

Impact of Ozone Exposure on Mouse Colon

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There is growing concern about the health effects of ozone pollution. Through the gut-lung axis, ozone creates oxidative stress and damage in the lungs that may induce changes in the intestines. This study evaluated intestinal changes following ozone exposure. Free fatty acid receptor 3 (FFAR3) is a G protein-coupled receptor activated by short-chain fatty acids (SCFAs), metabolites produced from fermentation of fiber by gut bacteria. Activation of the receptor triggers regulation of immune cell activity. Goblet cells secrete mucins, which help maintain gut health. We hypothesized that ozone exposure alters intestinal function by changing FFAR3 expression and goblet cells in the distal colon of mice. C57BL6 male and female mice were exposed to 0.8 ppm ozone or air for 3 hours, or 1.5 ppm ozone or air for 2 hours over 6 weeks. Colon tissues were biopsied for histology and immunohistochemistry (IHC) after 24h. IHC was performed on acute air exposed female mice to visualize FFAR3 in the colon. We tested several blocking reagents with FFAR3 antibody and IgG control to determine the best FFAR3 staining. Colonic goblet cells in male and female mice exposed to air and ozone were visualized with Alcian Blue/Periodic Acid- Schiff. IHC revealed FFAR3 expression in the colon of air exposed mice. However, the data is inconclusive because the IgG showed positive staining. Interestingly, there appeared an increased number of goblet cells following ozone exposure. Future studies will enumerate goblet cell number and FFAR3 in the colon following acute and chronic ozone exposure. Supported by NIH R25ES020721, Ernest Mario School of Pharmacy

