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Editorial

Functionalized Carbon Nanotubes (F-CNT) in Drug Design and Discovery

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Novel engineered nanoparticles, nanomaterial product(s) and composites are continually emerging worldwide. Recent information on nanoparticles has proved the vast number of their advantages in pharmaceutical and medical field [1]. The nanomaterial, carbon nanotubes (CNTs) were discovered in 1991 and shown to have certain unique physicochemical properties, attracting considerable interest in their application in various fields including drug delivery. The unique properties of CNTs such as ease of cellular uptake, high drug loading, thermal ablation etc. render them useful for therapy in healthcare system [2]. Considerable work has been done on CNTs as drug delivery systems over the last two decades [3]. In pharmacological applications, CNTs have primarily been explored as potential drug carriers and delivery vehicles. Recent advances in the development of reliable methods for the chemical functionalization of the nanotubes provide an additional impetus towards extending the scope of their application spectrum [4]. Basically, CNT can functionalize by the following well known methods namely covalent functionalization, non-covalent functionalization, external decoration with inorganic materials, and endohedral filling. In particular, covalent modification schemes allow persistent alteration of the electronic properties of the tubes, as well as to chemically tailor their surface properties, whereby new functions can be implemented that cannot otherwise be acquired by pristine nanotubes. CNTs can be functionalized with different functional groups to carry simultaneously several moieties for targeting, imaging, and therapy. CNT have contained or modified with following functionalized groups OH, COOH, plasma functionalized carbon nanotubes in O+ (all the oxygen groups) COOH, NH_2, N_2, F groups [5]. The recently chemical methods for chemical functionalization of carbon nanotubes have opened up a broad range of novel application. In biomedical application, especially in targeted drug delivery system for different cancer therapy etc the f-CNT are used with significant results [6]. F-CNT with different drugs could enhance the pace of drug discovery which would offer savings in money and time. It improves the traditional virtual screening methodologies and also enhances site specific action which will cure the serious diseases like cancer. Thus, f-CNT could play an important role in designing and development of novel pharmacological therapeutics.

Bibliography

1. Todkar SS., *et al.* "Risk and management of nanoparticles - an overview". *International Journal of Pharma Research and Life Sciences* 1.1 (2017): 1-13.

2. Kushwaha SKS., *et al.* "Carbon nanotubes as a novel drug delivery system for anticancer therapy: A review". *Brazilian Journal of Pharmaceutical Sciences* 49.4 (2013).

3. Liu Z., *et al.* "Drug Delivery with Carbon Nanotubes for *In vivo* Cancer Treatment". *Cancer Research* 68.16 (2008): 6652-6660.

4. Kannan B and Marko B. "Chemically Functionalized Carbon Nanotubes". *Small* 1.2 (2005) 180 –192.

5. Prato M., *et al.* "Functionalized carbon nanotubes in drug design and discovery". *Accounts of Chemical Research* 41.1 (2008): 60-68.

6. Zhang X., *et al.* "Targeted delivery and controlled release of doxorubicin to cancer cells using modified single wall carbon nanotubes". *Biomaterials* 30 (2009): 6041-6047.

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