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Short Communication

Immune and reproductive system impairment in adult sea urchin exposed to nanosized ZnO *via* food

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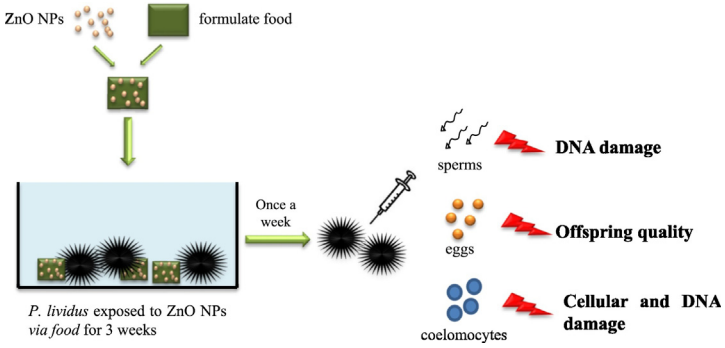
HIGHLIGHTS

- Adult sea urchins were exposed to different size of ZnO NPs *via* food.
- Cyto-genotoxicity of coelomocytes and evaluation of offspring quality were performed.
- ZnO NPs provoked damages to immune cells and transmissible effects to offspring.

GRAPHICAL ABSTRACT



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ABSTRACT

In marine environment the release and the consequent sedimentation of ZnO NPs, mainly used in sunscreens, could provoke toxic effects in particular in grazer organisms, like sea urchins. In this work, a first evaluation of DNA and cellular effects on adult sea urchins *Paracentrotus lividus* exposed through the diet to different sizes (100 and 14 nm) ZnO NPs, was performed. Moreover, the consequent impact upon offspring quality was evaluated. Preliminarily results showed that the assumption of food containing ZnO NPs 100 nm provoked in adult echinoids damages to immune cells (33% of damaged nucleus) and transmissible effects to offspring (75.5% of malformed larvae). Instead food with ZnO NPs 14 nm provoked 64% of damaged nucleus in immune cells and 84.7% of malformed larvae.

1. Introduction

In the last years, the production volume of nanomaterials (NMs) continued to grow rapidly (Keller et al., 2013). Nanoparticles (NPs) such as zinc oxide (ZnO) are mostly used in personal care products (sunscreens) to preserve the shelf life of products or as carriers for scents, vitamins and minerals and, to enhance favorable skin-care properties such as hydration. Actually, NM-containing products large use implies NPs release in seawater, where they could represent a risk for marine ecosystem. In seawater, the increasing salinity encourages the aggregation and, therefore, the sedimentation of the NPs, putting

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