

Séminaire LIONS



Jeudi 10 avril 2014 à 11h00, pce. 157, bât. 125

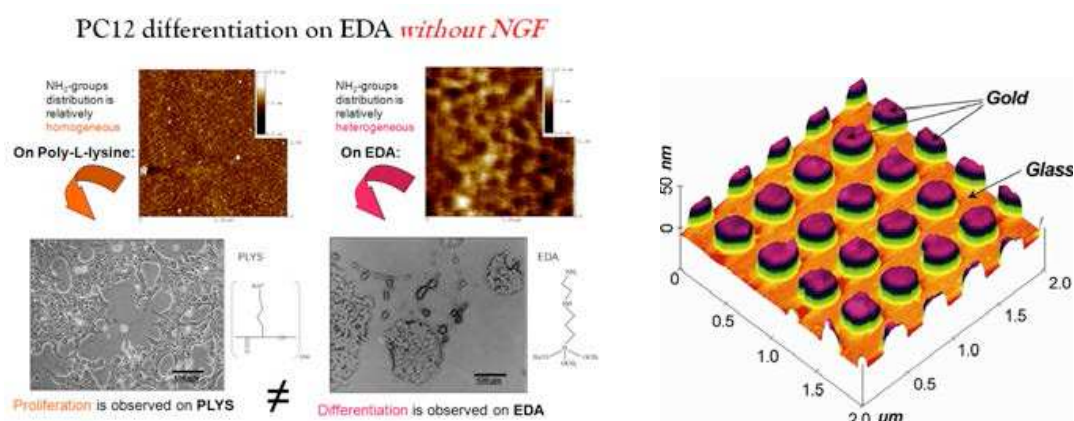
Influence of nanoscale surface free energy gradients on neuronal adhesion and differentiation

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Neuronal differentiation is critical to nervous tissue regeneration after injury, and adhesion on a substrate is critical for neurite extension. The initiation and guidance of a neurite rely on extra-cellular signals, such as substrate energy of adhesion (*e.g.*, surface energy, or surface tension), especially local gradients. Hence, it is of great interest to unveil the substrates characteristics that are effectively sensed by the growth cone, and translated into neuritis extension as a response to these physical cues. The ability to spatially control the distribution of the energy of adhesion is of particular interest in many biomedical and tissue-engineering applications.

Recent results indicate that, in addition to chemical, spatial and mechanical cues, substrate physical cues such as gradients in surface energy may also impact cell functions, such as neuronal differentiation of PC12 cells (Model of neurons). However, it remains to be determined what surface effect is the most critical in triggering cell (Neuron) differentiation.



G. Lamour, N. Journiac, S. Souès, S. Bonneau, P. Nassoy, A. Hamraoui Influence of surface energy distribution on neuritogenesis. *Colloids Surf., B* **72**, 208-218 (2009)

G. Lamour, A. Eftekhari-Bafrooei, E. Borguet, S. Souès, A. Hamraoui Neuronal adhesion and differentiation driven by nanoscale surface free-energy gradients. *Biomaterials* **31**, 3762-3771 (2010)

G. Lamour, S. Souès, A. Hamraoui Interplay between long- and short-range interactions drives neuritogenesis on stiff surfaces. *J. Biomed. Mater. Res. Part A* **99A**, 598-606 (2011)