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MEETING ABSTRACTS

ARYL HYDROCARBON RECEPTOR (AhR) LIMITS THE INFLAMMATORY IMPACT OF EXTRACT OF REFERENCE DIESEL EXHAUST PARTICLES IN HUMAN LUNG EPITHELIAL A549 CELLS

Gerardo Vázquez-Gómez [1], Martina Karasová [1], Zuzana Tylichová [1], Marketa Kabatková [1], Aleš Hampl [2,3], Jason Matthews [4,5], Jiří Neča [6], Miroslav Ciganek [6], Miroslav Machala [6], Jan Vondráček [1]
Presenting author: Gerardo Vázquez-Gomez (vazquez@ibp.cz)

[1] Institute of Biophysics of the Czech Academy of Sciences, Královopolská 135, 612 65 Brno, The Czech Republic
[2] Faculty of Medicine, Masaryk University, Kamenice 753/5, 625 00 Brno, The Czech Republic
[3] ICRC, FNUSA, Pekařská 53, 656 91 Brno, The Czech Republic
[4] Institute of Basic Medical Sciences, University of Oslo, Sognsvannsveien 9, 0372, Oslo, Norway
[5] University of Toronto, 1 King's College Circle, Toronto, Ontario, Canada M5S 1A8
[6] Veterinary Research Institute, Hudcova 296/70, Brno, The Czech Republic

The aryl hydrocarbon receptor (AhR) is well known for its detoxification/bioactivation role. However, it has been suggested to participate also in the control of inflammatory responses. Diesel exhaust particles (DEP) are known to induce inflammation in respiratory tract. Here, we used standard reference mixture of diesel exhaust particles (SRM1650b) in order to evaluate the functional role of the AhR (using wild-type and AhR-deficient A549 lung epithelial cells) in the control of inflammatory responses towards DEP-associated pollutants. We compared their effects with those of pro-inflammatory cytokines, such as IL-1β. We found that the induction of cyclooxygenase-2 (and secretion of prostaglandins), as well as expression of pro-inflammatory cytokines, were notably higher in the AhR-deficient A549 cells, when exposed to inflammatory cytokines. Both crude organic extract of SRM1650b and its polar fraction induced an increased inflammatory response in AhR KO cells, including the induction of COX-2, TNFα, CXCL8 and IL-6 mRNAs. Our further experiments have identified increased nuclear factor-κB (NF-κB) activity to contribute to the exacerbated inflammatory response in the AhR-deficient A549 cells. Thus, the interplay of AhR and NF-κB signaling may modulate responses of lung epithelial cells towards complex mixtures of organic pollutants, such as those associated with DEP.

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