Exploiting C. elegans to assess Nanotechnology and nanomedicine

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Caenorhabditis elegans (*C. elegans*) is a transparent invertebrate worm that shares 60% genetic homology with humans, and it offers a platform for amenable experiments in various fields. In our group, we use this small organism as an *in vivo* metrology to reduce the number of higher animals used, comply with the 3R principles, and speed up the translation process of nanoparticles (NPs) or biopolymers to the market.

NPs have been suggested as promising as drugs, drug carriers, and therapies. Hundreds of NPs have been produced. However, the lack of time—and batch-efficient methods to evaluate NPs and processes prevents establishing general fundamental principles and impedes the progress of these future drugs and therapies unless high-throughput methods advance. Using this worm, we evidenced how nanoparticles' distinct chemical and structural properties could modulate their interaction with small organisms.

Biopolymers are also highly sought in nanomedicine since they offer a biocompatible platform for cell scaffolds, drug carriers, or tissue regeneration. We will present the evaluation of bacterial nanocellulose and focus on the worm's gastrointestinal tract, allowing us to elucidate lipid metabolism changes.

These simple experiments can potentially revolutionize the engineering of NPs and biopolymers by decreasing the time and cost effort required.