Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Carbon nanotube monolayer patterns for modulating stem cell behavior SUNG YOUNG PARK, Interdisciplinary Program in Nano-Science and Technology, Seoul National Univ., Korea, KI-BUM LEE, Dept. of Chemistry & Chemical Biology, The State Univ. of New Jersey, USA, SEUNGHUN HONG, Dept. of Physics and Astronomy, and Dept. of Biophysics and Chemical Biology, Seoul National Univ., Korea — Nanostructures and nanomaterials intrinsically can interact with biological systems at the fundamental molecular levels with high specificity, which has held great potential for developing methods of controlling cell behaviors such as adhesion, proliferation, and differentiation. For instance, carbon nanotubes (CNTs), as extracellular scaffolds, have been used to guide neural cell growth and regulate cell polarity. However, in order to harness the potential of nanomaterials as artificial scaffolds, there is a clear need to develop methods of patterning nanomaterials over large surfaces with high precision and maintaining biocompatibility of patterned nanostructures. Herein, we report a novel method to regulate stem cell behaviors by using of combinatorial CNT patterns with different shapes and sizes in an effective way. Importantly, the SCs exhibited preferential growth on CNT patterns, and the CNT monolayer patterns did not show cytotoxicity during the long-term cell culture. These results clearly show that CNT monolayer patterns have enormous potentials as a platform for basic research and applications in stem cell tissue-engineering.

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Date submitted: 22 Nov 2009 Electronic form version 1.4