Bispecific and Trispecific T-cell Engager Antibodies

Tech ID: 33449 / UC Case 2023-594-0

ABSTRACT

Researchers at the University of California, Davis have developed multi-specific antibody molecules including bi-specific and tri-specific antibodies that could serve to co-localize effector T-cells, target tumor B-cells and would simultaneously enhance anti-tumor activity and proliferation, whilst minimizing potential systemic toxicities

FULL DESCRIPTION

Two recently FDA-approved immunotherapies for B-cell malignancies target CD 19, in the form of a Bi-specific T-Cell Engager (BiTE) antibody construct or chimeric antigen receptor T (CAR-T) cells. Blinatumomab, an FDA approved BiTE, binds to CD19 on B cells and to CD3 on T cells, mediating effector-target cell contact and T-cell activation that results in effective elimination of target B cells. Although CD 19 expressed by essentially all B-cell malignancies at clinical presentation, relapses with loss or reduction of CD 19 surface expression are increasingly recognized as a cause of treatment failure. Therefore, there is a clear need to develop therapeutics for alternate targets.

Researchers at UC Davis have developed CD22xCD3 BiTE antibody that has significant in vitro and in vivo activity against ALL and in addition may synergize with blinatumomab. The CD22xCD3 BiTE demonstrated activation of effector T-cells and prolonged survival of mice with xenografts with minimal toxicity. The novel CD22xCD3 BiTE may offer an alternative or companion therapy to CD 19-based treatments. In addition, UC Davis researchers have developed tri-functional T-cell engager molecules that comprise two recognition arms (anti-CD22 and anti-CD3 single-chain antibodies) and a central activating cytokine. The cytokine activating component boosts proliferative and anti-tumor effects of NK and CD8+ T cells.

APPLICATIONS

- Cancer immunotherapy, specifically targeting B-cell malignancies
- Platform for the development of alternative bispecific and trispecific molecules with diverse targeting and stimulating capabilities
- Potential use in other immune response-related diseases

FEATURES/BENEFITS

- Co-localizes effector T-cells and target tumor B-cells, enhancing anti-tumor response
- Minimizes risk of systemic IL-15 delivery toxicities
- Simultaneously boosts NK cell activity within local immune response
- Encourages retention of memory T-cells through IL15 superagonist activation
- Design format is adaptable for inclusion of different immunostimulatory cytokines or targeting antibodies
- Potential for superior functionality with alternative molecule configuration
- Improves efficacy in comparison to existing bi-specific molecules

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OTHER INFORMATION

KEYWORDS

antibodies, anti-cancer, anti-CD22, cancer therapy, lymphoma, target delivery, Tri-functional antibodies, tumor targeting, BiTE, Bispecfic antibodies, Trispecific antibodies, CAR-T, Leukemia, ALL, T-cell Engager, B-cell therapy,

CATEGORIZED AS

- **Medical**
  - Disease: Autoimmune and Inflammation

- Minimization of systemic delivery risks associated with powerful cytokine IL-15
- Overcomes limitations of localized T-cell and NK cell responses

RELATED MATERIALS

- A Novel bispecific T-cell engager (BiTE) targeting CD22 and CD3 has both in vitro and in vivo activity and synergizes with blinatumomab in an acute lymphoblastic leukemia (ALL) tumor model

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	WO2024/243093A2	11/28/2024	2023-594

Additional Patent Pending

- Disease: Blood and Lymphatic System
- Disease: Cancer
- Therapeutics

RELATED CASES

2023-594-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Fermented Wheat Germ Extract And Its Purified Low Molecular Weights Proteins For Treatment Of Lung Cancer

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