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Evaluation of air pollution effects on human population: a Zagreb case

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In terms of exposome, air pollution is a life-long and constant source of exposure affecting human organs, tissues, cells, and molecules. It is considered responsible for more than 3 million premature deaths annually. Currently ongoing HUMNap project investigates possible associations between air pollutants and biomarkers of exposure and early biological effects. The evaluation of results is divided in two parts. In part 1 we examined historical data (2011-15) of cytogenetic biomarkers in Zagreb population (N=130) and corresponding air quality data. Measured air pollution parameters were largely below regulatory limits, except for B[a]P. There were no significant positive associations indicating contribution of air pollutants to increased genome damage for designated period.

In part 2, in 2021-22 we recruited a new cohort (N=60) and included biomarkers of exposure (benzene, toluene, ethylbenzene, o-, m- and p-xylene) and effect (blood comet assay, buccal and blood micronucleus assay). For air quality data, the results were in agreement with results from part 1. Similarly, tested parameters did not impact biomarkers of exposure nor the genotoxicity biomarkers. The focus of the project will now turn to other cities with different air pollution burden, and will expand the number of evaluated biomarkers in order to find possible links between air pollution and the biomarkers of effect, improve prediction models, and to serve in better risk assessment of general public. Supported by the Croatian Science Foundation (HUMNap project 1192 and the work of doctoral student K. Matković).

Keywords:

Air pollution; genotoxicity; human population.