**Explanation of rearing data collection**

Quantification of mouse locomotion and rearing behavior: To measure any effects of intranasal soot treatment on behavior, mice were individually placed in a 34 x 31 x 14 cm (L x W x H) plastic enclosure 1 month after the start of the treatment and within two days of perfusion and histology. All experiments were performed between 900 and 1600 ZT. The acquisition and analysis were done with the experimenter blinded to the treatment and the order of animals was randomized. Mice were placed in the enclosure for 20 minutes, and the behavior was quantified over this entire period. The enclosure was cleaned with 70% ethanol between mice. The amount of locomotion and rearing behavior were monitored using an Intel® RealSense™ Depth Camera D43[PD1] . This camera provides simultaneous visible light depth information used to calculate the animal’s distance from the camera. Images were acquired at nominal rate of 15 frames/second using MATLAB. To track the distance the animal traveled, the distance between the centroid of the mouse was calculated between each successive frame. This distance between frames is then summed over the course of the 20 minutes. Rearing events were defined as when the mean of the highest 20% of pixels of the mouse were above 8 cm from the bottom of the enclosure. Code for the acquisition and analysis of the behavioral data is here:

(https://github.com/KL-Turner/Norwood\_Turner\_Drew\_Manuscript2020).

A generalized linear mixed-effects model (MATLAB function fitglme) was used to evaluate the differences in rearing events, rearing duration, and distance traveled. Each treatment (water, Soot2040, Soot2040F) was a fixed-effect, with the mouse’s ID and sex (Male/Female) was treated as a random effect. We corrected for multiple comparisons (2) using the Bonferroni correction.

[PD1]1. Hong W, Kennedy A, Burgos-Artizzu XP, Zelikowsky M, Navonne SG, Perona P, Anderson DJ. Automated measurement of mouse social behaviors using depth sensing, video tracking, and machine learning. Proc Natl Acad Sci U S A. 2015;112(38):E5351-60. doi: 10.1073/pnas.1515982112. PubMed PMID: 26354123; PMCID: PMC4586844.