Dr Alvaro Mata

Biomedical Engineering and Biomaterials; Institute of Bioengineering; School of Engineering & Materials Science; Queen Mary, University of London

Szkoła IN : Thursday 21 of May 2015, g. 12:00-13:00, room 0.48 ("Akwarium"), Pasteura 5, Faculty of Physics University of Warsaw

Proteins are attractive building-blocks to create complex nanomaterials. However, the difficulty to control their assembly across scales has hindered their functionality. Studying the interactions between peptides and proteins opens the possibility to identify molecular processes that can be used in innovative ways to generate materials with novel properties. Following this principle, we explore the possibility to use peptides to hierarchically guide protein conformation to bioengineer functional materials of improved complexity. The talk will first provide an overview of novel fabrication platforms to create bioactive membranes for bone regeneration and a novel 3D printing technique to create molecular patterns within 3D hydrogels. Then, I will focus on a novel dynamic system emerging from the conformational modification of an elastin-like protein by a self-assembling peptide amphiphile. This molecular interplay leads to a distinctive nanoarchitecture that can be maintained in non-equilibrium for substantial periods of time and enables the formation of robust macrostructures that display a wide range of dynamic properties including the capacity to undergo morphogenesis into desired shapes with spatio-temporal control. The functionality of the system was demonstrated by creating vascular-like structures that supported growth of vascular endothelial cells and adipose-derived stem cell.

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Szkoła odbywa się dzięki wsparciu projektu POKL UDA – POKL.04.01.01-00-100/10 "Chemia, fizyka i biologia na potrzeby społeczeństwa XXI wieku: nowe makrokierunki studiów I, II i III stopnia" prowadzonemu na Wydziale Chemii UW.