Tobacco Smoke Exposure

Oxidative Stress

†MiR-638

Mitochondrial Dysfunction
DHCR7, ERAL1, SLC25A1, STARD3, TOMM40

†DNA Damage
DNA Repair
Telomere Shortening
APBB1, KRT7 MAD2L2

Accumulation of Damaged/Ubiquitinated Proteins
ATG9A, GANAB

Fibroblast Cellular Senescence (Replicative and Stress Induced)

Cell Cycle Arrest

Loss of Proliferative Capacity
ADAM15, ARHGDIA, COMMD1, DHCR7, HDAC5, MAD2L2, PFKL, YPEL3

Arrested Tissue Repair/ Decreased Matrix Protein Production

Emphysema

Chronic Inflammation
Aberrant Cytokine Secretion

Production of Proteases & Toxic Oxygen Species

Tissue Damage

Figure 6. Hypothesized Role for miR-638 in Emphysema