

Urban Air Pollution Particulates Suppress Human T-cell Responses to *Mycobacterium tuberculosis*

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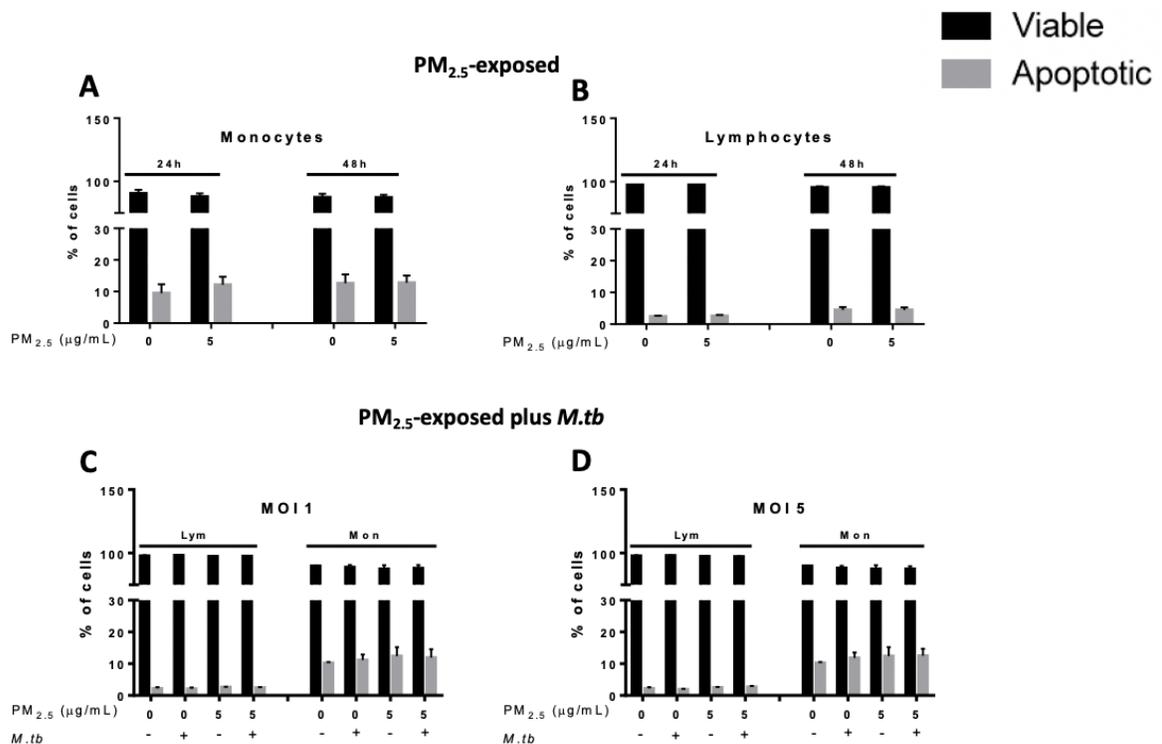
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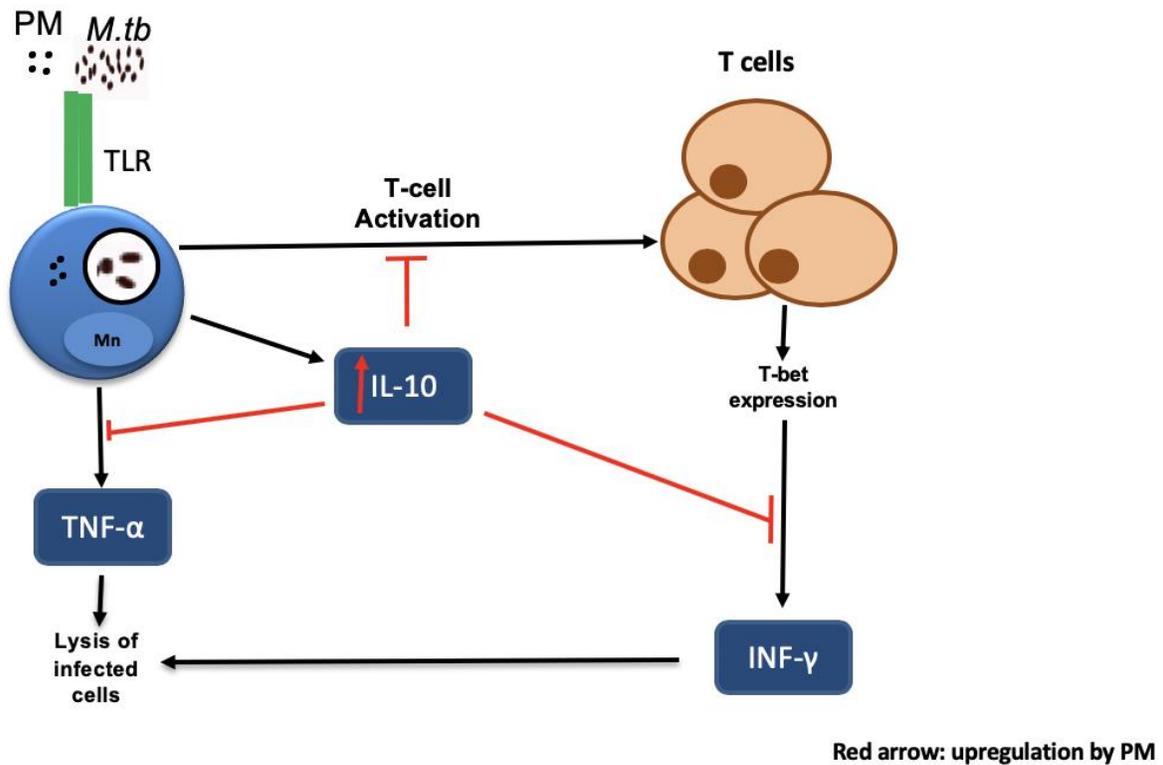
Online Supplementary Figures

Figure S1. Effects of PM_{2.5} on apoptosis of mononuclear cells



(A, B) PBMC from three study subjects were pre-exposed to PM_{2.5} (5 µg/ml) for 24 and 48 h. Detection of phosphatidylserine exposure by Annexin-V FITC/propidium iodide double-staining was performed to assess the proportion of mononuclear cells that were undergoing apoptosis (Annexin V and Propidium Iodide positive). (C, D) PM_{2.5} effects on apoptosis in PBMC from three study subjects pre-exposed to PM_{2.5} for 20 h followed by infection with *M.tb* MOI 1 and 5 for 18 h were determined by detecting phosphatidylserine. Values are expressed as the mean +/- SEMs of three independent experiments (A, B, C, D).

Figure S2. Hypothetical model of PM-induced suppression of T cell immune responses to *M.tb*.



A prerequisite for T cell immune responses to *M.tb* infection, is the interaction of *M.tb* with toll like receptors (TLR) on monocytes resulting in their activation. Activated monocytes produce effector molecules and present antigens to naïve T cells resulting in the activation of the T cells and expression of transcription factor T-bet that positively regulates IFN- γ production. Activated T cells and monocytes produce several protective cytokines (including IFN- γ and TNF- α respectively) that can result in the killing of *M.tb*-infected cells. Air pollution PM exposure impairs antimycobacterial T cell immune responses by downregulating T cell activation, inhibiting the growth control of *M.tb* in infected cells, by impairing the production of protective cytokines (IFN- γ and TNF- α) and by augmenting the production of anti-inflammatory cytokine IL-10 as well as via downregulation of T-bet. Activation processes are shown with pointed black arrows, PM-induced upregulation of IL-10 is shown with an upward-pointing red arrow, while PM-induced inhibition via IL-10 is shown by blunt-end red arrows. (TLR, toll like receptors; Mn, monocyte).