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seminar

Thursday, 5th May, 9.30am, Online

Host: Prof. Luis M. Liz-Marzán

Label-Free Monitoring of Tumor Models by Surface-Enhanced Raman Scattering

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The future treatment of cancer will be undoubtedly sustained by the detection of validated biomarkers and the development of personalized in vitro models that enable a precise classification of patients, as well as understanding the basis of the disease. Up to now, genomics, transcriptomics and immunohistochemistry have been the main amenable tools at hand for identifying key processes in tumors. However, other strategies, including metabolomics or 3D cell cultures, are still in their infancy and require more progress towards their routine implementations. In this context, surface-enhanced Raman scattering (SERS) spectroscopy has been recently recognized as a promising technology for cell environment monitoring, including complex tumor models, thanks to its high sensitivity and label-free operation. SERS promises to accelerate the discovery of biomarkers and their corresponding screening in a simpler, faster, and less expensive manner, so that it may improve cancer treatment and diagnosis.

In this manner, the experiments performed throughout this thesis sought to demonstrate the suitability of SERS for the screening of extracellular environments, including 3D models. We have provided illustrative examples of the use of SERS for monitoring cancer-related biomarkers, with a particular emphasis on identifying those directions that may drive widespread integration into biomedical sensors. Special attention was also paid to those requirements needed for improving in-situ measurements, introducing strategies based on artificial intelligence or responsive materials. We attempted to create thereby platforms with a wider versatility to address future exciting opportunities and challenges lying ahead.

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