HUMAN WHITE BLOOD CELLS AFTER *EX VIVO* EXPOSURE TO POLYSTYRENE NANOPLASTICS

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Most of the produced plastic ends in the environment as a waste after use, causing an important ecological problem. Once in the environmental matrices, plastic degrades to micro and nanosizes (MNPLs) forming a non-visible source of environmental pollutants. At these sizes, MNPLs can be easily intake by organisms, including humans, supposing a potential health concern. Independently of the exposure route, the uptaken environmental MNPLs end into the body general compartment (blood), potentially interacting with blood cells. In this study, we propose a novel approach to understand the risk of polystyrene nanoparticles (PSNPs) exposure for humans, as a model of MNPLs. Thus, *ex vivo* whole blood samples from different donors were exposed to different doses of PSNPs in exposures lasting for 24, 48, or 72 h. The evaluated effects were determined in different subsets of white peripheral blood cells (WBCs), namely lymphocytes, monocytes, and polymorphonuclear (PMN) cells, to determine specific cellular sensitivity. Our results show no relevant toxicity of PSNPs when evaluated on the overall WBCs population. Interestingly, the different cell lineages manifested sharp differences in PSNPLs uptake with very limited uptake in lymphocytes, and very high uptake in monocytes. Furthermore, significant increases in the levels of DNA damage were observed in monocytes and polymorphonuclear cells, but not in lymphocytes. Furthermore, our results showed that PSNPLs exposure-induced changes in the whole blood secretome. These findings were further confirmed when the expression of different cytokines was analysed, revealing a significant increase in the expression of different cytokines related to the inflammatory, immune, and stress response, as well as cell proliferation. Summarizing, our results support that the *ex vivo* model is a powerful strategy to study the nanoparticles effects on the human blood system. Moreover, they confirm that exposure to PSNPs can negatively affect the WBCs, showing clear differences between the different cell subtypes.