Bicistronic Chimeric Antigen Receptor (CAR) Constructs Targeting CD19 and CD20

Summary (1024-character limit)

Chimeric Antigen Receptors (CARs) are engineered proteins that can be used in a therapeutic capacity when expressed by an immune cell (e.g., a T cell). Specifically, CARs comprise a targeting domain (such as an antibody or binding fragment thereof) as well as domains that activate immune cells. By selecting a targeting domain that binds to a protein that is selectively expressed on a cancer cell, it is possible to target immune cells to the cancer cells. Upon binding to the target cell, the immune cells are activated, leading to the destruction of the cancer cell. This therapeutic approach holds great promise, as evidenced by the recent FDA-approval of CAR-T cell therapies, KYMRIAH and YESCARTA, both of which target CD19.

NIH Reference Number

E-205-2018

Product Type

- Therapeutics

Keywords

- B Cell Malignancies, Leukemia, Lymphoma, CD19, CD20, Bicistronic, Adoptive Cell Therapy, ACT, Chimeric Antigen Receptor, CAR, Kochenderfer

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

CD19 and CD20 are promising targets for the treatment of B-Cell malignancies. Unfortunately, some clinical studies have shown that there is a loss of CD19 or CD20 expression in various cases of lymphomas and leukemias, particularly after treatment with an agent that targets CD19 (e.g., anti-CD19 CAR-T). However, studies have shown that expression of one protein is retained when the other is lost. This suggests that a therapeutic with the ability to simultaneously target both CD19 and CD20 could represent a solution to the drawbacks of current therapies.

Researchers at the National Cancer Institute (NCI) have developed the current invention which is an expression construct for a CAR that targets both CD19 and CD20. Specifically, a bicistronic construct has been created for expressing the two CARs from a single vector, thereby allowing for a more efficient transfection of T cells. The result is a more efficient and simultaneous targeting of both CD19 and CD20 by the same T cell.

Potential Commercial Applications

- Treatment of cancers and B cell malignancies expressing CD19, CD20, or both

Competitive Advantages

- First in class CAR treatment targeting both CD19 and CD20 simultaneously
- Simultaneous targeting of two antigens decreases the chance that a patient will acquire a non-responsive disease condition
- A single, bicistronic expression vector (rather than two separate vectors) allows for more efficient transfection of cells that can target two antigens

Inventor(s)

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Development Stage

- Discovery (Lead Identification)

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/732,263 , Filed 17 Sep 2018

Related Technologies

- E-042-2014

Therapeutic Area

- Cancer/Neoplasm