Abstract:

Ozone (O3), a criteria pollutant, has known effects on pulmonary and cardiovascular complications that is augmented in susceptible populations such as elderly, children, and those with pre-existing pulmonary and cardiovascular disease. Currently there is an increasing prevalence of days where O3 levels reach concentrations known to induce health effects in susceptible populations. O3 is known to induce pulmonary inflammation, but the mechanistic link of this process remains a fundamental gap in our knowledge. Specialized pro-resolving mediators (SPMs) are lipid mediators produced during inflammation that promote the resolution of the immune response. SPMs, specifically D-series resolvins, maresins, and protectins, are synthesized from dietary sources of the omega-3 fatty acid docosahexaenoic acid (DHA). Previous data from our lab indicates that O3 suppresses pulmonary SPM production. Additionally, when mice are pretreated with intraperitoneal SPM injections prior to O3 exposure, SPM levels in the lung are rescued and pulmonary inflammation is decreased. Currently our laboratory is exploring mechanisms by which SPM production contributes to alterations in pulmonary macrophage/monocyte populations during O3-induced lung injury and inflammation; and 2) the role of dietary DHA supplementation on O3-induced lung inflammation and pulmonary SPM production. Findings from this research will lead to a better understanding of the role of SPMs in regulating the pulmonary immune response and the resolution of lung injury in environmental lung diseases.

Host: Dr. Jonathan Shannahan