TECHNOLOGY TRANSFER

LICENSING OPPORTUNITIES

Fondazione I.R.C.C.S.
Istituto Neurologico Carlo Besta

Sistema Socio Sanitario
Regione Lombardia

CELL-TYPE CARRIER FOR TARGETED TRANSPORT OF AT LEAST ONE MOLECULE AND/OR AT LEAST ONE MOLECULAR COMPOUND TO AT LEAST ONE TARGET CELL IN A HUMAN OR NON-HUMAN MAMMAL

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APPLICATIONS

- ◊ therapy of solid tumors and leukemias
- ◊ applications in regenerative therapies (wounds, reconstruction of organs and tissues)
- ◊ applications in inflammatory diseases (arthritis, colitis, etc. ..)

KEY BENEFITS

The combined action of drug-loaded mesenchymal stem cells (MSCs) has numerous advantages including:

- ◊ Greater therapeutic effect: local action of the drug transported
- ◊ Lower side effects potentially generated by the drug used
- ◊ Less quantity of drug to be used for therapeutic purposes

OFFER

To all those companies interested in the development of new drug delivery systems to enhance the therapeutic efficacy of a molecule and its more selective action in the pathological site

- ◊ Licensing out.
- ◊ Co-Development

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INVENTION

The invention consists in having discovered that MSCs, without genetic manipulation, are able to carry drugs, including chemotherapeutic drugs, and therefore to localize the therapeutic effect in the diseased site.

BACKGROUND

The primary goal of cancer chemotherapy is to localize the chemotherapeutic drug in the tumor microenvironment to kill as many cancer cells as possible while producing the lowest collateral toxicity.
To do this, a significant number of technical approaches, from the use of toxic immunoconjugates for targeting tumor-specific antigens (Car-T cells) to the sophisticated use of nanoparticles or genetically manipulated stem cells for drug delivery, have been intensively studied over the past 20 years. Because mesenchymal stem cells (MSCs) readily adapt to in vitro growth conditions and are able to establish themselves in pathological tissues when injected in vivo, they seem to represent the best choice to deliver anticancer agents. However, the procedures used so far (often through genetic manipulation) to induce the release of anti-tumor molecules present, in clinical application in humans, many risks.

TECHNOLOGY

The Paclitaxel (PTX) was used to load MSCs into culture. Incorporation of PTX into MSCs was studied using FICT-labeled PTX and analyzed by FACS and confocal microscopy. Release of PTX from loaded MSCs was studied by HPLC. The activity was tested in vitro on proliferation of different tumor cell lines and in vivo by co-transplantation of MSCs-PTX with tumor cells in mice. The data show, for the first time, that without any genetic manipulation, mesenchymal stromal cells can take up and subsequently slowly release chemotherapeutics. This could lead to the development of new cell therapy tools to increase the efficacy of chemotherapeutics in cancer therapy while simultaneously reducing their toxic side effects.

INVENTORS

GIULIO ALESSANDRI

Eugenio Parati
Augusto Pessina

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