PP13.2
Immunotoxic effect of cigarette smoke as environmental factor on immune functions and DNA damage in alveolar macrophages

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Introduction: Cigarette tobacco smoke is consisted from mainstream tobacco smoke (MTS) and secondhand tobacco smoke (STS). STS is released into the atmosphere, and may impact lung health and development of allergic lung diseases in non-smoker. STS is inhaled into the lung by respiration and affect to alveolar macrophage (AM). AM is playing an important role of immune system in the lung.

Objective: However, the effect of STS on AM is not yet fully demonstrated compared with MTS. In this study, we investigated the effect of STS on DNA damage and immune functions in AM.

Materials and Methods: Mice were exposed to STS of 20 cigarettes/day during 10 days by using STS exposure auto-machine. Extract of water soluble side-stream cigarette smoke (WSTS) was obtained by which STS was bubbled in sterile distilled water and freeze-dried. After STS exposure, AM were obtained by brochoalveolar lavage (BAL). TLRs and phagocytic activity, reactive oxygen species (ROS) generation of AM were determined by FACS. Expressions of cytokines mRNA of AM were measured by RT-PCR. DNA damage of AM was evaluated by comet assay.

Results: The number of AM was significantly increased in STS exposed mice. The cell size and intra-cellar structure of AM were changed by STS. Phagocytic activity of AM was significantly inhibited by STS. Expressions of CD11b, TLR-2, TLR-4 and CD14 on AM were significantly inhibited by STS. ROS generations of AM were significantly increased by STS exposure. Expression of TNF-α mRNA in AM was significantly inhibited by STS. Tail moment and length of AM as indicator of DNA damage were significantly increased by STS. DNA damage in AM was also induced by WSTS at dose dependent.

Conclusions: STS exposure caused the change of cell size and intracellular structure in AM. STS and WSTS induced significantly increase of DNA damage in AM. The phagocytic activity, expressions of CD11b, TLR-2, TLR-4, CD14 and TNF-α mRNA in AM were decreased by STS. STS was a risk factor for DNA damage of AM and inhibited the immunological functions in AM mediated by DNA damage. These results suggest that inhibition of phagocytosis, TLR expression and STS induced-DNA damage of AM may associated with infection and development of allergy in the lung.

Financial support: This study was supported by Grant-in-Aid for Scientific Research (C).

http://dx.doi.org/10.1016/j.toxlet.2016.07.618

PP13.3
Effect of a mixture of environmental pollutants on IL-4 and IFN-γ-Cytokines production in human peripheral mononuclear cells

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Introduction: Humans are environmentally exposed to a very complex mixture of chemical substances. Several "in vitro" studies have been focused to assess toxicity mechanisms related to single pollutants, however it is necessary to evaluate effects due to possible interactions amongst the mixture of environmental pollutants.

Objective: To assess the effect of a mixture of selected environmental pollutants on IL-4 and IFN-γ cytokines production in peripheral blood mononuclear cells (PBMNC).

Materials and Methods: PBMNC were isolated from healthy volunteers and incubated during 72-h with 1 μg/mL anti-CD3, 2 μg/mL anti-CD28 and 100 U/mL rIL2 in presence or not of *p,p'*-DDE (10 μg/mL), PCB153 (20 ng/mL), PCB118 (20 ng/mL), B(a)P (100 ng/mL) or in binary mixture. IL-4 and INF-γ – producing cells were identified by flow cytometry analysis.

Results: The major findings in our study were: (1) no effect on the % IFN-γ-producing cells was observed at all treatment tested, (2) a decrease in the % IL4-producing cells when PBMNC were treated with p,p'-DDE (10 μg/mL) and p,p'-DDE (10 μg/mL) and PCB118 (20 ng/mL) mixture and (3) an increase in the % IL4-producing cells when PBMNC were treated with PCB153 (20 ng/mL) and B(a)P (100 ng/mL) mixture.

Conclusions: The mechanisms by which DDTs, PCB's and PAH's affect the cytokines production have not been completely elucidated; however, the dysregulation of specific T lymphocytes and their cytokines plays an important role in the etiology of several immune diseases. Considering the possible toxicological interactions, it is important to assess the deleterious effects caused by co-exposure to these compounds in individuals living in high-risk sites.

Financial support: SSA/IMSS/ISSSTE, S000-2013-1, 2002736. CONACYT, México.

http://dx.doi.org/10.1016/j.toxlet.2016.07.619