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Empowering Ideas

A versatile universal immune receptor platform for generating targeted cellular immunotherapies

Brief Description

Platform for spontaneous, covalent linkage of any antigen-binding moiety to an engineered immune receptor on the surface of an immune cell

Inventor

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Andrew Tsourkas, Ph.D, Professor of Bioengineering and Associate Director, Center for Targeted Therapeutics and Translational Nanomedicine (CT3N), Institute of Translational Medicine and Therapeutics (ITMAT)

STATE OF DEVELOPMENT

in vitro proof of concept

INTELLECTUAL PROPERTY

Provisional pending

DESIRED PARTNERSHIPS

- License
- Co-development

APPLICATIONS

- Cellular immunotherapies for oncology or other indications
- Novel tumor-targeting antibody conjugates

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Problem

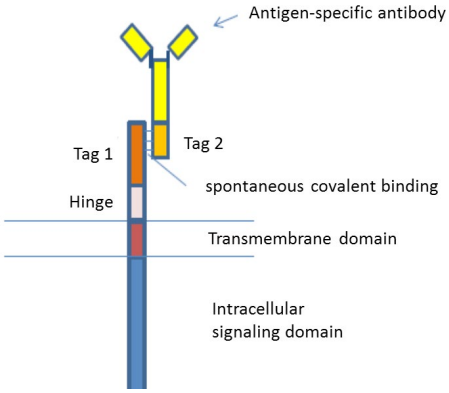
Traditional chimeric antigen receptors (CARs), having fixed antigen specificity, i.e. one-car/one-target, may be limited in widespread application due to heterogeneous antigen expression or antigen loss during disease progression. Having a panel of CARs available with distinct target specificities would address this issue, but generation of such a library is technically and economically challenging. A platform that allows flexibility in target antigen specificity and control of immune cell activity would be advantageous compared to current one-CAR/one-target approaches.

Solution

Drs. Powell and Tsourkas have developed a universal immune receptor platform that allows for spontaneous and covalent linkage of any moiety incorporating a specific tag to an engineered immune receptor on the cell surface containing a reciprocal tag. This novel platform provides a single engineered cell therapy that can be used in combination with a variety of targeting moieties, including a wide range of antibodies, ligands, aptamers etc., or labels for imaging. Co-administration of a tagged antibody and the engineered cells is anticipated to result in *in vivo* redirection of adoptively transferred immune cells to the desired target. The platform also has the potential to control immune cell activity (by controlling the dose of the targeting antibody) and to switch specificity (by subsequently introducing distinct targeting antibodies). In addition, the platform can be used in combination with tagged imaging agents to enable T cell tracking, to determine the kinetics of maximal antibody binding to target vs. normal tissue, and to monitor response to therapy.

Advantages

- At-will redirection of T cells toward a specified antigen
- Multivalent antigen targeting of heterogeneous tumors or antigen loss variants
- Permits labeling of transferred T cells for in vivo tracing
- Allows imaging of target tumor as a companion diagnostic and to determine optimal timing of T cell infusion
- Enables use of engineered T cells to deliver a payload of tagged molecule to target site



Schematic of the universal immune receptor platform showing spontaneous covalent linkage of an antibody through two complementary engineered tags