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A System for Delivery of Nanocarrier for the Treatment of Cancers

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ABSTRACT
Cancer, also known as a malignant tumour or malignant neoplasm, refers to a group of disorders characterised by abnormal cell proliferation with the ability to infiltrate or spread to other regions of the body. Radiation treatment, surgery, chemotherapy, and targeted therapy are frequently used to treat cancer. Radiation treatment, surgery, chemotherapy, and targeted therapy are frequently used to treat cancer. In 2012, over 14.1 million new cases of cancer were diagnosed worldwide. As a result, developing novel therapy methods for oral cancer remains a top focus. The invention is about a cancer obliterator that contains anticancer drug enriched by H5WYG peptides containing several histidine's with a property escaping from endosomes; and solves the problem of the vasoactive intestinal peptides and drug-loaded nanoparticles taken into the cell (which play a role in endocytose process and specifically bind to the receptors on cancer cell membranes) not being released into the cytosol by being held by endosomes.

Key words:
Malignant Tumour,H5WYG Peptide,,Nanoparticles,Endosomes

I. INTRODUCTION

In 2012, over 14.1 million new cases of cancer were diagnosed worldwide. It killed around 8.2 million people, accounting for approximately 14.6 percent of all human mortality. Cancer risk increases dramatically with age, and rates are rising as more people survive to old age.

Tobacco and alcohol use, as well as exposure to the Human Papillomavirus, are the leading causes of oral cancer (HPV). Despite advances in diagnostic procedures and treatment modalities such as surgery and chemo-radiotherapy, treating oral cancer remains a big issue. As a result, developing novel therapy methods for oral cancer remains a top focus. Small molecule tyrosine kinase inhibitors (TKIs) like sorafenib constitute an appealing therapeutic option for cancer therapy. Sorafenib is an example of a small molecule TKI with broad target selectivity that suppresses tumour cell proliferation via the Raf/MEK/ERK pathway (MAP Kinase), angiogenesis, and tumour microenvironment signalling (metastasis and invasion), as well as treatment-resistant malignancies. It also inhibits the proteins c-Raf-1 and B-Raf. In some of the Patent Literature and Non-patent literature search references given below for cancer treatment drug delivery.

US8945629B22005, The invention is a nanoparticle that contains an anticancer drug that is released in cancer cells when administered to a subject. The nanoparticles have a core including the anticancer drug and polymer chains that are soluble at the pH of the cancer cell. The core is surrounded by a layer of polymer chains that are insoluble at the pH of healthy tissue but soluble at the pH of the cancer interstitium. An outside layer is made of water-soluble polymer chains to shield the nanoparticle from RES recognition and give the nanoparticle a long circulation time in the bloodstream of the subject. The outside layer may also include folic acid moieties that bind folic acid receptors on the surface of the cancer cell. Nanoparticle-based drug delivery system (DDS) is considered promising for cancer treatment. Compared with traditional DDS, the nanoparticle-based DDS shows improved efficacy by 1) increasing the half-life of vulnerable drugs and proteins, 2) improving the solubility of hydrophobic drugs, and 3) allowing controlled and targeted release of drugs in the diseased site. This review mainly focuses on nanoparticle-based DDS fabricated from chitosan, silica, and poly (lactic-co-glycolic acid). Their fabrication methods and applications in cancer treatment are introduced. The current limitations and future perspectives of the nanoparticle-based DDS are discussed.

Dasatinib, erlotinib, gefitinib, imatinib, lapatinib, nilotinib, and sunitinib are some more small molecule tyrosine kinase inhibitors. However, these molecules face common drawbacks such as instability, poor oral availability, inability to cross the blood-brain barrier, pH sensitivity,

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poor solubility, rapid metabolism, and clearance, repeated high dose medication, adverse drug reactions such as gastrointestinal bleeding, hypertension, hepatotoxicity, dermatological toxicity (hand-foot syndrome), dysgeusia, and diarrhoea, which severely limits the therapeutic effectiveness of sorafenib in cancer patients. To address these issues, researchers have focused on electrostatic interactions, which aid in the effective loading of small molecule inhibitors into the polyelectrolyte shell. The alteration of the particle surface with ionic polyelectrolyte(s) layers serves the objective of increasing the effectiveness of small molecule inhibitors in oral, intravenous, intratumoral, or subcutaneous administration treatment regimens.

OBJECTS OF THE INVENTION

It is an object of the present disclosuretoprovide a system for the delivery of nanocarrier for the treatment of cancers.

DESCRIPTION OF CARRIER

- a nanocarrier-based template nucleus (102) for encapsulating anti-cancer drugs;
- antineoplastic compounds(104) selected from the small molecule comprising of;tyrosine kinase inhibitors are chosen from at least one of dasatinib, erlotinib, gefitinib, imatinib, lapatinib, nilotinib, sorafenib and sunitinib, regorafenib, dasatinib, vemurafenib, taxol class of taxanes Thalidomide or a derivative thereof;
- the polymeric layering of antineoplastic agent (106)from atleast one polyanionic electrolyte and atleast one polycationic electrolyte;
- sorafenib encapsulated (108) layer-by-layer assembled CaC03 nanocarriercalled LbL-nanosoraf;
- a nanocarrier (110) selected from at least one of calcium carbonate, calcium phosphate, mesoporous silicananoparticlesfor drug delivery;
- calcium carbonate is used as a nanocarrier, and it restricts the aggressiveness of tumor cells without affecting the growth and behaviour of the surrounding stromal cells
- calcium carbonate nanocarriers core template used forencapsulation, it dissolved under mild conditions and are biocompatible, biodegradable, non-toxic, natural mineral.

II. CONCLUSION

A system (100) for delivery of nanocarrier for treatment of cancers a nanocarrier-based template nucleus (102) for encapsulating anticancer drugs, an antineoplastic compounds (104) selected from the small molecule comprising of; tyrosine kinase inhibitors chosen from at least one of dasatinib, erlotinib, gefitinib, imatinib, lapatinib, nilotinib, sorafenib and sunitinib, regorafenib, dasatinib, vemurafenib, Taxol class of taxanes,thalidomide or a derivative thereof, a polymeric layering of antineoplastic agent (106) from atleast one polyanionic electrolyte and atleast one polycationic electrolyte, sorafenib encapsulated (108) in layer-by-layer assembled CaC03 nanocarrier called LbL-nanosoraf, a nanocarrier (110) is selected from at least one of calcium carbonate, calcium phosphate, mesoporous silica nanoparticles for drug delivery.