

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

Summary

Researchers at the National Cancer Institute (NCI) developed improved monospecific and bicistronic chimeric antigen receptors (CARs) targeting CD19 and CD20. Importantly, CD19 and CD20 are highly expressed in diffuse large B-cell lymphoma, acute lymphoblastic leukemia and other B-cell lymphomas. These improved CARs can be useful in treating these diseases. NCI is seeking parties interested in the co-development or licensing of this invention for immunotherapy.

NIH Reference Number

E-065-2021

Product Type

- Therapeutics

Keywords

- B Cell Malignancies, Leukemia, Lymphoma, Autoimmune, CD19, CD20, Monospecific, 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

Patients with chemotherapy-refractory, diffuse large B-cell lymphoma (DLBCL) have poor prognoses. CD19 and CD20 are promising targets for the treatment of B-Cell malignancies. However, despite the initial promising results from anti-CD19 CAR therapy, only 30-35% of patients with DLBCL achieve remissions lasting longer than 2-3 years after anti-CD19 CAR T-cell therapy. Relapse and non-response are likely due to diminished CD19 expression after anti-CD19 therapy and low expression of CD19 in some lymphomas.

To overcome the limitations of the CD19 CAR T therapy, inventors developed an improved

CAR targeting both CD19 and CD20. CARs targeting both CD19 and CD20 showed greater efficacy than the CD19 targeting CAR by itself. The structure of the CD20 binder in some of these CAR constructs is optimized to reduce death of CAR-expressing T cells and to promote retention of CAR expression. Also, these constructs are optimized to reduce retroviral recombination events.

Potential Commercial Applications

- Treatment of CD19-positive malignancies such as diffuse large B-cell lymphoma, acute lymphoblastic leukemia, and chronic lymphocytic leukemia
- Treatment of CD20-positive malignancies such as diffuse large B-cell lymphoma, chronic lymphocytic leukemia, follicular lymphoma, and mantle cell lymphoma
- Treatment of autoimmune diseases via B cell depletion

Competitive Advantages

- Constructs optimized to reduce retroviral recombination events
- Bicistronic expression vector allows for more efficient targeting of two antigens versus two separate vectors
- Bicistronic construct targeting both CD19 and CD20 increases the durability of response often limited by diminished expression of CD19 on tumor cell surfaces after anti-CD19 therapy

Inventor(s)

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Development Stage

- Pre-clinical (in vivo)

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 63/165,195, Filed 24 Mar 2021

Related Technologies

- [E-205-2018 - Bicistronic Chimeric Antigen Receptor \(CAR\) Constructs Targeting CD19 and CD20](#)

Therapeutic Area

- Cancer/Neoplasm
- Immune System and Inflammation

Updated

Wednesday, January 25, 2023

Source URL: <https://techtransfer.cancer.gov/availabletechnologies/e-065-2021>