OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Clinical & Experimental Cardiology

April 15-17, 2013 Hilton Chicago/Northbrook, USA

Effect of traffic-related air pollution ($PM_{2.5}$ fraction) on fast glycemia of aged obese type 2 diabetic mice

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Abstract

Recent experimental data have provided associations between ambient PM2.5 (fine particulate matter; diameter ≤2.5µm) and propensity to inflammation and chronic diseases especially among susceptible groups, such as elderly people. There is cumulative evidence that type-2 diabetes mellitus is a chronic inflammatory state aggravated by factors that promote endothelium inflammation. Accordingly our hypothesis that the exposure of aged obese population to PM2.5 might aggravate type-2 diabetes, we tested this hypothesis in a model of diet-induced obesity where C57BL6 male mice were fed with regular chow (n=30; RC) or high-fat chow (n=36; HF) during one-year and randomly assigned to filtered (FA-RC, n=16; FA-HF, n=19) or PM2.5 concentrated air (600 µg.m-3) (EXP-RC, n=14; EXP-HF, n=17) daily during 1-hour for 30-days. Fast glycemia was measured before the animals were euthanized. All experimental procedures were approved by the Institution's Ethics Committee. Heart mRNA content of selected migration, signalization and adhesion proteins were measured by SYBR Green fluorescence Real Time RT-PCR protocol using appropriate primers. There were no difference between RC-EXP and RC-FA nor between HF-EXP and HF-FA body weight. Regarding fast glycemia, both, RC and HF groups, were diabetic, but only the HF group was affected by acute exposure to PM2.5 (mean±SD, EXP-HF vs FA-HF, 172.8±23.4 vs 156.7±17.6, $p<0.05$; EXP-RC vs FA-RC, 149.8±19.2, 139.7±15.3, ns; ANOVA). The expression profile of the proteins studied, E-selectin, IL-6, VCAM-1, ICAM-1 and MMP-9, were different in heart and lung. Proteins activated by inflammatory stimuli involved in the inhibition of insulin signaling are being investigated.

Biography

Scientific Researcher at Pro-Blood Foundation of Blood Center of São Paulo since 1991. Is part of Experimental Air Pollution Laboratory - LPAE staff at the Department of Pathology, Medical School of University of São Paulo, Brazil, since 2010.
Expert in Cellular and Molecular Biology with cell surface proteins studies and extracellular matrix research. Teacher of Cell and Molecular Biology themes at different graduation careers, Post-graduation advisor, and Coordinator of specialization courses and National and International Projects.
PhD in Science from the Federal University of São Paulo-School of Medicine UNIFESP-EPM (1996), M.Sc. in Molecular Biology UNIFESP-EPM (1987) and graduated in Biological Sciences Medical Modality from the University Methodist Piracicaba - UNIMEP, State of São Paul (1983).