

Supplementary materials

Table 1. Overview of the impact of microplastics on major human organ involved.

Organ	Reference	Disease
Gut	(Zhang et al., 2021)	Ingested MPs accumulate in the intestine, compromising the integrity of the intestinal barrier and triggering chronic inflammatory processes.
	(Su et al, 2024)	MPs-PS exposure for 4 weeks alters the gene expression of tight junctions in the jejunum and duodenum, also modifying gut microbiota composition.
	(Zeng et al, 2024)	28-day exposure to MPs-PS increases intestinal permeability and reduces mucus production due to the downregulation of ZO-1, OCLN, and CLDN-1 in the colon.
	(Donkers et al, 2023; Chen et al, 2022)	MPs (1-10 µm) penetrate the intestinal barrier, impairing colon function and altering gut microbiota composition.
	(Chen et al, 2022)	MPs accumulation is associated with a reduction in Actinobacteria and an increase in Muribaculum, Akkermansia, Anaerostipes, and Prevotella, contributing to intestinal barrier dysfunction.
	(Wu et al, 2025)	Positive correlation between intestinal fibrosis in Crohn's disease patients and high concentrations of MPs in the ileum.
Liver	(Xu et al, 2024)	Ingested MPs cause hepatocytotoxicity, lipid metabolism disorders, and alterations in biochemical markers related to liver function.

	(Chen et al, 2022)	Chronic exposure to PVC-MPs (0.2 μm , 0.5 mg/day) increases circulating ALT and AST levels, activating the PIK3K/Akt pathway associated with apoptosis and oxidative stress.
	(Shen et al, 2022.)	MPs accumulation (0.1 μm , 1 mg/L for 60 days) activates the cGAS/STING pathway, triggering chronic inflammatory responses and the synthesis of fibrosis-associated proteins such as α -SMA and fibronectin.
	(Yin et al, 2023)	MPs activate the immune system and the formation of METs, further exacerbating liver inflammation.
Brain	(Yin, 2022)	MPs-PS exposure alters hepatic glutamine metabolism, increasing the synthesis of glutamate and oxidative compounds that cross the blood-brain barrier, leading to neurotoxicity and reducing Purkinje cells in the cerebellum.
	(Wang et al, 2022)	MPs induce oxidative stress, increasing acetylcholinesterase (AChE) activity while reducing acetylcholine and ChAT, impairing cognitive function. The CREB/BDNF pathway, crucial for long-term memory, is significantly reduced.
	(Amato-Lourenço et al, 2025)	A cadaver study showed MPs accumulation in the olfactory bulb, suggesting a direct entry route to the brain via inhalation.
	(Werder et al, 2018)	Subjects exposed to MPs-PS had high concentrations of MPs in their blood and neurological symptoms, indicating a possible correlation with MPs inhalation.

	(Teixeira et al, 2010)	Workers in a plastic manufacturing plant showed high concentrations of MPs metabolites (MA and PGA) in urine and DNA mutations associated with genotoxic damage.
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