



Nanovehcles are Sustained System to Compact with Active Natural 'Payloads' for Effective Cancer Treatment

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Abstract

Cancer continues to be one of the prime human threat diseases now a days, causes six million deaths around the world every year (WHO), the existing chemotherapeutic drugs such as doxorubicin, daunorubicin, bleomycin and cisplatin are inadequate and having adverse side effects with multiple drug resistance (MDR). The modes of action of chemotherapeutic are influencing both cancer and normal cells to some extent. As an alternative many natural entities for anticancer activity rooted from biological origins almost desert to the deep sea has been accounted, but it has a restriction of solubility and bioavailability. To conquer this impediment, emphasizing the nanovehicles for sustained and targeted delivery encrusted with active natural 'payloads' were advisable to improve the quality of cancer patient's self-life. Biologically active compound functionalized metal can be employed as a nano-drug formulation for cancer therapy.

Nanotechnology Approaches

Advancement of nanotechnology improves the therapeutic potentials with targeted drug and delivery systems towards anticancer applications. Nanovehicles are maintained the sustained release of a drug at the site, and improves the therapeutic value of a drug, without residual and adverse side effects [1]. Nano products such as liposomes, biodegradable polymer, carbon nanotubes, metal oxides and quantum dots have been formulated for a range of anticancer bio active compounds [2]. Biodegradable polymeric nanoparticles PLGA (poly-d, l-lactide-co-glycolide) act as one of the successful nanocarrier to deliver a choice of bio active compounds like curcumin [3] and apigenin [4], camptothecin [5]. As an evident few of our studies, dietary flavone chrysin [6] Chrysin (5, 7-Dihydroxy flavone ChR) a natural anticancer bioflavonoid, emerged as a potential drug therapy for almost all types of cancer have been functionalized with metal nanostructures like silver and gold for enhanced anticancer applications. Camptothecin a marine alkaloid was assembled with multi walled carbon nanotubes to destroy human cervical carcinoma cells (HeLa) [7]. Similarly, curcumin a well-known anticancer flavonoid has been successfully delivered with PLGA nanoparticles [8,9] for prostate and cervical cancer treatment. Owing to their high surface area-to-volume ratio, size and composition NPs holds the unique advantages to carry and deliver large payloads at targeted sites. It will leads to low risk, less expensive, improve the efficacy, solubility, and bioavailability of respective natural drugs.

Conclusion

Bio nano formulations can be explored the way out for the outbreak of human cancers with cost effective and stability of drugs. The natural compound influences the nano structure and encoded with active molecule considered as the cutting-edge technology to overcome the drug resistance. Choice of delivery systems with desired product plays a vital role at specific pathological studies, particles which can be embedded and drained to the leaky vasculature and poor lymphatic drainage. In order to validate the pathological component extensive pre-clinical studies are essential and interaction between particles and cells, profoundly histological research were advisable for safety in cancer treatment.

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