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### **Diblock Copolymer Foams with Adhesive Nano-domains Promote Stem Cell Differentiation<sup>1</sup>**

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Adhesions play an important role in cell behavior, including differentiation. Substrates are typically modified with homogeneous protein coatings; extracellular matrices *in vivo* provide heterogeneous adhesive sites. To mimic adhesive heterogeneity, internal phase emulsion foams were polymerized with polystyrene-polyacrylic acid (PAA) and polystyrene-polyethylene oxide (PEO) to determine if interface de-mixing would form patch-like surfaces. PEO/PAA mole ratios were confirmed by XPS and water contact angle while spatial distribution was measured by chemical force spectroscopy. This method confirmed the presence of patch-like PAA domains. Protein differentially adsorbs on PEO and PAA, so adsorption on foam mixtures was copolymer ratio dependent. Bone marrow-derived mesenchymal stem cell (BMSC) adhesion was ratio dependent, but the highest density and vinculin expression was observed for 75PEO/25PAA. BMSCs appeared to change lineage expression the most on this composition, suggesting that this foam, which exhibits small adhesive PAA domains, may be more biomimetic than uniformly adhesive scaffolds, e.g. 0PEO/100PAA.

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