# Interactions of in-house made polyethylene terephthalate nanoparticles with human hematopoietic cell lines as an improved model for assessing the health risk of nanoplastics

**Aliro Villacorta[1,2], Josefa Domenech[1], M. Alaraby[1,3], L. Vela[1,4], Alireza Tavakolpournegari[1], Ricard Marcos[1], Alba Hernández[1]**

*[1]Departament of Genetics and Microbiology, Faculty of Biosciences, Universitat Autònoma de Barcelona, Cerdanyola del Vallès (Barcelona), Spain.*
*[2]Facultad de Recursos Naturales Renovables, Universidad Arturo Prat, Av. Arturo Prat s/n Campus Huayquique, Iquique, Chile.*
*[3]Zoology Department, Faculty of Sciences, Sohag University, 82524 Sohag, Egypt*
*[4]Faculty of Health Sciences Eugenio Espejo, Universidad UTE, Quito, Ecuador.*

*E-mail: aliro.villacorta@e-campus.uab.cat*

Despite the increasing literature in the field of exposure or detection of environmental micro- and nano-plastics, few data has been reported at the nanoscale level. This is considering a nanoscale that is under 1 µm not under 100 nm, as the definition adopted by the European Union on 2011. Moreover, the reported literature on their biological effects is mainly focused in the use of commercial pristine perfectly round engineered material, which is not difficult to conceive to be different to the polydispersity in terms of size and shape that can be found in nature or more accurately in the environment. To solve this gap, hereby we propose the use of polyethylene terephthalate (PET) samples intentionally degraded to nanoscale size starting from environmental PET bottles, which can mimic more accurately nanopollutant (nanoPET). To evaluate the potential effects of such samples we use human hematopoietic cell lines such as THP-1 (monocytes) and TK6 (lymphoblast). The NanoPET size and shape were analyzed by transmission electron microscopy (TEM), while the size measurement was compared with diameter measurements by dynamic light scattering on zetasizer ultra, confirming the nanoscale of the particles in the preparations. Particle concentration was also measured by these means. Fourier transform infrared spectroscopy (FTIR) analysis confirmed the presence of PET in the preparations and scanning electron microscopy coupled with EDX confirm the chemical composition of the NanoPET suspension.

By staining the NanoPET suspension with fluorescent Nile red we success to demonstrate cell uptake, as observed by flow cytometry. In spite of the observed internalization, our preliminary results show no significant biological effects on cell viability at exposures lasting for 24 and 48 h. Furthermore, no induction of intracellular reactive oxygen species (ROS) was detected after 3 or 24 h exposures, using the dihydroethidium (DHE) methodology. Further effects on other biomarkers are under development.