

Supplemental methods and results

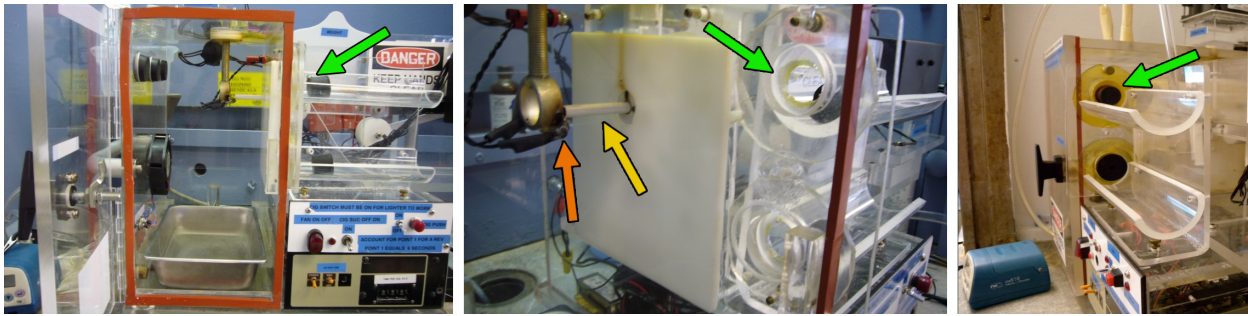
Validation of modified SHS exposure system. To achieve greater control over low RSP levels, we modified the smoking machine as described in the Methods section. The ability to confirm the desired exact starting level is an advantage of this system. However, to confirm that the ~20 liter volume of air in the exposure chamber was not limiting for respiration we exposed a test rat to 30 min of room air, followed by 30 min of clean air in the exposure chamber, and sampled arterial blood before and after each exposure for blood gas measurements with a blood gas analyzer (Diamond Diagnostics, Holliston, MA). The exposure to clean air in the chamber did not change blood pH, pCO₂, pO₂, or HCO₃ from values after exposure to room air (not shown), ensuring that physiological changes from subsequent smoke exposure would not be attributed to a lack of air.

Nitroglycerin administration. Nitroglycerin was injected into the tail vein at 8.8×10^{-5} mol/l as a 0.1 ml/100 g bolus to assess endothelium-independent vasodilation.

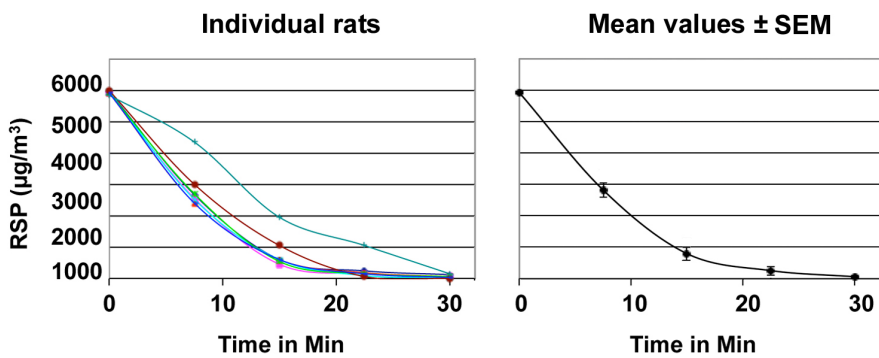
Serum measurements of cotinine. After the final FMD measurement in each experiment, rats were bled terminally and serum was collected. Cotinine was measured at the UCSF Helen Diller Family Comprehensive Cancer Center Tobacco Biomarkers Core.

Supplemental Table S1. Relative total exposure corresponding to varying exposure durations at 670 and 180 $\mu\text{g}/\text{m}^3$ starting concentrations.		
Mean target starting concentration ($\mu\text{g}/\text{m}^3$)	Duration of exposure	Relative total exposure ($\mu\text{g}/\text{m}^3 \cdot \text{min}$)
670 \pm 4.6	1 min	618
670 \pm 4.6	4 breaths (est. 15 s)	135
180*	10 min	947*
180*	1 min	165*

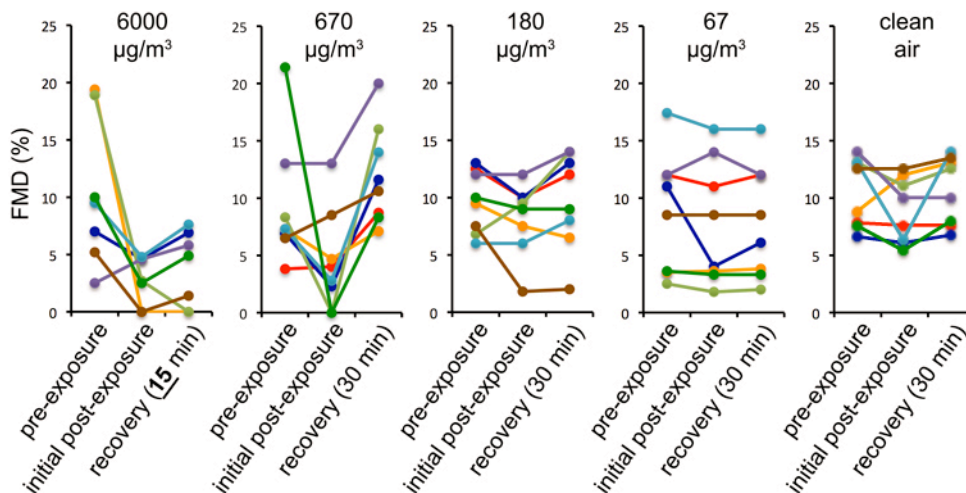
*Due to loss of particle detector data for this set, the total exposure values are extrapolated from the values for the other groups for reference.
Numbers following \pm are SEM.



Supplemental Figure S1. Redesigned smoke machine. Front, interior of smoke chamber, and exterior of smoke chamber are shown. Green arrows point to rat exposure ports, orange arrow points to automatic lighter coil, yellow arrow points to cigarette in smoking position.



Supplemental Figure S2: Changes in particle concentration in the SHS exposure chamber over time. Good reproducibility of kinetics over 30 min from a starting level of $\sim 6000 \mu\text{g}/\text{m}^3$ RSP was observed between eight replicate experiments. The average level over time was $1975 \pm 1104 \mu\text{g}/\text{m}^3$ (SEM); data for all conditions is shown in Table 1.



Supplemental Figure S3. All FMD data points for 30 minute duration exposures (see Figure 3). Each individual rat is followed over time.