Abstract Submitted
for the MAS14 Meeting of
The American Physical Society

Cell fate Affected by Carbon Nanotubes during C17.2 Neural Stem Cell Differentiation MASSOOMA PIRBHAI, SABRINA JEDLICKA, SLAVA V. ROTKIN, Lehigh Univ — Delivery of materials, such as drug compounds or imaging agents for treatment or diagnosis of disease still presents a biomedical challenge. Nanotechnological advances have presented biomedicine with a number of agents that possess the appropriate size and chemistry to pass the blood brain barrier. Functionalized carbon nanotubes are one such agent. Functionalized carbon nanotubes, shown to penetrate the blood brain barrier can potentially aid in drug and gene delivery to the central nervous system. In addition, carbon nanotubes have already been applied in several areas of nerve tissue engineering to probe and augment cell behavior, to label and track subcellular components, and to study the growth and organization of neural networks. Although the production of engineered carbon nanotubes has escalated in recent years, knowledge of cellular changes associated with exposure to these materials remains unclear. In this study, we employed multipotent C17.2 neural stem cells to probe how individual single-wall carbon nanotubes functionalized with synthetic ssDNA or RNA affect cellular processes of adhesion, proliferation, and differentiation. The research has shown that while toxicity might not be an issue at low concentration of the carbon nanotubes, irregular behavior is nonetheless observed in terms of the fate of cells after differentiation and is worth considering when developing strategies to deliver components to the central nervous system.

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Date submitted: 29 Aug 2014 Electronic form version 1.4