

Establishment of an *in vitro* gastrointestinal barrier model to study nano and microplastics pollution

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Microplastics and nanoplastics are fragments of less than 5 mm in size emerged as ubiquitous environmental contaminants. These minute plastic particles result from the breakdown of larger plastic items and are used in various consumer products. As they find their way into ecosystems, including marine environments and terrestrial systems, they have raised concerns about their potential impact on both environmental and human health.

One significant route of human exposure to microplastics and nanoplastics is through the consumption of contaminated food and water. The gastrointestinal system plays a crucial role in mediating the interaction between these plastic particles and the human body. Understanding the potential risks associated with microplastic and nanoplastic ingestion necessitates a comprehensive assessment of their effects on the intestinal barrier, which acts as the body's first line of defence against foreign substances.

The aim of this work is to set up an *in vitro* gastrointestinal barrier model based on the co-culture of three cell lines, Caco-2, HT29 and Raji B, as a valuable tool for evaluating the interactions between microplastics/nanoplastics and the gastrointestinal system. The developed 3D model was then used for a preliminary study analysing the internalization of polystyrene micro/nanospheres with different sizes (200 nm and 40 nm). In both cases, internalization was observed mainly within the cells; minimally they remained trapped on the cell surface, probably due to the presence of mucus. Further studies will be necessary to better understand the internalization mechanism and the cytotoxic or genotoxic effects that the spheres can induce on the intestinal barrier.