Bushfire Smoke Modulates Human Microglial Inflammation

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1. Introduction

- The dysfunction of microglia, the immune cells of the brain, has been implicated in neurodegenerative diseases including Alzheimer’s Disease (AD)1
- Air pollution has been associated with AD risk and microglial inflammation2,3
- Bushfire smoke is an important air pollution subset that we postulated may alter microglial inflammation in health and disease, contributing to AD

2. Methods

- Monocytes from healthy control and AD patient blood samples
- Induced microglia (iMG)4
- Burnt Australian plant matter in cell media5
- Microglia exposed to 1% bushfire smoke extract
- RT-PCR and phagocytosis assays for inflammatory impacts of bushfire smoke

3. Results

- Bushfire smoke increased young control microglial expression of pro-inflammatory cytokines including interleukin 6 (IL-6), IL-1β and tumour necrosis factor alpha (TNF-α)
- Exposure to bushfire smoke differentially modulated phagocytosis of E. coli in young control, aged control and AD microglia

4. Discussion & Conclusion

- Bushfire smoke was pro-inflammatory to young control microglia, and differentially modulated phagocytosis in young, aged and AD microglia
- The brain impacts of bushfire smoke are of importance, especially with bushfire incidence set to increase, so further research should be pursued