Impact of polycyclic aromatic hydrocarbons on the environment and human health: evidence retrieved from biomonitoring studies

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The presence of polycyclic aromatic hydrocarbons (PAHs) in different environmental matrices has significant repercussions on ecosystems and human health. There is a need to reunite and revise the available literature to improve the evaluation of the impact of PAHs on the environment, and human health. This work compiles, for the first time, the concentrations of PAHs in the air, aquatic ecosystems, and soils with a global overview of the results from environmental and human biomonitoring studies. The higher incidence of anthropogenic occupancy is directly associated with the presence of PAHs in environmental matrices ($1344.4 - 12300$ ng/m3 versus $0.03-0.60$ ng/m3 in the air of industrial/urban and rural areas, respectively; $2.00 - 1.66 \times 10^7$ ng/L and $7.00 \times 10^{-4} - 1.00 \times 10^9$ ng/g in the water systems and aquatic sediments from coastal areas, respectively; $0.14 - 1.77 \times 10^6$ ng/g and $1.59 - 5.87 \times 10^3$ ng/g in the urban and rural soils, respectively). Benzo(a)pyrene, a carcinogenic PAH, was found in all environmental matrices. The potential of some sentinel species (e.g., mosses, lichens, tree leaves, bivalves, and cephalopods) to be used as biomonitors in environmental biomonitoring studies was described. Despite the growing concern about the negative impacts of PAHs exposure, more biomonitoring studies are crucial to characterize the impact of PAHs on the environment, and human health and estimate the associated risks for wildlife and humans. Mitigation and preventive measures for PAH exposure can be beneficial to protect human health due to the improvement in the human-animal-environment interface.