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Lacrimal cytokines assessment in subjects exposed to different levels of ambient air pollution in a large metropolitan area

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Abstract

Recent experimental data have provided associations between ambient $PM_{2.5}$ (fine particulate matter ≤2.5μm) and propensity to inflammation, particularly those of the respiratory tract. Similar to respiratory mucosa, the ocular surface is directly exposed to ambient air pollution since only a very thin lacrimal film separates the corneal and conjunctival epithelia from the air pollutants. To investigate the effect of ambient air pollution on ocular defense, lacrimal film cytokine levels were evaluated twice (each 15 days) in traffic professionals (taxi drivers and traffic controllers, high pollutants exposure, group 1) and workers of a Forest Institute (low pollutants exposure, group 2) from Sao Paulo city. Personal ambient exposure of $PM_{2.5}$ was 24 hour-recorded by an individual monitor and the tears were collected to measure interleukins (IL)-2, IL-4, IL-5, IL-10 and interferon gamma (IFN-γ) levels by multiplex immunoassay. Traffic professionals presented higher $PM_{2.5}$ exposure than forest workers (evaluation 1: 41.2±12.1 and 26.9±10 μg/m^3 and evaluation 2: 37.5±14.5 and 29.1±16.4 μg/m^3, respectively; $p<0.001$). There were no differences in the average of cytokines between the two groups. However, $PM_{2.5}$ exposure decreased the IL-5 level in 1.65 pg/mL ($p=0.01$) and the IL-10 level in 0.78 pg/mL ($p=0.003$) for each increment of 50 μg/m^3 of $PM_{2.5}$ in the traffic professionals tears as when analyzed by generalized estimating equation. These results suggest that continuous ambient air pollution exposure modulates the immune response of the defense system which may increase the susceptibility to ocular disorders. This study was supported by CNPq 555223/2006-0 and FAPESP 2008/57717-6.

Biography

Monique Matsuda is the scientific research at Laboratory of Investigation in Ophthalmology, Medical School of University of Sao Paulo, Brazil since 2009 and is collaborator of Experimental Air Pollution Laboratory-LPAE projects in the area of air pollution effects on health. Ph.D. and M.Sc. in Science from the University of Sao Paulo-School Medicine (2010 and 2006), and graduated in Biology from the University of Cruzes Mogi, Sao Paulo (2002). Expert in Cellular and Molecular Biology, emphasizing the study of matrix extracellular and cell surface proteins in the Ophthalmology area.