Characterization and preclinical testing of nanomedicines

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A significant number of nanomedicinal products with high diversity has reached the market in the last decades. Recent examples are the mRNA Covid-19 vaccines based on lipid nanoparticles (LNP-mRNA), the most utilized COVID-19 vaccines in Europe and USA. In addition to vaccines against infectious diseases LNP-RNA therapeutics are being developed in several therapeutic areas: cancer therapy, rare diseases, neuroscience.

The accurate characterization of nanomedicines is challenging due to their intrinsic complexity. Their accurate pre-clinical characterization requires combination of physicochemical, immunological and toxicological assays [1].

In this presentation, I will address the role of quality attributes (QA) in ensuring consistency and reproducibility and the analytical techniques for their measurement. The availability of accurate methods for the characterization of nanomedicines helps to address some challenges in the field and will guide the rapid development of safe and effective nanomedicines for different therapeutic areas.

[1] Guerrini, G., Magrì, D., Gioria, S., Medaglini, D., & Calzolai, L. (2022). Characterization of nanoparticles-based vaccines for COVID-19. Nature Nanotechnology, 1-7.