Jožef Stefan Institute, Ljubljana, Slovenia

Jamova cesta 39, SI-1001 Ljubljana, Slovenia
Tel.: +386 1 477 3900 / Fax: +386 1 453 5400

center for technology transfer and innovation
at the Jožef Stefan Institute

Tel.: +386 1 477 3224 / Fax: +386 1 423 5400
E-mail: tehnologije@ijs.si

TECHNOLOGY OFFER

Targeted anti-cancer drug delivery system

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.

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 non-specific 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 characteristic-ally 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 specificially targeting cathepsins in the tumor microenviron-ment, and therefore bringing the liposome containing the drug (eg. doxorubicin), to the target site.

Application:

The technology is applicable for targeted delivery of both anti-tumor and anti-inflammatory drugs. Apart from treatment, the technology is also applicable for detection purposes (for example, by specific delivery of a fluorescent marker to a tumor site).

Contact person: Levin Pal, Tel.: +386 1 477 3303, e-mail: levin.pal@ijs.si

Jamova cesta 39, SI-1001 Ljubljana, Slovenia
Tel.: +386 1 477 3900 / Fax: +386 1 453 5400

Tel.: +386 1 477 3224 / Fax: +386 1 423 5400
E-mail: tehnologije@ijs.si

Advantages:

- use of liposomes as drug delivery systems is safe as liposomes are biologically inert, natural occuring 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

Stage of development:

Successful functioning of the system has been demonstrated both in cell cultures and in vivo (on mouse tumor models).

Intellectual property:

Patent application has been filed for the technology.

Type of partnership sought:

The researchers seek investment partners, technical cooperation partners, and/or joint venture partners. The partners are expected to be able to fund and/or have the know-how, the capacity, and accreditation to carry out pre-clinical studies, including, for example, laboratory animal tests (mice, primates), and ultimately scale up the manufacturing to industrial scale.

CONTACT DETAILS

Levin Pal, PhD
Center for Technology Transfer and Innovation,
Jozef Stefan Institute,
Jamova cesta 39, SI-1000 Ljubljana
http://tehnologije.ijs.si
Phone: +386 1 477 3303
E-mail: levin.pal@ijs.si

Contact person: Levin Pal, Tel.: +386 1 477 3303, e-mail: levin.pal@ijs.si