Abstract:

Microglia, the resident innate immune cells in the brain, have long been implicated in progressive neuron damage in diverse neurodegenerative diseases. Recent reports implicate urban air pollution in several central nervous system (CNS) diseases. However, the mechanisms underlying how inhaled air pollution triggers microglial activation to impact CNS disease are complex and poorly understood. Here, we review our previous findings supporting both direct and indirect mechanisms through which microglia detect exposure to air pollution and propose a new route of microglial activation, the Lung-Brain Axis. More specifically, we will discuss our recent findings indicating that pulmonary interactions with air pollutants result in circulating signals that: are detectable by microglia resulting in a persistent microglial response; are independent from traditional circulating cytokines; reprogram microglia to be more sensitive to additional pro-inflammatory stimuli (priming); augment ongoing neurotoxicity.

Host: Dr. Zheng