HY – YAS | YAS - AS |
| Demographics | | | | | |
| Sex | 10M/10F | 4M/1F | 25M/3F | / | / |
| Smoking (Pack years) | 0 | 10.0 ± 3.8 | 34.3 ± 18.4 | / | < 0.01 |
| Age (Years) | 33.3 ± 7.5 | 31.4 ± 4.4 | 58.1 ± 7.7 | 0.49 | < 0.01 |
| Pulmonary Function Tests | | | | | |
| FEV ₁ /FVC | 0.82 ± 0.09 | 0.80 ± 0.05 | 0.77 ± 0.07 | 0.81 | 0.28 |
| Ventilation | | | | | |
| VDP (%) | 1.3 ± 1.0 | 1.6 ± 0.5 | 4.3 ± 1.7 | 0.18 | 0.01 |
| Lung morphometry parameters | | | | | |
| <i>h</i> (μm) | 194 ± 8 | 189 ± 12 | 183 ± 12 | 0.47 | 0.42 |
| <i>L_m</i> (μm) | 211 ± 21 | 216 ± 22 | 233 ± 30 | 0.57 | 0.27 |
| ADC (cm ² /s) | 0.034 ± 0.003 | 0.034 ± 0.003 | 0.036 ± 0.004 | 0.52 | 0.34 |
| Gas-transfer function | | | | | |
| <i>d</i> (μm) | 9.9 ± 0.7 | 9.8 ± 0.8 | 10.9 ± 1.8 | 0.80 | 0.07 |
| <i>δ</i> (μm) | 1.0 ± 0.3 | 1.3 ± 0.5 | 1.4 ± 0.5 | 0.13 | 0.79 |
| Hct | 0.22 ± 0.04 | 0.24 ± 0.04 | 0.16 ± 0.04 | 0.25 | 0.01 |
| RBC/TP | 0.43 ± 0.11 | 0.43 ± 0.09 | 0.27 ± 0.07 | 0.86 | 0.01 |

Supplemental Table: The comparisons of young asymptomatic smokers (YAS) with the HY and AS groups asymptomatic smokers. *HY*, healthy young; *YAS*, young asymptomatic smokers; *AS*, asymptomatic smokers; *M*, male; *F*, female; *FEV₁*, forced expiratory volume in 1 s; *FVC*, forced vital capacity; *VDP*, ventilation defects percent; *h*, alveolar sleeve depth; *L_m*, mean airspace chord length; *ADC*, apparent diffusion coefficient; *d*, total septal wall thickness; *δ*, barrier thickness; *Hct*, blood hematocrit; *RBC/TP*, ratio of xenon signal from red blood cells and interstitial tissue/plasma