Abstract Group: 6.2. Occupational and Environmental Health

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Title: Biological monitoring of particulate matter accumulated in the lungs of urban asthmatic children in the Tel Aviv Metropolitanian Area

Prof. Dr Elizabeth 7609 Fireman fireman@tlvmc.gov.il 1, Mrs. Daria 7633 Bliznuk daria.bliznuk@gmail.com 1, Dr. Yehuda 7634 Schwarz schwarz@tlvmc.gov.il MD 2, Dr. Ruth 7635 Soferman ruthso@tlvmc.gov.il MD 3 and Prof. Dr Shmuel 7636 Kivity allergy@tlvmc.gov.il MD 4. 1 Laboratory of Pulmonary and Allergic Diseases, Tel-Aviv Sourasky Medical Center, Sackler Faculty of Medicine, Tel Aviv University, Tel-Aviv, Israel, 64239 ; 2 Department of Pulmonary Diseases, Tel-Aviv Sourasky Medical Center, Sackler Faculty of Medicine, Tel Aviv University, Tel-Aviv, Israel, 64239 ; 3 Pediatric Pulmonary Department, Tel-Aviv Sourasky Medical Center, Sackler Faculty of Medicine, Tel Aviv University, Tel-Aviv, Israel, 64239 and 4 Allergy Unit, Tel-Aviv Sourasky Medical Center, Sackler Faculty of Medicine, Tel Aviv University, Tel-Aviv, Israel, 64239.

Body: Background: Lung inflammation from exposure to air-borne particulate matter (PM) may be responsible for morbidity in asthma. But several studies using environmental monitoring data showed inconsistent results. We evaluated the capability of induced sputum (IS) technology to biologically monitor particulate matter in the lungs of urban asthmatic children. Methods: We collected clinical, demographic, biological and environmental monitoring data on 136 children referred for asthma evaluations. The study participants were divided into two groups according to IS eosinophil counts of <3% (non-inflammatory) and ≥3% (inflammatory). Results: Particles (ranges 0-2.5 µm and 0-5 µm) in biologic monitoring comprised a strong risk factor for eosinophilic inflammation in IS (≥3%). Children with >80% of particles (0-2.5 µm) out of the total particulate matter accumulated in the airways display the highest OR 10.7 (CI=2.052-56.4 p = 0.005) to induced eosinophilic inflammation. Heme oxygenase-1 (HO-1) enzyme levels in IS positively correlated with % eosinophils and with particles in IS ranged between 2-3 µm. The level of HO-1 enzyme activity and FEV1/FVC in children with <3% eosinophils, but not ≥3%, were positively and significantly correlated, showing a protective effect of HO-1 in this group. Conclusions: Accumulation of particulate matter involves oxidative stress pathways and is a risk factor for developing eosinophilic inflammation in asthmatic children. IS can biologically monitor this process.