Studying monocyte adhesion through biofunctionalised nanopatterns

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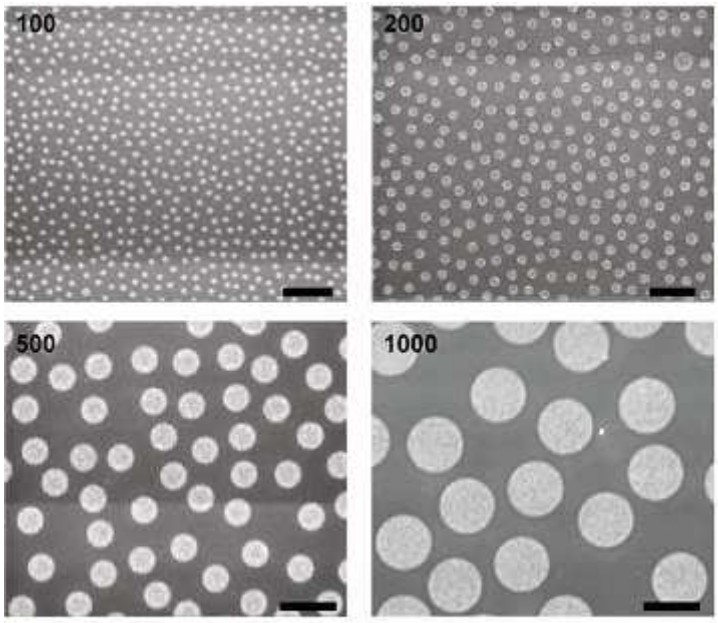

Fig.1: Through colloidal selfassembly nanopatterns of varieing size can be fabricated. Numbers on each picture inditcate size of PSNP used. Scalebar 1000nm.

Knowledge of the molecular mechanisms involved in the immune system is crucial for understanding and combating pathological conditions since all pathogens must take measures to avoid a full immune response.
The interaction between THP1 cells, a monocyte cell line, and bionanopatterns is investigated, specifically the LFA1-ICAM1 interaction which have been shown to be a major part in transmigration of immune cells through the blood and lymph systems endothelial layer. This pathway is also a major part of atherosclerosis, where monocyte derived macrophages endocytose LDL and initiates the formation of a plague, possibly giving rise to a blood clot.
I will present the experimental setup of a cell experiment with THP1 cells on biofunctionalized nanopatterns starting with the fabrication of large area nanopatterns achieved through colloidal selfassembly of negatively charge polystyrene nanoparticles in sizes ranging from 100-1000nm fig.1 (1), followed by a 4 step biofunctionalization which gives functional oriented ICAM1 molecules arranged in nanopatterns in a non-adhesive background, using Neutravidin, ProteinA-biotin, ICAM1-FC and PLL-g-PEG. By this method we can study the relationship between nanopatterns and receptor binding potentially revealing more detailed information about the interaction.

(1) Sutherland D.; Malmström J.; Large Area Protein Patterning Reveals Nanoscale Control of Focal Adhesion Development. Nano let., Vol 10, 2010, 686-694.