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CENTER FOR COOPERATIVE RESEARCH IN BIOMATERIALS

seminar

Thursday, 8th November, 12.00 pm, Seminar Room

Host: Prof. Luis M. Liz-Marzán

Addressing Oncology Questions with Gold Nanostars and SERS

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Plasmonic nanostructures are well-known as effective substrates for applications in which near field enhancements are sought. In particular, we have shown that gold nanoparticles can be employed to carry out identification of U87 glioblastoma cells with surface enhanced Raman spectroscopy (SERS), by targeting overexpressed $\alpha V\beta 3$ integrins via RGD peptides [1]. However, gold nanostars have been proven to lead to much higher field enhancements, owing to their uniquely sharp protruding spikes. In particular, we have shown how they can be employed to build sensing platforms for the direct identification of small molecule analytes by SERS achieving femtomolar limits of detection [2]. In this talk, I will describe how gold nanostars can be tethered to rigid substrates and conjugated *in situ* to aptamers for targeting and recognition of prostate cancer cells and enable the quantification of cancer cell biomarkers at the single cell level [3], and how SERS-based quantification of prostate specific membrane antigen (PSMA), a promising biomarker for prostate cancer diagnosis, enables discrete patient stratification. Finally, I will introduce some tools we have developed in our lab to computationally predict important physical and optical properties of gold nanostars [4] and how to leverage coating materials to tune the field enhancement and increase colloidal stability [5].

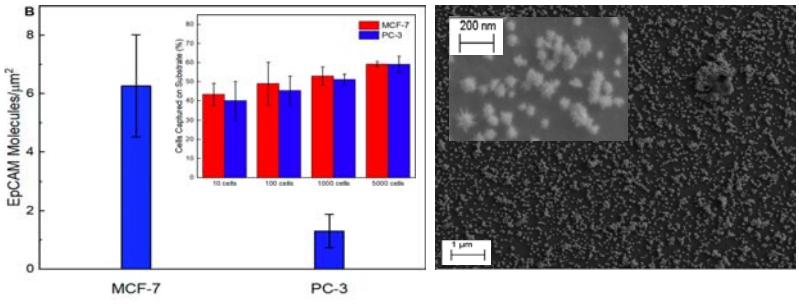

Figure 1. Gold nanostar substrates functionalized with EpCAM-specific aptamers enable to achieve 50% yield in capture and quantification of biomarker at the single cell level [3].

References.

[1] Indrasekara, A. S. D. S.; Paladini, B. J.; Naczynski, D. J.; Starovoytov, V.; Moghe, P. V.; Fabris, L. Adv. Healthcare Mater. 2013, 2, 1370.
[2] Indrasekara, A. S. D.S.; Meyers, S.; Shubeita, S.; Feldman, L. C.; Gustafsson, T.; Fabris, L. Nanoscale 2014, 6, 8891.
[3] Bhamidipati, M.; Cho, H. Y.; Lee, K.-B.; Fabris, L. Bioconj. Chem. 2018, 29, 2970.
[4] Tsoulos, T. V.; Han, L.; Weir, J.; Xin, H. L.; Fabris, L. Nanoscale 2017, 9, 3766
[5] Atta, S.; Tsoulos, T. V.; Fabris, L. J. Phys. Chem. C 2016, 120, 20749.