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Effects of Polymer Surfaces on Proliferation and Differentiation of Embryonic Stem Cells and Bone Marrow Stem Cells SISI QIN, Materials Sciences and Engineering at Stony Brook University, WENBIN LIAO, YUPO MA, Stony Brook Medical Center, MARCIA SIMON, Stony Brook Dental School, MIRIAM RAFAILOVICH, Materials Sciences and Engineering at Stony Brook University, STONY BROOK MEDICAL CENTER COLLABORATION, STONY BROOK DENTAL SCHOO COLLABORATION — Currently, proliferation and differentiation of stem cell is usually accomplished either *in vivo*, or on chemical coated tissue culture petri dish with the presence of feeder cells. Here we investigated whether they can be directly cultured on polymeric substrates, in the absence of additional factors. We found that mouse embryonic stem cells did not require gelatin and could remain in the undifferentiated state without feeder cells at least for four passages on partially sulfonated polystyrene. The modulii of cells was measured and found to be higher for cells plated directly on the polymer surface than for those on the same surface covered with gelatin and feeder cells. When plated with feeder cells, the modulii was not sensitive to gelatin. Whereas the differentiation properties of human bone marrow stem cells, which are not adherent, are less dependent on either chemical or mechanical properties of the substrate. However, they behave differently on different toughness hydrogels as oppose to on polymer coated thin films.

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