

MULTIMATERIAL AND MULTISCALE BIOFABRICATION APPROACH TO REPRODUCE THE 3D COMPLEXITY OF NATURAL TISSUE

Giovanni Vozzi, C De Maria, A De Acutis, A Lapomarda and F Montemurro

University of Pisa, Italy

A biological tissue is a composite material with bottom-up hierarchical structure that is closely related to its heterogeneous function. The extracellular matrix modulates biochemical and biophysical signalling and its rigidity is an important micro-environmental parameter that regulates the spatiotemporal dynamics of intercellular signalling. For this reason, many studies are focused on fabricating scaffolds processed at multiple scales with structural and mechanical properties that are optimal for eliciting specific response or mimic those found naturally. These scaffolds have to present large surface areas that have appropriate topology and biochemical cues (e.g. ligands) at the nanoscale for tissue adhesion, while also exhibiting integral porosity to allow for the exchange of molecules that maintain cellular function. In this talk, the use of a multiscale and multimaterial process will be presented to develop 3D *in vitro* model that can mimic the 3D complexity of natural tissue. These novel 3D *in vitro* models can be used for the study of physio-pathological condition and for the analysis of effects on cell activities of different biomolecule and/or drugs.

g.vozzi@unipi.it