Università degli Studi di Padova

DiSC

Lunedì **23 maggio 2022** alle ore **14:30** presso l'**aula A-Nasini**

la **Dr.ssa Dorleta Jimenez de Aberasturi**

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terrà il seminario dal titolo:

Application of inorganic-organic hybrid materials in 3D cell models

3D-printed cell models are currently in the spotlight of medical research.[1] Whilst significant advances have been made, more realistic models that can mimic the different physical forces and stress factors that cells experience in healthy and pathphysiological conditions are still needed.[2,3] One method to achieve suitable bioink is via hybrid biomaterials, in which inorganic nanoparticles (NPs) and organic materials can be combined to produce a biocompatible and stimuliresponsive environment.[4,5] The NPs can provide the physical properties of interest (i.e. optical response, heating, or mechanical strength, etc.), while the organic matrix (polymers, proteins, etc.) can provide the structural microenvironment for cell growth, with controlled porosity or responsiveness toward external stimuli. For example, 3D-printed scaffolds containing AuNPs are explored to study tumor growth.[6] This model aims to allow the analysis of relevant cancer biomarkers in situ, thanks to the sensing properties of the AuNPs which can be used as Surface Enhanced Raman Scattering (SERS) substrates for Raman-active molecules. A model of the arterial wall, composed of 3D printed endothelial and smooth muscle cells, is obtained by combining those living inks with a stimuli-responsive hybrid ink, which can contract and expand in response to externally applied light in resonance with the localized surface plasmons of incorporated AuNPs. These sophisticated models not only require improvements in cell engineering techniques and in the development of new hybrid materials, but also advanced imaging tools to accurately characterize them.[7,8]

[1] S. V Murphy, A. Atala, Nat. Biotechnol. 2014 328 2014, 32, 773.
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[3] N. Campillo, et al., Chemosens. 2021, Vol. 9, Page 248 2021, 9, 248.
[4] L. Nicole, et al. Nanoscale 2014, 6, 6267.
[5] M. S. Strozyk, D. Jimenez de Aberasturi, L. M. Liz-Marzán, Chem. Rec. 2018, 18, 807.
[6] C. García-Astrain, E. Lenzi, D. Jimenez de Aberasturi, M. Henriksen-Lacey, M. R. Binelli, L. M. Liz-Marzán, Adv. Funct. Mater. 2020, 30, 2005407.
[7] C. S. Hansel, M. N. Holme, S. Gopal, M. M. Stevens, Biomaterials 2020, 226 119406
[8] D. Jimenez de Aberasturi, M. Henriksen-Lacey, L. Litti, J. Langer, L. M. Liz-Marzán, Adv. Funct. Mater. 2020, 30, 1909655.

La presenza della S. V. sarà molto gradita

Il Direttore del Dipartimento
Michele Maggini

Lucio Litti