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Cell fate variation of neural stem cells treated with carbon nanotubes[1] MASSOOMA PIRBHAI, SABRINA JEDLICKA, Lehigh University, MING ZHENG, National Institute of Standards and Technology, SLAVA V. ROTKIN, Lehigh University — 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 through the blood brain barrier. Functionalized carbon nanotubes are one such agent, which 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 functionalized carbon nanotubes has escalated in recent years, knowledge of cellular changes associated with exposure to these materials remains unclear. In this study, cellular phenotypes such as proliferation, growth and differentiation in C17.2 neural stem cells have been tested when treated with single-walled carbon nanotubes functionalized with synthetic ssDNA and RNA. The research has shown irregular behavior in the cell fate which could be due to changes in the cytoskeletal filaments. These results would be worth considering when developing strategies to deliver components to the central nervous system.

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