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Universal route for cell micropatterning using an amphiphilic comb polymer

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Micropatterning of localized chemical or biochemical domains has the potential to become a powerful tool to control the behavior of anchorage-dependent cells. Previously, control of cell-substrate contact area, cell attachment and growth, and cell-cell interactions in the microscale have been demonstrated using microfabricated metal templates, self-assembled monolayers, biopolymers, extracellular matrix proteins, cell-adhesive peptides, and membranes. However, several problems, such as the limited types of substrates that can be successfully patterned with cells and the lack of reliable, long-term retention of cellular patterns under physiological conditions need to be solved for cellular patterning to become widely applicable for cell-based biosensors, biomaterials, and high-throughput drug screening assays. We demonstrate in the presentation a simple and generic method to micropattern surfaces with an amphiphilic comb polymer presenting short oligoethylene glycol side-chains that enables long-term, spatially resolved attachment and growth of mammalian cells in a biologically relevant milieu on a variety of substrates.