



# ZERNIKE - STRATINGH COLLOQUIUM

## Prof.dr. Luisa De Cola - Hybrid Materials for Medical Applications

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Time: 14:00 hrs

Place: Room 5161.0105, Bernoulliborg

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### ABSTRACT

(Luisa De Cola, Silvana Perretta, Giuseppe Alonci)

Despite the substantial progress that has been made in biomaterials synthesis and functionalization, the challenge of mimicking the ECM with implants that are able to reduce immunoresponse is still unmet. Recent findings have shown that mesenchymal stem cells (MSC) infiltrating into the implant have effects on the scaffold integration by improving the healing process. Towards this aim, we report novel biocompatible hydrogel with the ability to release a migration-inducing factor, for the recruitment of stem cells, and able to be injected in vivo. The hydrogel is a composite made of mesoporous silica materials able to respond to an external stimulus. In particular we devoted much effort in the last 5 years for the creation of “containers” able to break in small fragments (<5 nm) by a redox reactions, enzymatic degradation, and pH. Such containers can also release large macromolecules such as proteins and enzymes. They have been recently used in vivo to study their elimination and ability to release large biomolecules such as siRNA and chemotherapeutic drugs. The hydrogels that contain such porous materials are perfectly biocompatible and can also be made degradable, if necessary. Interestingly they can be injected as liquid and are able to solidify in few seconds in different tissues and organs. In collaboration with IRCAD and IHU we have shown the potential use of such materials for a series of diseases.