NANOPARTICLES MEET ORGANIZED SOFT ASSEMBLIES: CHALLENGES AND OPPORTUNITIES FOR THE BIOMEDICAL FIELD

DEBORA BERTI
University of Florence, Italy
e-mail: debora.berti@unifi.it

The combination of inorganic nanoparticles (NPs) with organized natural or synthetic lipid assemblies has the potential to expand both our understanding and the applicative spectrum of these materials in the biomedical field.
This contribution will deal with hybrid systems composed of NPs and extracellular vesicles, (EVs). EVs are a major player in intercellular communication and mediate physiological and pathological processes. I will show how some central colloidal properties of EVs' dispersions can be monitored leveraging the properties of NPs, by introducing a nanoplasmonic assay for fast purity checking and a plasmon-based nanoruler for collectively fingerprinting EVs based on their stiffness.

REFERENCES:

1. C. Montis, D Maiolo, I Alessandri, P Bergese, D Berti, *Interaction of nanoparticles with lipid membranes: a multiscale perspective*, Nanoscale, 2014, 6 **(12)**, 6452-6457
2. C. Montis, L. Caselli, F. Valle, A. Zendrini, F. Carlà, R. Schweins, M. Maccarini, P. Bergese, D. Berti, *Shedding light on membrane-templated clustering of gold nanoparticles*, Journal of Colloid and Interface Science, 2020, **573**, 204-214
3. D. Maiolo, L. Paolini, G. Di Noto, A. Zendrini, D. Berti, P. Bergese, D. Ricotta, *Colorimetric Nanoplasmonic Assay To Determine Purity and Titrate Extracellular Vesicles,* Anal. Chem., 2015, 87, **(8)**, 4168–4176
4. Caselli, L., Ridolfi, A., Cardellini, J., Sharpnack, L., Paolini, L., Brucale, M., Valle, F., Montis, C., Bergese, P., & Berti, D. A *plasmon-based nanoruler to probe the mechanical properties of synthetic and biogenic nanosized lipid vesicles.* Nanoscale Horizons, 2021, 6 **(7)**, 543-550