

Fully Human Antibody Targeting Tumor Necrosis Factor Receptor Type 2 (TNFR2) for Cancer Immunotherapy

Summary

The National Cancer Institute (NCI) seeks licensing or co-development for a novel human antibody against tumor necrosis factor receptor type 2 (TNFR2) for cancer immunotherapy.

NIH Reference Number

E-065-2017

Product Type

- Therapeutics

Keywords

- Antibody, Immunotherapy, Tumor Necrosis Factor Receptor Type 2, TNFR2, Cancer, Antibody-Dependent Cellular Cytotoxicity, ADCC, Tregs, Oppenheim

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

Tumor necrosis factor receptor type 2 (TNFR2)-expressing regulatory T cells (Tregs), present in the tumor microenvironment, play an important role in tumor immune evasion. TNFR2 plays a crucial role in stimulating the activation and proliferation of Tregs, a major checkpoint of antitumor immune responses. In addition to its expression on Tregs, TNFR2 is also known to be overexpressed on some types of tumors and the survival and growth of these tumor cells is promoted by ligands of TNFR2. Therefore, antagonists of TNFR2 may act as checkpoint inhibitors that suppress Tregs but may also be cytotoxic to tumor cells whose survival is promoted by TNFR2 ligands. Targeting TNFR2 in this manner could be a feasible approach to the treatment of cancer and other immune diseases.

NCI researchers have isolated and engineered a fully human TNFR2-specific monoclonal antibody capable of inducing cell killing of Tregs. The monoclonal antibody, named E4,

was isolated from a phage display scFv library. The antibody has also been produced in a defucosylated form, denoted E4F6, in an engineered CHO mutant cell. Experimental data has shown that the defucosylated antibody can specifically bind human TNFR2 on Treg cells and eliminate those cells through antibody-dependent cellular cytotoxicity (ADCC). This technology has potential uses in cancer immunotherapy to enhance antitumor responses or for targeting TNFR2-positive cancers.

Potential Commercial Applications

- Immunotherapeutic for the treatment of cancer
- Potential for synergistic effect to enhance the antitumor response to existing chemotherapeutics

Competitive Advantages

- Less crowded IP and commercial landscape than traditional checkpoint inhibitors
- Fully human antibody likely to have a lower toxicity and side effect profile than cross-species antibodies

Inventor(s)

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Development Stage

- Discovery (Lead Identification)

Publications

Chen X, Oppenheim JJ. Targeting TNFR2, an immune checkpoint stimulator and oncoprotein, is a promising treatment for cancer. [[Vol. 10, Issue 462, eaal2328](#)]

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number US 62/508,827 , Filed 19 May 2017
- **U.S. Patent Filed:** U.S. Patent Application Number PCT/US2018/031618 , Filed 08 May 2018

Therapeutic Area

- Cancer/Neoplasm

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