P18-002
Biomonitoring of firefighters occupational exposure to polycyclic aromatic hydrocarbons during the 2014 hot season

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Human biomonitoring is an important tool in environmental medicine that is used to assess the level of internal exposure to environmental pollutants. Firefighters are one of the most exposed and least studied occupations. During fire suppression, firefighters are heavily exposed to a wide range of chemicals. Polycyclic aromatic hydrocarbons (PAH) are ubiquitous environmental pollutants that are considered as the largest known group of carcinogens due to their cytotoxic and mutagenic properties. Smoke and ashes released during a fire are important sources of PAH. Firefighters can be also exposed to PAH through smoking, via polluted ambient air, water, soil, and through consumption of food. Metabolites of PAH (OH-PAHs), such as 1-hydroxynaphthalene (1OHNapt), 1-hydroxyacenaphthene(1OHAce), 1-hydroxypyrene (1OHPy) and 3-hydroxybenzo[a]pyrene (3OHB[a]P) have been used as biological markers for measurements of human internal exposure to PAH. The present work aims to quantify the urinary metabolites of PAH, namely 1OHNapt, 1OHAce, 1OHPy and 3OHB[a]P in study population of firefighters. Firemen exposed to fires that occurred during 2014 season were asked to fill a post-fire questionnaire and to collect urinary samples. A control study population group was selected to collect samples of urines during the pre-fires season (winter). Among all participating firemen only healthy no-smoking subjects were considered. OH-PAHs were analysed by high-performance liquid chromatography with fluorescence detection. Overall, 1OHNapt and 1OHAce were the most abundant OH-PAHs in firemen urine samples, accounting for approximately 90% of the total OH-PAHs. The urinary OH-PAHs in exposed firefighters were higher than those of control group. Data collected with the individual questionnaire were further used to analyse the concentrations of OH-PAH between (and within) control and exposed groups of firemen. Additionally, 1OHPy concentrations in the exposed firefighters will be compared with the available proposed guidelines.

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Neurotoxicity of amphetamine and its metabolite 4-hydroxynorephedrine on differentiated SH-SY5Y dopaminergic cells

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Amphetamine (AMPH) is used worldwide by millions of patients in the clinical treatment of attention deficit hyperactivity disorder, narcolepsy or even obesity. However, there are concerns on its high abuse potential and neurotoxicity and the neurotoxicity of its main metabolites is presently unknown. The metabolite 4-hydroxynorephedrine (4-OHNE) is known to persist for longer periods than amphetamine or other main metabolites in the cerebral tissue. In the present study, we aimed to evaluate the neurotoxicity of AMPH and its metabolite 4-OHNE, obtained by chemical synthesis, in human dopaminergic differentiated SH-SY5Y neurons. SH-SY5Y cells were differentiated with retinoic acid and 12-*O*-tetradecanoyl-phorbol-13-acetate, for 6 days to acquire a dopaminergic phenotype, and exposed to AMPH (concentration range 0.0–5.0 mM) and 4-OHNE (concentration range 0.0–10 mM). After 24 or 48 h incubation, life-death assays were performed. Membrane damage was assessed by lactate dehydrogenase (LDH) release into the cell's medium and mitochondrial dysfunction by the MTT reduction assay. Acridine orange/ethidium bromide staining was used to assess apoptotic versus necrotic death. Results showed that for both AMPH and 4-OHNEPH there was a time- and concentration-dependent toxicity. The AMPH concentration that promoted 50% of toxicity (TD50) after 24 h exposure was about 3.5 mM as verified both by MTT and LDH assays. Meanwhile, for 4-OHNE 8.0 mM was the approximate TD50 verified in both cytotoxicity tests. Acridine orange/ethidium bromide staining at 24 h revealed a high number of necrotic cells following exposure to 3.5 mM of AMPH, as for 8 mM of 4-OHNE more apoptotic and less necrotic cells were seen. In conclusion, the AMPH metabolite 4-OHNE was shown to be less neurotoxic than the parent compound *in vitro*.

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