Polystyrene nanoparticles as carriers of environmental pollutants and its toxicological assessment on *in vitro* human intestinal Caco-2 cells

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Micro- and nanoplastics contamination has become a big issue placed in the foreground of mass media, political agendas and public due to its ubiquity and persistence. Thus, humans are exposed to these environmental contaminants through airborne inhalation or dermal contact, but ingestion through food chain contamination is considered the main route of exposure to MNPLs. Although previous studies have depicted its inert behavior on human-derived *in vitro* intestinal models, MNPLs have been described as carriers of other coexisting environmental contaminant which are toxic to humans. Owing to this so-called *Trojan horse* behavior, evaluating the effects of the co-exposures MNPLs/other environmental contaminants is urgent.

Aiming to address this concern, we studied the physical interaction between polystyrene nanoparticles (PSNPs) and silver materials, namely silver nanoparticles (AgNPs) and silver ions (Ag^+ derived from $AgNO_3$) as models of trace metal contaminants. Further experimental approaches were carried out to evaluate potential harmful endpoints in the human intestinal cell line Caco-2.

Firstly, the characterization of the silver/PSNPs interaction was visualized using transmission electron microscopy (TEM), and TEM coupled with energy dispersive X-ray (EDX) was used to confirm the elemental composition of the adsorbed silver on PSNPs' surface. On the other hand, toxic and genotoxic effects of silver materials, nanoplastics and silver/nanoplastic complexes were evaluated to determine whether additive, synergistic or antagonistic effects were induced by the co-exposure. Although cytotoxicity, oxidative stress induction or genotoxicity of AgNPs or Ag^+ on Caco-2 cells were not altered with the addition of PSNPs, a slight increase of silver uptake was detected with increasing concentrations of PSNPs. Nevertheless, taking all the data together, PSNPs do not seem to exacerbate AgNPs or Ag^+ harmful effects, so further investigation is required to elucidate the interaction's implications.