

Nano-immunosafety in marine organisms, a central issue in environmental nanotoxicology

D. Boraschi¹, I. Corsi², A. Duschl³, and V. Matranga⁴

¹ *CNR Institute of Biomedical Technologies, Pisa, Italy*

² *University of Siena, Siena, Italy*

³ *Paris-Lodron Universitaet Salzburg, Salzburg, Austria*

⁴ *CNR Institute of Biomedicine and Molecular Immunology, Palermo, Italy*

diana.boraschi@itb.cnr.it

Besides direct toxicity (relatively easy to detect and measure), nano-objects may affect the capacity of biological systems of maintaining homeostasis and performing their functions. This is particularly important in the case of the immune system, responsible for defending the organisms from external and internal dangers, where alterations in immune responses may lead to significant pathological consequences.

Nano-immunosafety is therefore a topic of central relevance in nanosafety regulations and needs to be seriously addressed. Indeed, the issue does not exclusively pertain human health, but it is of utmost importance also for the environment, since all living organisms (including worms, insects, and plants) have an immune system which ensures their health and survival.

Within the Working Group Hazard of the EU-sponsored NanoSafety Cluster, the Immunosafety Focus Group (led by D. Boraschi and A. Duschl) and the Marine Ecotox Focus Group (led by I. Corsi and V. Matranga) are working together for determining the impact of nano-objects on the immune defensive system of organisms in the environment (besides man), starting from marine invertebrates. The goal is two-fold:

1. validate the concept that the immune response of environmental organisms is a key element in assessing environmental nanosafety;
2. propose and develop the use of non-human immune cells/organisms for assessing nano-immunosafety for human beings.

The impressive similarity of several mechanisms of innate immunity across species warrants the possibility of developing predictive assays for testing the immunosafety of nano-objects in different settings (*e.g.*, in the working place). The final goal is that of providing the regulatory bodies with valid and robust predictive assays to be adopted for both environmental and human nanosafety.