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MicroRNAs mediate the association between short-term ambient particulate air pollution exposure and lung function

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Background: Ambient particulate air pollution is a risk factor for cardiovascular and respiratory disease, yet the biological mechanisms underlying this association are not well understood.

Objectives: Our main aim was to investigate the relationship between MicroRNAs with ambient particulate air pollution exposure, and blood pressure, and lung function.

Methods: A genome-wide MicroRNAs study using mediation analysis models was used to investigate the association between MicroRNAs with exposure to personal PM2.5, cardiovascular and respiratory physiology parameters, which included 120 adults (60 truck drivers and 60 office workers) aged 18 to 46 years recruited from 15 June 2008 through the end of follow-up (a 1- to 2-week interval).

Results: There is a significant difference in PM2.5, FEF25-75, PEF, FEV1 and FEV1/FVC between truck drivers and office workers (all $p < 0.05$). According to the p-value threshold used, personal PM2.5 data showed a significant association with miR-644 (Bonferroni corrected threshold p value $< 6.81 \times 10^{-5}$). The mediation effect of miR-644 on the association between of personal PM2.5 with FEF25-75 [B (95%CI) = -1.306 (-2.750, -0.170)], PEF [B (95%CI) =-1.727 (-3.713, -0.210)], and FEV1/FVC [B (95%CI) = -0.114‰ (-0.215‰, -0.023‰)] was significant. There were not similar associations with blood pressure.

Conclusions: MiRNAs were potential mediators of ambient particulate air pollution exposure, which is associated with respiratory health. Subsequent studies are needed to further elucidate the potential mechanisms of action by which the mediation effect of miRNAs is achieved with this process

Biography

Xiaowei Cong is a Ph.D. student at Southeast University and has experience in exposure science (models), environmental policy, environmental health science, and building hiPSC-derived hematopoietic stem progenitor cells (HSPCs) and mouse models. His articles as the first author are published in top environmental science journals, including Environment International, Science of the Total Environment, Environmental Pollution, and Ecotoxicology and Environmental Safety.

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Page 11