Targeted, Ferritin-based Molecular MR Imaging Probe for Cancer Detection and Treatment (EA) (Case 2129)

Published date: Nov. 3, 2014

Technology description

Brief Description

Lack of effective diagnosis and treatment of cancers such as colorectal, prostate, breast, lung, and liver cancer presents a great need for relevant technology. The market urgently requires early detection methods and selective tumor-targeting therapeutic agents for common cancers. Tumor-specific biomarkers and visualization/detection methods for accurate treatment of cancer are the current emphasis in cancer research. This presents an opportunity for new technology development in this area.

The invention is a molecular MR imaging probe for the targeted destruction of tumor cells. This nanoconjugate strategy uses MRI to detect and destroy tumor cells using: 1.) genetically modified ferritin and 2.) a monoclonal antibody against a tumor-specific cell surface protein Nectin-like molecule 5 (Necl-5). Ferritin regulates iron ion homeostasis, and this modified version proposed has strong MRI contrast properties. The glycoprotein Necl-5 promotes "cellular proliferation, migration and invasion of transformed cell lines," and is up-regulated in multiple human carcinomas. The proposed monoclonal antibody greatly enhances selectivity toward such tumor cells. The genetically modified ferritin component serves as an MR contrast agent with greatly enhanced magnetic susceptibility at low concentrations as compared to conventional iron-based imaging contrast agents, while the monoclonal antibody of the nanoconjugate binds to tumor cells with high specificity. The ferritin/ Necl-5 conjugate effectively uses magnetic hyperthermia to destroy labeled tumor cells.

Application area

Applications include cancer detection and treatment of such cancers as prostate, colorectal, lung and liver cancer. Specifically, this technology may be used as a tumor-specific contrast agent for MRI, and also as a hyperthermal cancer therapy. Other applications of the ferritin/mAb(Necl-5) nanoconjugate may also include hyperthermia therapy. Compared to healthy cells, tumor cells are more susceptible to increases in ambient temperature, and may be killed by thermotoxicity. The proposed method of

hematogenously delivering the ferritin/mAb(Necl-5) nanoconjugate for this purpose is expected to be more effective than the conventional iron oxide nanoparticle (ION) approach.

Institution

Brown University

Inventors

William Keun Chan Park
Assistant Professor of Diagnostic Imaging (Research)
Bio Med Diagnostic Imaging
Edward Walsh
Assistant Professor of Neuroscience (Research)
Bio Med Neuroscience
David Mills
Assistant Professor of Medicine (Research)
Bio Med Medicine

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com