

---

# How surface properties of pristine and environmentally exposed microplastics determine particle-cell-interactions

Anja Frm Ramsperger\*<sup>1</sup>, Christian Laforsch<sup>2</sup>, and Holger Kress<sup>1</sup>

<sup>1</sup>University of Bayreuth – 95440 Bayreuth, Germany

<sup>2</sup>University of Bayreuth – Universitätsstr. 30, 95440 Bayreuth, Germany

## Abstract

Microplastic particles ubiquitously found in the environment are taken up by various organisms, including humans. Upon uptake, microplastic particles can translocate from the primarily exposed organs to other tissues, likely by cellular internalization. The process of cellular internalization of particulate matter is determined by several factors. In the case of microparticles, their surface properties determine their interactions with cells, including internalization, and potential health effects. We show how the initial surface properties determine the cellular interactions of pristine and environmentally exposed microplastic particles. Furthermore, we describe how the environmental exposure of microplastic particles alters their surface properties and discuss how these alterations consequently change the number of particle-cell interactions and internalization. Especially the physicochemical surface properties of a microplastic particle, like its surface charge, functional groups and the coating with an eco-corona, are important factors for particle attachment, internalization and subsequent cellular reactions. Therefore, an in-depth characterization of the used particles in cytotoxicity studies is essential. We can only conclude the cause of possible toxicity from microplastics if we understand which properties of the plastic particles determine their reactivity towards cells.

**Keywords:** particle, cell, interactions, microplastics, eco, corona, zeta, potential

---

\*Speaker