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Short Communication

Nanoparticles; The Tinest Warriors

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In recent years, the biggest challenge for the pharmaceutical scientists is to develop the novel system for drug delivery that can overcome problems of conventional dosage forms. It is in the mid-1980s that Nanoparticles reached the first clinical trial for anti-cancer drug delivery. Later in 1995, liposomal encapsulated doxorubicin entered the pharmaceutical horizon as first nanoparticle. Since then, lots of development took place in this field with approval of a range of new nanoparticles for cancer treatment as drug delivery systems [1,2].

The treatments present for different cancers comprise hormonal and radiation therapy, surgery and chemotherapy. Even though these conventional therapeutic strategies have enhanced the survival span of patients, yet they are over-burdened with numerous limitations. The main disadvantage of conventional chemotherapy has been non-specific distribution of drugs. Having no target specificity, generic cancer drug not only kills cancer cells but also kills neighbor healthy cells; hence confirms toxicity. Other side effects include organ dysfunction, weakness, hair loss, leading to a low quality of life for cancer patients. All these troubles have directed to the only resolution i.e. Nano Medicine, the straight medical usage of nanotechnology [3,4].

Targeted nanoparticle drug delivery offers several advantages and compensation to improve chemotherapeutic agents and/or gene delivery, thus overcome limitations of conventional therapies. These targeted nanoparticles work efficiently by enhancing the solubility ratio of hydrophobic drugs, minimize the non-specific uptake by normal body cells thereby reducing the side effects, prolonging the circulation time of drugs and thus improving penetration of drug intra-cellularly, preventing undesirable off-targets and so allowing for highly specific targeting of cancer cells [5].

Natural products have gained tremendous attention in the recent past, mainly because of their specificity and less side effects. Formulation of a stable and effective preparation is not an easy task for the pharmaceutical formulators. Gold nanostructures provide an adaptable platform to incorporate several therapeutic alternatives which leads to effective "combinational therapy" to fight with cancer. It is the non-toxicity of Gold nanoparticles to human cells that makes the clinical perspectives of gold based multifunctional nanoparticles promising. (U.S. National Cancer Institute-06-C-0167) [6-8]. Therefore, to synthesize a novel GNPs formulation, to monitor the effects of reported potential compounds for cancer treatment when trapped in gold nanoparticles can increase the horizon of treatment offers. Additionally, a comparative profile of targeted effect of these drugs when given alone or when integrated with gold nanoparticles can also assure the utilization of these methods for futuristic approach. The effectiveness, circulation half-lives and side-specific release of these drugs on the targeted cancerous site would also be observed using cancer cell lines, to get potent anticancer hits among these compounds, and following investigation of their underlying molecular mechanisms. Moreover, the combination of currently used anticancer drugs (e.g. cisplatin and 5-Fluorouracil) with selected potential compounds against different types of cancer can also be formulated to observe the synergestic effect of effect of these drugs, in order to improve the treatment strategies against such devastating ruinous diseases.

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