



Licensing opportunity

Targeted anti-cancer drug delivery system

Field of use

Anti-cancer drug delivery system

Current state of technology

Technology validated in lab

Patent status

EP and US patent granted

Publication

TBA

Developed by

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Reference

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Background

A molecular system for delivery of anti-cancer drugs specifically to target sites has been developed. Drugs are delivered in liposomes, using cathepsin inhibitors as guides towards cathepsins released by tumor cells. The system prevents toxic side effects, reduces the dosage, and treatment costs.

Description of the Invention

The Problem:

Despite the progress of modern medicine, cancer still represents a major problem of the developed world. A number of drugs exhibit major harmful side effects or are inefficient because of low bioavailability. There is a need for development of novel, more efficient drugs and novel targeted drug delivery systems. Current delivery systems are often based on nanoparticles or conjugation with antibodies; however, nanoparticle systems are often nonspecific and require high doses of drugs to be effective, and antibody-based systems are costly.

The Solution:

The invention solves this problem by safely and accurately delivering the drug to its target. Tumor cells characteristically secrete enzymes cathepsins that the delivery system is targeting. A specific cathepsin inhibitor is linked to a liposome via a lipid tail, and the liposome encloses the drug, offering protection from the environmental factors, preventing drug degradation as well as nonspecific delivery. The system is used for specifically targeting cathepsins in the tumor microenvironment, and therefore bringing the liposome containing the drug (eg. doxorubicin), to the target site.

Main Advantages

- use of liposomes as drug delivery systems is safe as liposomes are biologically inert, natural occurring particles in the human body; use of liposomes as drug carriers is common, and approved by the U.S. FDA
- using targeted delivery, therapy is made more efficient, thereby reducing the required dosage; this, in turn, leads to reduced treatment costs
- compared to passive drug delivery, the system has a 20-fold higher tumor cell killing capacity (i.e. requires 20-fold lower drug quantity for the same effect)
- side effects are minimized and the drug is delivered exclusively to tumor cells, increasing drug efficiency and patients' survival
- drug toxicity is reduced as the drug is enclosed in a liposome

