An expressive note on biomarkers to create pharmacotherapy improvement and mutation drug resistance.

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Abstract

Cancer remains a significant challenge despite the progress in developing different therapeutic approaches. Nano medicine has been explored as a promising novel cancer therapy. Recently, biomimetic camouflage strategies have been investigated to change the bio-fate of therapeutics and target cancer cells while reducing the unwanted exposure on normal tissues. Endogenous components have been used to develop anticancer drug delivery systems. These biomimetic systems can overcome biological barriers and enhance tumour cell-specific uptake. The tumour-targeting mechanisms include ligand-receptor interactions and stimuli-responsive delivery. Drug delivery carriers composed of endogenous components represent a promising approach for improving cancer treatment efficacy. In this paper, different biomimetic drug delivery strategies for cancer treatment are reviewed with a focus on the discussion of their advantages and potential applications.

Keywords: Cancer, Biological barriers, Cancer treatment, Drug delivery carriers, Immunotherapy.

Introduction

For the past few years, nanotechnology has provided a lot of new treatment opportunities for prostate cancer patients, and brilliant achievements have been acquired indeed. It not only prolonged circulation time in vivo but also increased bio-availability of drugs. Among them, nanoparticles with specificity ligand can be better targeted at prostate cancer, which improves the curative effect and reduces side effects. What's more, in terms of combined administration, the synergistic effect of chemotherapeutic drugs and hormones, or co-delivery two or more different drugs into the same delivery system, has achieved good therapeutic progress as well. In this paper, a comprehensive overview of Nano-technology and the combination therapy for prostate cancer by pharmaceutical and clinical pharmaceutical strategies have been proposed to further appreciate and recommend the design and development of prostate cancer treatment [1].

Nevertheless, evidence on their adoption is still limited for some drug delivery methods, such as vaginal rings, patches, and subcutaneous implants. Further research is needed to define better their clinical utility in patients with endometriosis. Nanotechnologies have been investigated as novel drug delivery methods able to target the drug at the disease level. However, data are very limited and preliminary, and further research is needed to consider a possible clinical application in endometriosis [2].

Lung cancer is considered to cause the most cancer-related deaths worldwide. Due to the deficiency in early-stage diagnostics and local invasion or distant metastasis, the first line of treatment for most patients unsuitable for surgery is chemotherapy, targeted therapy or immunotherapy [3]. Nano carriers with the function of improving drug solubility, in vivo stability, drug distribution in the body, and sustained and targeted delivery, can effectively improve the effect of drug treatment and reduce toxic and side effects, and have been used in clinical treatment for lung cancer and many types of cancers [4].

The development of novel polymeric materials is guided by the goal of improving patient survival and quality of life by increasing the bioavailability of drug to the site of disease, targeting delivery to the pathological tissues, increasing drug solubility, and minimizing systemic side effects. Polymerases vesicles are the only type of polymeric nanocarriers that can physically encapsulate at the same nanoparticle hydrophilic drugs in their aqueous interior and/or hydrophobic agents within their lamellar membranes. Polymerases have been shown to possess superior biomaterial properties compared to liposomes, including greater stability and storage capabilities, as well as prolonged circulation time [5].

Drug resistance is worldwide health care crisis which decrease drug efficacy and developing toxicities. Effective resistance detection techniques could alleviate treatment cost and mortality associated with this crisis. In this review, the conventional and modern analysis methods for monitoring of drug resistance are presented. Also, various types of emerging rapid and sensitive techniques including electrochemical,

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electrical, optical and Nanobased methods for the screening of drug resistance were discussed. Applications of various methods for the sensitive and rapid detection of drug resistance are investigated. The review outlines existing key issues in the determination which must be overcome before any of these techniques becomes a feasible method for the rapid detection of drug resistance. In this review, the roles of nanomaterials on development of novel methods for the monitoring of drug resistance were presented. Also, limitations and challenges of conventional and modern methods were discussed.

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