Biointerfaces from dynamic polymer interfaces to nanofiber 3D-scaffolds

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The developed dynamic stimuli-responsive microstructured polymer brush interface, made of patterns of disjoining PNIPAM and adhesive RGD-PAA domains, is efficient for the separation and isolation of live or dead cells based on their affinity to the brush surface (Figure 1). The developed interface showed highly effective sorting of target cells from a complex mixture with non-target cells, even for highly asymmetric mixtures, because the quasi-irreversible and non-specific adsorption is compensated by oscillating repulsive mechanical forces generated by the stimuli-responsive interface. This oscillation between the adhesive and disjoining forces enables approaching the affinity-based equilibrium for cell adsorption at the interface[1].

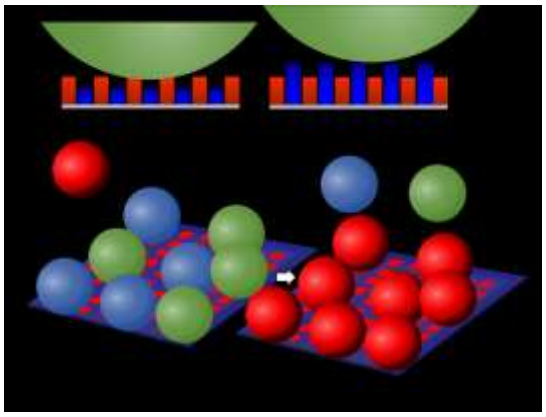

Figure 1. Polymer dynamic materials are capable of sorting fine particles and cells based on their affinity owing to multiple cycles of alterations between the adhesive and repulsive regimes

Another discussion topic is the fabrication of well-aligned 3D scaffolds for the manufacturing of cells and tissues. Two novel methods of nanofiber fabrication and alignment are discussed in light of possible applications in biotechnology[2,3].

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