



Directing Cells to Target Organs for Therapeutic Treatment using Asialodeterminants and Glycoconjugates (VA Reference No. 98-010)

Novel methods for delivering cells to a target tissue for stem cell therapy, gene therapy, and immunotherapy

Technology

Methods for delivering cells to target tissues or organs

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Key Features

- Less invasive method of delivering cells to target tissues or organs
- Facilitates localization of administered cells
- Multiple applications including stem cell therapy, gene therapy, and immunotherapy
- Multiple routes of administration

Stage of Development

Reduced to practice with successful demonstration in both *in vitro* and animal models

Keywords

- Therapeutic
- Cell delivery
 - Target organ
 - Stem cell therapy
 - Gene therapy
 - Glycoconjugate
 - Immunotherapy

Patent Status

[US Pat. Nos. 7,282,222](#) and [7,563,459](#)
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Technology

The Department of Veterans Affairs has developed methods for delivering cells to a target tissue using glycoconjugates to traffic the cell to a desired organ. The methods are especially applicable to administering stem cells such as those derived from the bone marrow or from umbilical cord tissue.

Description

The administration of cells that are able to localize to specific organs is useful for enhancing the efficacy of bone marrow and stem cell transplants, tissue repair, gene therapy, and adoptive immunotherapies. The ability to target stem cells to specific organs is of further importance as differentiation to the proper cell type is influenced and facilitated by neighboring cells. Currently, the implementation of cell-based therapies is limited by the ability to accurately target the localization of the therapeutic cells. Furthermore, a limitation for stem cell therapies is the proper differentiation of cells into the cell-type required.

The methods developed by the VA target delivery of cells of therapeutic value to target organs by sequential or concomitant administration of a carbohydrate presenting molecule (glycoconjugate) and the cells. The invention also provides for modification of cell-surface carbohydrates such as desialylation by treatment with neuraminidase on the cells themselves to facilitate a targeted delivery.

Competitive Advantage

Other available methods for localization of administered cells are more invasive and do not preclude the possibility of post-procedural migration of the therapeutic cells away from the target organ.

This invention:

- Could be used for multiple applications including the enhancement of the efficacy of bone marrow and stem cell transplants, tissue repair, gene therapy, and adoptive immunotherapies.
- Allows for delivery of the cells by either parenteral or intravenous injection.

Status

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license, and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).