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Mini Review

Nanoparticles for treatment of Cancer

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Introduction

In recent studies, it has been seen that cancer cell detection in the initial stage and its treatment are getting complex with passing days. Treatment of various cancers and psychosis gets problematic if the initial stage detection is not made on time¹⁻⁴. Apart from this, sometimes drug delivery at specific cancer affected area become impossible for some specific characteristic feature of the functioning of the chemotherapeutic drugs. To address the issue, the use of nanoparticles, anti-MiRs, exosomes, and DNA modification is seeing a high. Along with it, histone modification is getting used to addressing this problem⁵⁻¹¹.

Numerous ways are followed to address the issues relating to cancer treatment, and psychosis. Detection, management, and treatment of brain tumor-like glioblastoma are getting tougher with passing years. Chemotherapy is not only usually used into the treatment of a brain tumor, but also it has some drawbacks like an increase in the level of cytotoxicity and drug resistance¹²⁻²³. To meet with the issue use of specially designed nanoparticles with chemotherapeutic drugs are increasing. Similarly, to control the problems like multidrug resistance the use of nanoparticles with the capability of co-delivery of dual drugs has been started. Multidrug resistance (MDR) mainly impacts the treatment of malignant cells of the human body²⁴⁻²⁹.

To minimize the challenges concerned with the conventional way of drug delivery, this new process of drug delivery process has been invented.

Hence, to minimize the issues like toxicity and deaths due to a higher dosage of chemotherapeutic drugs nanoparticles with the capability of co-delivery of dual drugs into the affected areas of the human body³⁰⁻³⁵.

Sometimes, the single and combined drug delivery becomes necessary for saving the normal tissues from getting destroyed. Nano-sized Camptothecin is used these days for this kind of individual and combined drug delivery at the affected areas³⁶⁻⁴⁰.

The antipsychotic drugs used in these days sometimes cause several fatal side effects in the human body. Metabolic syndromes and sometimes movement disorder are those fatal outcomes caused by those imperfect antipsychotic drugs⁴¹⁻⁴⁴. Nanoparticles of the size between 1-500nm are mainly used with the antipsychotic drugs to address the issue. It helps the drug to pass through the blood-brain barriers so that it can work properly and those side effects can get solved⁴⁵.

Nanoparticle introduction into the chemotherapeutic drug not only helps to minimize the impact like cytotoxicity and drug resistance but also assists the chemotherapeutic drugs to become capable of passing through the blood-brain barrier. Without the incorporation of nanoparticles with the drug, it is impossible to make the chemotherapeutic drug passable through the blood-brain barrier⁴⁶⁻⁴⁹. To meet with the issues of drug resistance the use of high dose chemotherapeutic drugs gets preferred sometimes, but it causes a high level of intoxication and even death of the patient. Nanoparticles that are used combined with chemotherapeutic drugs mainly enhances the permeability of the cellular membrane of the human body through which the drugs get incorporated into the affected area of the human body. Nanoparticles not only allow the drugs to pass through the blood vessels but also help to retain the medications for a more extended period so that it can work properly^{50,51}.

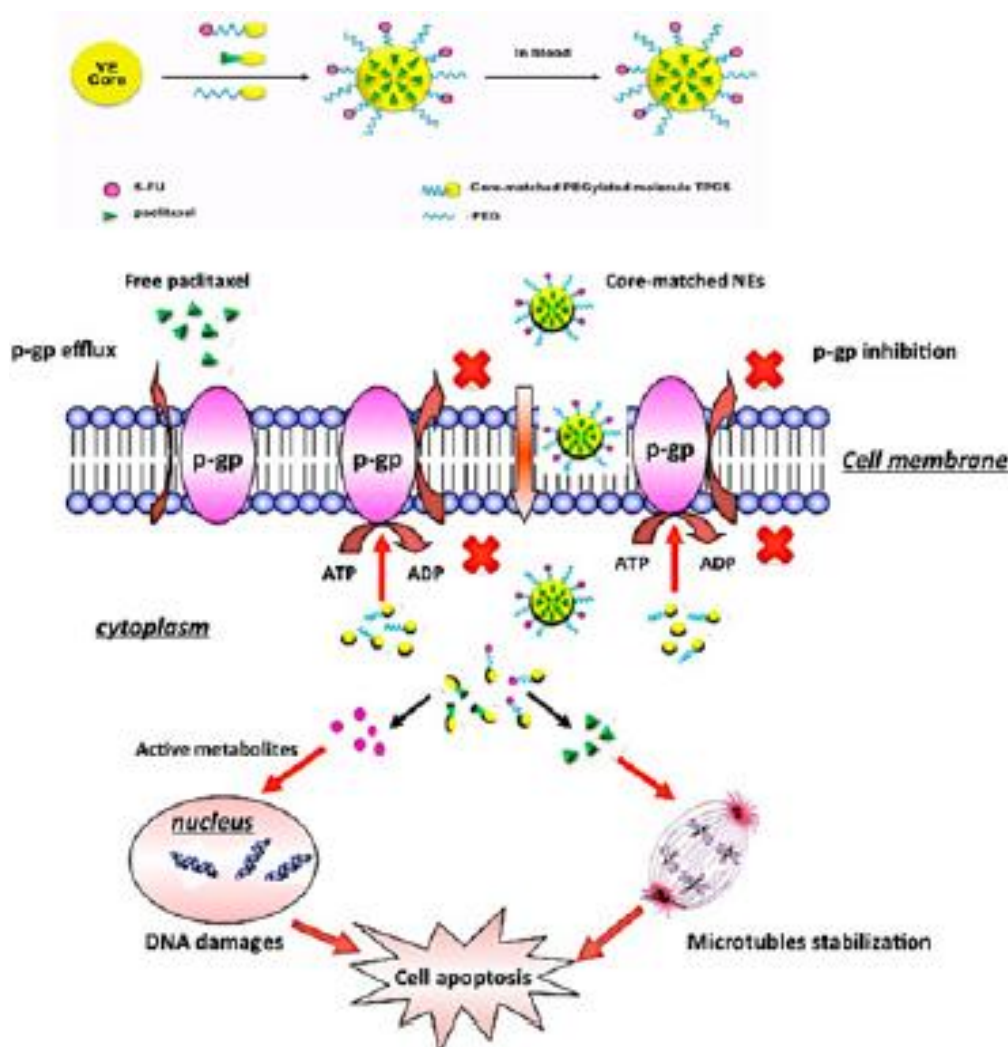


Figure 1: Core-matched nano-emulsions co-delivering PTX and 5-FU¹³.

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