

Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences de l'Ingénieur

Madame Catherine PHILIPPART

Master ingénieur civil en chimie et science des matériaux

Nanopatterned surfaces to control the development of bacteria and mammalian cells

The development of surfaces controlling both bacterial and mammalian cell behaviors is of a great interest for applications in tissue engineering. The challenge is to produce surfaces promoting the development of mammalian cells, such as stem cells, while preventing the bacterial colonization. Besides the conventional approaches using antibiotics and bioactive compounds, recent studies showed that surface properties such as topography, stiffness, biochemistry and their patterning can be used to control mammalian or bacterial cells.

In this context, this thesis explores the fabrication of chemical and topographical patterns composed of nanometer lines of hydrophilic polymer brush grafted with peptides, to control both cell types. Three peptides were used: a cell-adhesive peptide (RGD-C) and two bactericidal peptides, i.e. cathelicidin (C-LL37) and magainin I (MAG-C). The behaviors of *Escherichia coli* (*E. coli*) and stem cells from the apical papilla (SCAPs) were investigated on these surfaces.

It was evidenced that C-LL37 and RGD-C patterns showed bactericidal and bioadhesive properties towards *E. coli* and SCAPs, respectively, while the antibacterial activity of MAG-C-modified surfaces was limited. Moreover, the comparison of SCAP behavior on homogeneous and patterned surfaces, revealed that nanopatterns grafted with RGD-C or a C-LL37/RGD-C mixture induced a clear variation of SCAP morphology. Thus, the neuronal, osteogenic and adipogenic expression of differentiation markers by SCAPs on patterned surfaces was investigated.

The results obtained during this PhD evidence the potential utility of the peptide-modified nanopatterns for applications in biomedical applications

Lundi 08 janvier 2018 à 16h00

Auditoire BARB 92
Place Sainte Barbe
1348 Louvain-la-Neuve



Membres du jury :

Prof. Karine Glinel (UCL), promoteur
Prof. Jean-François Gohy (UCL), président
Prof. Anne des Rieux (UCL), secrétaire
Prof. Jacques Mahillon (UCL)
Prof. Sylvain Gabriele (UMons)
Prof. Madeleine Ramstedt (Umeå University, Suède)