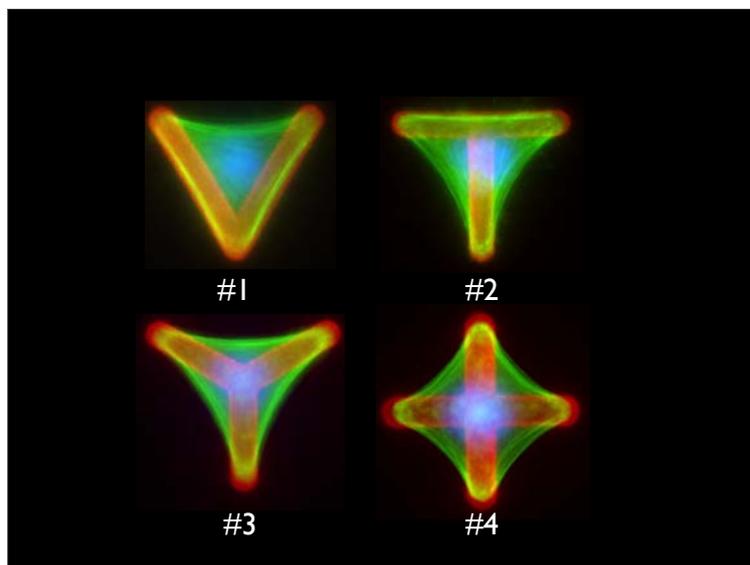


49: Biochip Photopatterning : surface functionalization for cell on a chip applications

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Surface micropatterning is a powerful tool for the design of cell-based assays and sensors, or for fundamental studies of cellular response to environmental cues. The combination of surface chemistry and microfabrication techniques allows to create substrates onto which adhesion can be tuned so as to obtain regular 2D arrays of immobilized cells. Such patterns have proven to be highly valuable for e.g. statistical analysis of the response of cells cultured in a well-controlled micro-environment (with potential applications in pharmacology and toxicology). Many different strategies have been developed to fabricate surfaces presenting cell-adhesive patterns, among which the most popular are based on microcontact printing or classical lithography. These widespread techniques may yet exhibit drawbacks in terms of ease of use (e.g. needed equipments or large number of steps), reproducibility, large scale homogeneity of the patterns, or stability of the produced surfaces. A key point in designing such surfaces is to obtain a high contrast between the regions onto which cells attach and the surrounding non-adhesive background.

During this practical, students will be trained to the design of micro-adhesive patterns using an optical system for rapid prototyping. Animal cell will be cultured with a very robust and easy accessible technique. The practical will last for 2 days during which the students will follow the global research process in the field going from the micro-pattern design, to cell culture on the biochips, fluorescence microscopy up to final image quantification and analysis. We hereby propose to initiate students to the basics of micropatterning for cell biology.



Caption: Serie of 4 micropatterns of extra cellular matrix protein coating (red signal) with cells actin cytoskeleton (green signal) and nuclei stained with DAPI (blue signal)

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