

DNA-decorated Quatsomes Nanovesicles for Biosensing Applications

Marianna Rossetti^a

Enric Calucho Palma,^a Liming Hu,^a Mariana Köber,^{b,c} Nora Ventosa,^{b,c,d} Elisa Paialunga,^e Alessandro Porchetta,^e and Arben Merkoçi^a

^a Institut Català de Nanociència i Nanotecnologia Barcelona, Campus UAB, 08193 Bellaterra, Spain

^b Institut de Ciència de Materials de Barcelona, ICMAB-CSIC, Campus UAB, 08193 Bellaterra, Spain

^c Centro de Investigación Biomédica en Red CIBER-BBN Madrid, 28029, Spain

^d Nanomol Technologies SL, Mòdul de Recerca B, Campus Universitari de Bellaterra, Cerdanyola del Vallès, Spain

^e Department of Chemical Science and Technologies, University of Rome Tor Vergata, Via della Ricerca Scientifica, 00133, Rome, Italy

marianna.rossetti@icn2.cat

One of the main challenges in nanobiotechnology is to artificially re-create sensing and transduction mechanisms that occur in biological systems by making use of artificial lipid vesicles. Quatsomes are synthetic unilamellar nanovesicles constituted by surfactants and sterols in defined molar ratios, that present an excellent morphological stability over years and superior brightness in comparison to conventional liposomes. Nucleic acid-responsive Förster resonance energy transfer (FRET)-active nanovesicles can be easily obtained by anchoring fluorescent amphiphilic nucleic acid-probes to dye-loaded quatsome nanovesicles.¹ Here we envisage potential applications of responsive DNA-grafted quatsome nanovesicles for biosensing applications.

Acknowledgments

This work was in part supported by the Marie Skłodowska-Curie grant agreement (“SERENA” project no. 101029884 to M.R.), by the Marie Skłodowska-Curie grant agreement “Nano-Oligo Med” (No 778133 to A.P., E.P. and N.V), Furthermore, ICMAB-CSIC acknowledges support from the MINECO through the Severo Ochoa Programme for Centers of Excellence in R&D (SEV-2015-0496 and CEX2019-000917-S). Quatsome production and their physicochemical characterization has been performed by the Biomaterial Processing and Nanostructuring Unit (U6) of the ICTS “NANBIOSIS”, a unit of the CIBER network in Bioengineering, Biomaterials & Nanomedicine (CIBER-BBN) located at the Institute of Materials Science of Barcelona (ICMAB-CSIC).....

References

- [1] Rossetti M, Stella L, Morla-Folch J, Bobone S, Boloix A, Baranda L, Moscone D, Roldán M, Veciana J, Segura M.F, Köber M, Ventosa N, Porchetta A, “Engineering DNA-Grafted Quatsomes as Stable Nucleic Acid-Responsive Fluorescent Nanovesicles”. *Adv. Funct. Mater.* **2021**, 93, 2103511