

Aquatic animal models of increasing complexity for the assessment of nanomaterials effects

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Nanotechnology is nowadays the emerging multidisciplinary science, involving synthesis, characterization, and applications of nanomaterials (NMs). The increasing production and use of NMs raise concerns about inadvertent exposure and the potential for adverse effects on the environment and humans. Thus the nanoparticles applications and the potential nanoparticle-induced toxicity has become a point of concern. To test the safety of NMs the use of organism models, most likely the aquatic organisms, was introduced. This new recently emerged discipline, the Nanotoxicology, specifically aims to identify and predict effects elicited by nano-sized materials. To achieve this aim, nanotoxicology needs to take into consideration the entry routes and fate of nanomaterials in the abiotic and biotic environment to define exposure. It moreover needs to identify those interactions of nanomaterials with biota that alter the proper function of cells comprising an organism, thus impacting populations, which in turn can lead to changes in community structure and function and ultimately human health.

Here we discuss on studies of nanotoxicity in different models of aquatic organisms and their impact, by introducing the physicochemical characteristic of nanomaterials (size, aggregation, morphology, surface charge, reactivity, dissolution, etc.) and their influence on toxicity. Further, we discuss the direct effect of nanomaterials on development stage (embryonic and adult) in aquatic organisms, the mechanism of action as well as the toxicity data of nanomaterials in different species, i.e. algae, invertebrates and fish.