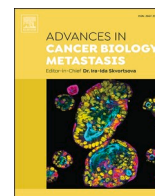




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An insight of various vesicular systems, erythrocytes, and exosomes to control metastasis and cancer

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ABSTRACT

Cancer is the most challenging global health issue despite advancement in new drug development and biological understanding of oncology. Metastasis is the hallmark of cancer development resulting in huge death and it remained poorly understood. Various research articles published to control cancer and metastasis using lipidic nanocarriers so far. However, safety and high patient compliance are the prime concern. Medication is always of major concern for a clinician before prescribing any dosage form or drug. The high toxicity profile of anticancer drugs led to increased financial burden of treatment, mortality and complex consequences. Therefore, conventional dosage forms failed to culminate various issues related to therapeutic efficacy and drug related toxicity. Then, many researchers tried the novel drug delivery systems for effective and safe targeting of anticancer drugs. Exosomes, vesicular systems, and erythrocytes have been explored to treat cancer. It was imperative to compile major findings from these researches carried out so far. In the review, we highlighted application of exosomes, liposomes, and erythrocytes to control metastasis and cancer. Moreover, we have addressed various critical attributes of liposomes while formulation design for improved therapeutic efficacy and mechanistic perspective for drug targeting using the described vesicular carriers. Finally, we compiled major findings of clinical data published in clinical research platform. This review highlighted the major findings associated with nanovesicles based tumor targeting in which anticancer drugs are encapsulated in suitable vesicular systems and reach to site specific delivery of drugs.

1. Introduction

The term cancer is defined as “uncontrolled cell division and cell proliferation” followed by metastasis (cancer cell lodged after migration from tumour site to other normal tissue) though angiogenesis (new blood vessels formation). Various cancers (> 100) named after the affected tissue or organs [1]. Cancer risk factors and causes are still complicated, diverse, and complex so far. Many factors are known to increase the risk of cancer, including external factor (tobacco, dietary

factors, certain infections, exposure to radiation) and internal factors (inherited mutations, hormones, immune conditions and mutations that occurs from metabolism) [2]. Cancer is treated with surgery, radiation, and chemotherapy [3]. An estimated 14.1 million new cancer cases and 8.2 million cancer-related deaths have been reported in 2012, compared with 12.7 million and 7.6 million, respectively, in 2008 [4] Prevalence estimates for 2012 show that there were 32.6 million people (over the age of 15 years) alive who had a cancer diagnosed in the previous five years. The most commonly diagnosed cancers worldwide were those of

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