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Engineered Nanoparticles as a toolkit to probe biomimetic and Biogenic Lipid Assemblies



Wednesday, 19th July
12.00 pm

CIC biomaGUNE - Seminar Room

Investigating the interaction of inorganic nanoparticles (NPs) with synthetic lipid assemblies has the potential to expand both our understanding and the applicative spectrum of these materials in the biomedical field. In particular, the mechanical properties of nanoparticles for biomedical use play a crucial role in their bioactivity, and in the interaction with cellular membranes, relevant for cellular uptake. Our group has investigated the interaction of plasmonic Au nanoparticles with supported and free-standing synthetic lipid bilayers, to address the membrane-induced aggregation which might result in a significant variation of the surface plasmonic resonance.

This contribution will deal with hybrid systems composed of NPs and membrane enveloped nanosized particles, either synthetic liposomes or extracellular vesicles, (EVs), a major player in intercellular communication and mediators for physiological and pathological processes. We will show how some central colloidal properties of liposomes and 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.

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3. Maiolo, D. et al. *Anal Chem* 87, 4168 (2015).
4. Caselli, L. et al. *Nanoscale Horizons* 6, 543 (2021).
5. Cardellini, J. et al. *J. Phys. Chem. C* 2022, 126, 9, 4483–4494
6. Zandrini, A. et al, *J Colloid Interf Sci Open*, 2023, 11, 100088
7. Cardellini, J. et al, *Colloid Interf Sci*, 2023,640, 100-109