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The Effects of High Frequency Oscillatory Flow on Particles' Deposition in Upper Human Lung Airways JEREMY BONIFACIO[1], HAMID RAHAI[2], SHAHAB TAHERIAN[3], CEERS/COE/California State University, Long Beach — The effects of oscillatory inspiration on particles' deposition in upper airways of a human lung during inhalation/exhalation have been numerically investigated and results of flow characteristics, and particles' deposition pattern have been compared with the corresponding results without oscillation. The objective of the investigation was to develop an improved method for drug delivery for Asthma and COPD patients. Previous clinical investigations of using oral airway oscillations have shown enhanced expectoration in cystic fibrosis (CF) patients, when the frequency of oscillation was at 8 Hz with 9:1 inspiratory/expiratory (I:E) ratio. Other investigations on oscillatory ventilation had frequency range of 0.5 Hz to 2.5 Hz. In the present investigations, the frequency of oscillation was changed between 2 Hz to 10 Hz. The particles were injected at the inlet and particle velocity was equal to the inlet air velocity. One-way coupling of air and particles was assumed. Lagrangian phase model was used for transport and depositions of solid 2.5 micron diameter round particles with 1200 kg/m^3 density. Preliminary results have shown enhanced PM deposition with oscillatory flow with lower frequency having a higher deposition rate

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