Investigating PGC1β as a Critical Mediator in the Resolution of Ozone-Induced Lung Inflammation

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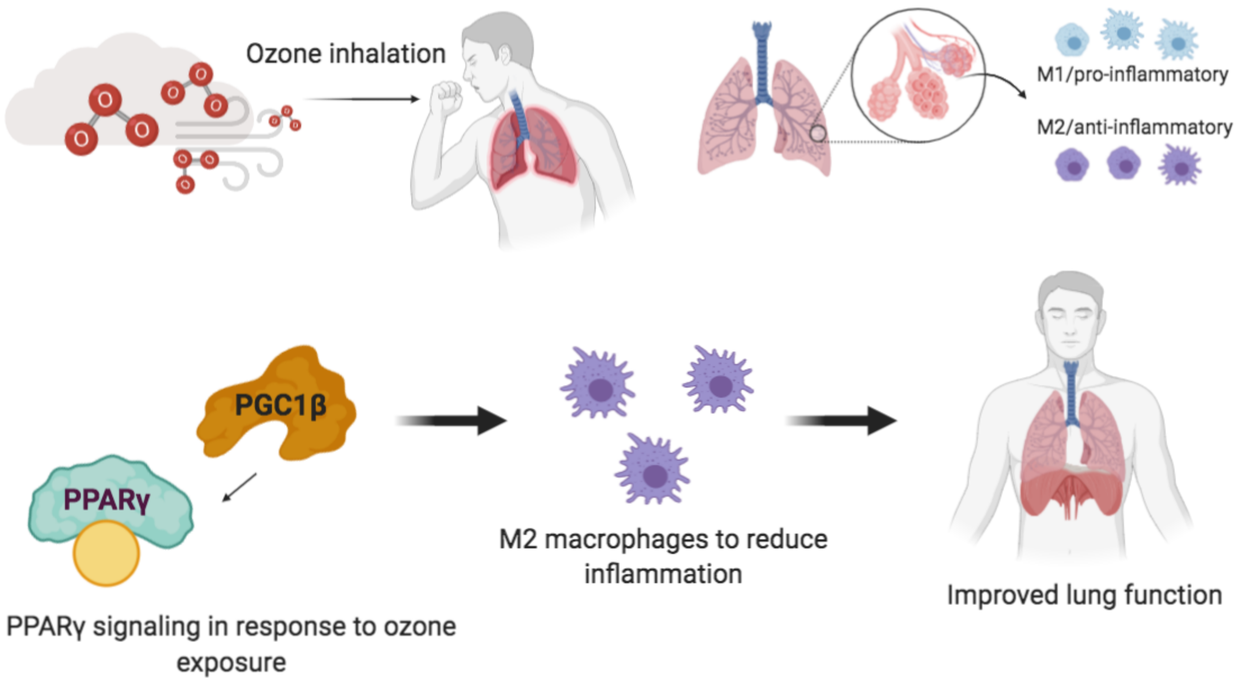
Introduction

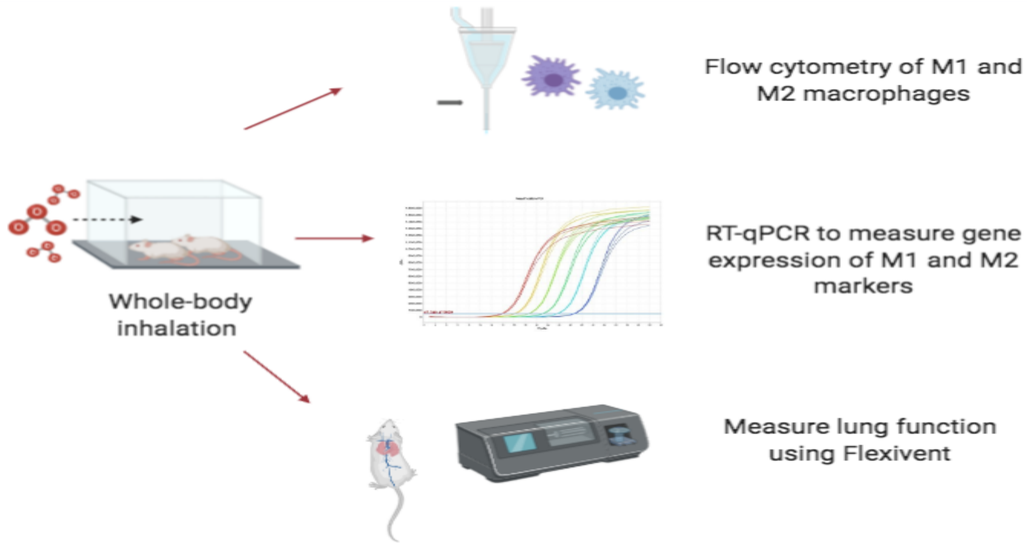
- Ground-level ozone is a ubiquitous air pollutant in urban and rural areas.
- Inhaled ozone reacts with the lining of the respiratory tract, which can cause damage to airway epithelial cells and initiate an inflammatory response that results in lung injury and reduced lung function.
- The inflammatory response to inhaled ozone is regulated by M1/pro-inflammatory and M2/anti-inflammatory macrophages that coordinate the acute and later resolution phases, respectively.
- Previous data from our group suggest that ozone exposure disrupts lipid metabolism and peroxisome proliferator-activated receptor gamma (PPARγ) signaling in alveolar macrophages; this is significant as PPARγ has been shown to promote M2 phenotype and facilitate wound repair.

Purpose and Hypothesis

- The purpose of this study is to understand the contribution of PPARγ coactivator 1-beta (PGC1β), a critical mediator of PPARγ signaling, to the inflammatory response to inhaled ozone.



Proposed Methods



Expected Results

- Mice with deleted PGC1B gene will have reduced M2 macrophages and increased M1 macrophages; the opposite will be observed in wildtype mice.
- Macrophages from mice with functional PGC1B gene will express increased M2 markers and decreased M1 markers in the RT-qPCR data, and PGC1B knockout mice will express significantly lower levels of M2 markers and significantly higher levels of M1 markers.

Conclusion

Due to a reduced M2 macrophage population, it is expected that the mice without the PGC1B gene will have a more severe inflammatory response and lung injury after exposure to ozone compared to the mice with the functional PGC1B gene. By understanding the role of PGC1β on lung inflammation, this data will help identify potential targets for future therapies and treatments.

Acknowledgments

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