C. elegans a powerful screening biotool for nanotechnology

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Nanoparticles (NPs) offer the possibility to chemically and structurally tune their properties impacting on how they interact with biological materials. Hundreds of NPs have been proposed as drug carriers and therapies, however the lack of a time- and batch-efficient method 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.

Biopolymers, probiotics and dietary fibers are also currently in exploration to fight metabolic diseases such as diabetes, linked to obesity. However, those polymers are frequently tested based on trial and error on humans.

In this context, *Caenorhabditis elegans* (*C. elegans*) emerges as an ideal biotool to evaluate nanomaterials. *C. elegans* is an invertebrate, transparent worm with high genetic homology to humans. The gastrointestinal tract (GI) of this worm shares traits to the humans; we use the GI as test-bed for the multiparametric optimization of those nanomaterials, in specific in applications by oral delivery. The use of this *in vivo* metrology reduce the number of higher animals used, complying with the 3R principles, and speed the process of translation of drugs and food complements to the market.

The combination of anatomical, biochemical and genetic tools with materials science characterization techniques in the tiny *C. elegans in vivo* and at multiple biological levels (whole organism, organs, tissues, cells and pathways) will breakthrough in the engineering of food components for oral delivery decreasing time and cost effort.

In this presentation, we will show how *C. elegans* is becoming a powerful biotool to evaluate nanoparticles ranging from oxides to metal nanoparticles or polymers.

References

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