

Poster 35

## ***In vitro* toxicity assessment of firefighters' breathable air collected on polyurethane foams in human lung epithelial cells**

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### **Abstract**

**Background:** Occupational exposure as a firefighter has been recently classified as carcinogenic to humans (Group 1) by the International Agency for Research on Cancer (IARC) [1]. Polycyclic aromatic hydrocarbons (PAH) are one of the main fire-related pollutants [3], and their presence in the breathable air of firefighters was already demonstrated [4]. However, the toxicity mechanisms involved in such exposures have not yet been evaluated in human cell lines. **Objective:** The present work aimed at quantifying the PAH levels of breathable air collected in polyurethane foams (PUF) of non-exposed firefighters (control group) vs firefighters exposed during controlled forest fires, as well as assessing the *in vitro* toxicity of the collected PUF extracts in human alveolar (A549) and bronchial (Calu-3) epithelial cell lines. **Methods:** Firefighters used a pre-cleaned PUF foam on the breathing air zone during regular work shifts at the fire station (control group) or during three distinct controlled fire events (November 2021-February 2022). Samples were extracted by microwave-assisted extraction and analyzed by liquid chromatography with a diode array and fluorescence detectors. The PUF extracts were analyzed *in vitro* by exposing them to A549 and Calu-3 cell lines for 24h. A 3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyl-tetrazolium-bromide (MTT) assay was performed to assess the cell viability. **Results:** The PAH levels determined in samples from controlled fire events were 1.9 to 23.2x higher than the control group and, the levels of carcinogenic PAH were 1.9 to 15.2x higher. Most of the PUF samples from non-exposed firefighters (control group) induced a significant viability decrease (<70%) for both cell lines. Although for controlled forest fire events, an accentuated decrease in A549 and Calu-3 cellular viability (similar to the positive control in most cases) was observed. **Conclusions:** The present results demonstrated that fire- or non-fire-related occupational activities may potentially contribute to the pulmonary health burden of firefighters.

**Keywords:** firefighters' exposure; PAH; pulmonary cell lines; cell viability

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