Antibody-Interferon Fusion Proteins For Enhancing Adoptive T Cell Therapies For The Treatment Of Cancer

Tech ID: 29789 / UC Case 2018-384-0

CONTACT

UCLA Technology Development Group
ncd@tdg.ucla.edu
tel: 310.794.0558.

INVENTORS

- Timmerman, John M.

OTHER INFORMATION

KEYWORDS

Adoptive cell therapy, T cell therapy, CAR T cell, fusion protein, antibody, interferon

CATEGORIZED AS

- **Materials & Chemicals**
  - Biological
- **Medical**
  - Disease: Cancer
  - New Chemical Entities, Drug Leads
  - Therapeutics

RELATED CASES

2018-384-0

SUMMARY

UCLA researchers in the Departments of Medicine and Microbiology, Immunology and Molecular Genetics have developed a novel combination therapy for enhanced efficacy of adoptive T cell therapies.

BACKGROUND

The market for cancer immunotherapy is rapidly increasing, and is expected to reach almost $120 billion by 2021. One promising approach is adoptive cell therapy (ACT), wherein a patients' T cells are removed, cultured *ex vivo*, and then infused back into the patients, boosting their immune system and killing cancerous cells. However, many patients' cancers resist infiltration by these T cells, or the T cells may be inactivated or weakened by the tumor microenvironment. Interferons (IFNs) have the potential to boost ACT effectiveness by promoting general immunological reactions, but injected IFNs are susceptible to rapid diffusion and clearance, resulting in limited benefit. There is therefore great unmet need for novel approaches that boost the efficacy of T cell therapies.

INNOVATION

Professor Timmerman and coworkers have developed an approach for enhancing the effect of adoptive cell therapy (ACT) for cancer treatment. By fusing interferons (IFNs) to a tumor-targeting antibody, IFNs will localize to the tumor site in the body, resulting in immune signals that direct T cells to the desired location. When ACT and IFN-antibody treatment was combined, tumor killing was doubled when compared to ACT treatment alone. Additionally, cytokine levels were elevated after IFN-antibody treatment, which has been shown to be necessary for optimal antitumor ACT.

APPLICATIONS

- Enhancement of adoptive cell therapy (ACT)
- Enhancement of CAR T cell therapy

ADVANTAGES

- Combination treatment leads to improved tumor killing compared to T cell treatment alone
- Improved efficacy compared to combination therapy with antibody alone (rituximab)
- Cytokine levels are increased, causing sensitization of tumor cells
- IFN-antibody can target tumor sites in all locations of the body

STATE OF DEVELOPMENT

IFN-antibody fusion proteins have been prepared and *in vitro* experiments using a variety of cell lines have demonstrated their efficacy when used in combination with adoptive cell therapy. Efficacy is improved compared to combination therapy with the FDA-approved rituximab.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20210087249	03/25/2021	2018-384

RELATED MATERIALS

- Trinh KR, Vasuthasawat A, Steward KK, Yamada RE, Timmerman JM, Morrison SL., Anti-CD20-interferon-ß fusion protein therapy of murine B cell lymphomas, Journal of Immunotherapy, 2013.
- Xuan, C., Steward, K. K., Timmerman, J. M., & Morrison, S. L., Targeted delivery of interferon-alpha via fusion to anti-CD20 results in potent antitumor activity against B-cell lymphoma, Blood, 2010.

UCLA Technology Development Group
10889 Wilshire Blvd., Suite 920,Los Angeles,CA 90095