

Carbon Nanotubes: Biomaterial Applications and Safety

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There is increasing interest in the unique biological and medical properties of carbon nanotubes (CNTs), and it is expected that biomaterials incorporating CNTs will be developed for clinical use. There has been a great deal of progress in improving the various properties of CNTs for use in biomaterials and for promotion of tissue regeneration as scaffold materials. However, many of these studies have not shown clinical success because the safety of CNTs has not yet been confirmed. Of course, the concerns regarding the safety of CNT inhalation are completely different from those associated with CNT implants present in the human body for a long time. Therefore, safety tests of CNTs and their composites used as implantation materials in the body must be performed, including monitoring of inflammatory reactions, acute cytotoxicity, irritation, sensitization, chronic toxicity, carcinogenicity, and so on. However, further research and development in this area will lead to the production of superior CNTs for application as biomaterials, which will be of great benefit to large numbers of patients in the near future.