Mechanisms of ozone induced airway inflammation and hyperresponsiveness

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Ozone (O_3) is a toxic air pollutant that activates the innate immune system upon inhalation. The two major effects of O_3 exposure are the influx of proinflammatory neutrophilic granulocytes to the airway (neutrophilia) and induction of airway hyperresponsiveness (AHR). Previous studies in our laboratory indicated that a novel immune cell type, the type 2 innate lymphoid cell (ILC2), was required and sufficient to produce these two effects after O_3 inhalation. However, how ILC2s produce airway neutrophilia and AHR after O_3 inhalation is unknown. In addition, the effects of neutrophilia is unclear, although this cell type has been implicated in the pathogenesis of a number of lung diseases. Therefore, the goals of this project are to unravel the mechanisms of ILC2-induced neutrophilia and AHR after O_3 exposure and to better understand the role of the neutrophil in contributing to the pathogenesis of lung diseases. *In vivo* and *ex vivo* mouse models will be used to evaluate these pathways. Ultimately, we must better understand the role of the innate immune system in mediating the effects of air pollutants on the lung. Unraveling these mechanisms may elucidate targets for therapeutic prevention.