From dynamics and function to structure:
Bridging the gap between high resolution light microscopy and EM

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Electron microscopy (EM) is an highly used technique in nanomedicine research, is one of the most efficient tools for the characterization of the nanomaterials and to study the viral structure. EM is also essential in drug delivery to gain information regarding the ultrastructure of the nanoparticles.

With EM you can get resolution under 1 nm and you can appreciate in detail the ultrastructure of the sample you are observing, that's why EM is extensively used in nanomedicine research.

But this technique can't give access neither to the temporal dimension nor to the possibility to work with multicolor labeling.

This is the framework where optical microscopy comes into play.

The possibility to work with living specimens allows to better design the administration strategy of drugs, to carry out tests to assess drugs and nanomaterial safety and to better understand the mechanisms of delivery from the injection site to the target structure.

Working in multicolor provides information for example on the interactions of the nanoparticles with the different cellular structures, allows to mark different viral proteins to better understand the viral composition.

With optical microscopy you can get complementary information to the EM one, completing in this way the picture.

During this presentation we will take a journey into light microscopy, starting from the widefield moving to STED nanoscopy and analyzing the benefits that this ever-growing field can bring to the nanomedicine research.