UNIVERSITÀ DEGLI STUDI DI BRESCIA

I SEMINARI DEL DIPARTIMENTO DI MEDICINA MOLECOLARE E TRASLAZIONALE

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Engineering the Cell-Extracellular Interface to Control Single Molecule Interactions

Lunedì 04 Dicembre 2017 ore 13:00
Aula A1 Edificio Polifunzionale

Ospite: Prof. Paolo Bergese

ABSTRACT. In our work, we apply physicochemical concepts and modern surface nanosciences to address different aspects of cell responses to bio-inspired surfaces and materials. We study the interaction of cells with such substrates with focus on the impact of biochemical and physical properties of different materials on cell adhesion and functions. We have dissected the importance of nanoscale spacing of single extracellular ligands on cell adhesion, migration and mechanotransduction. To further understand the process of tissue formation, we developed novel strategies to immobilize growth factors on materials to induce cell differentiation, e.g. into bone cells. In doing so, we apply different physical chemistry techniques, such as block copolymer micellar nanolithography (BCML), soft lithography and microcontact printing and grafting of self-assembled monolayers (SAMs) for protein immobilization. We further couple these surface chemistry approaches to traction force microscopy and molecular tension sensors to understand the role of cell receptor clustering in generating cellular forces during adhesion, which in turn regulate cell phenotype. In the future, these exciting developments are likely to help reconcile the clinical and commercial pressures on tissue engineering.