High-throughput screening for materials that support embryonic stem cell attachment using polymer microarrays.

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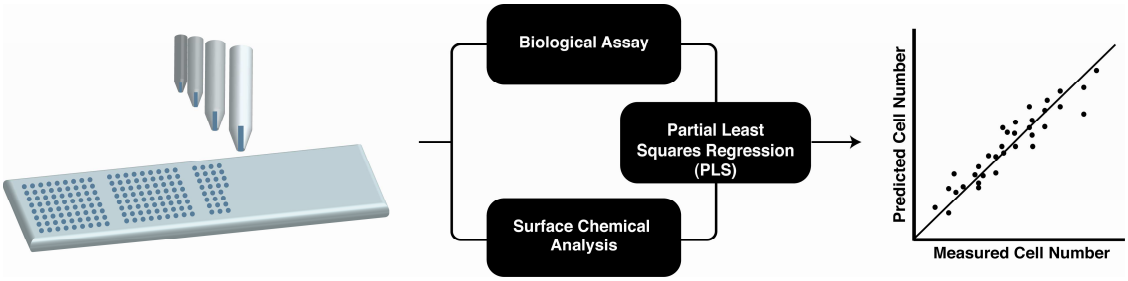

Polymer microarrays are a powerful sample format for high-throughput materials discovery. Described herein is a polymer microarray prepared via contact printing for the purpose of screening for human embryonic stem cell (hESC) attachment. Monomer solutions were prepared in a source plate with a photinitiator and spotted onto poly(2-hydroxyethyl methacrylate) (polyHEMA) coated glass slides and subsequently polymerized in-situ under UV irradiation to form the polymer microarray. The polymer microarray was characterized using time-of-flight secondary ion mass spectrometry (ToF-SIMS), water contact angle (WCA) measurements, atomic force microscopy (AFM), X-ray photoelectron spectroscopy (XPS) and raman spectroscopy. Polymers within the microarray that gave high hESC attachment were determined to be 'hit' materials. The surface chemistry of a biomaterial is thought to be important in determining whether a cell attachement is possible. To probe this relationship, surface chemical analysis of the hit materials was correlated with cell performance using multivariate analysis techniques such as principal component analysis (PCA) and partial least squares regression (PLS).