Covalent Bi-Specific Monoclonal Antibodies that Expand Selective T Cell Subsets

Tech ID: 21561 / UC Case 2008-247-0

SUMMARY

Researchers at UCLA have developed a bi-specific antibody useful for isolating and expanding specific T lymphocyte subsets.

BACKGROUND

Isolation of purified T-cell subsets through typical separation techniques is difficult when dealing with small numbers of cells. A solution is to add bi-specific antibodies that selectively expand a desired subset. For example, to obtain purified CD8+ T-cells, a CD3 and CD4 bi-specific antibody added to a mixed population will act by triggering cell death in CD8+ T-cells and activating cell division in CD4+ T-cells, thus selectively expanding the CD4+ T-cell population. A million PBMC typically can yield 15 to 20 million pure CD4+ or CD8+ T-cells by this approach, which is fully functional for immune response measurements and other experiments. For studies dealing with limited cells that preclude separation, this technique can provide large numbers of polyclonally expanded T-cells. This approach has been applied in several published studies, such as one examining HIV-specific CD8+ T-cells from rectal biopsies, where very few cells are obtainable (Ibarrondo et al, Journal of Virology 2005, 79:4289-97).

The limitation to this approach has been the lack of widely available bi-specific antibodies, which currently are produced by purifying the appropriately paired heavy and light chain antibodies from fused hybridomas (e.g. an anti-CD4 and anti-CD8 hybridoma fusion). This is very labor-intensive and expensive. Thus there is the need for an easier method that can produce bi-specific antibodies on a large scale for broader availability to researchers.

INNOVATION

UCLA investigators have generated co-valent constructs of bi-specific monoclonal antibodies that expand selective T cell subsets. The resulting expression system produces a single monoclonal antibody that requires no special purification methods. Therefore, in comparison to the existing practice, this system is easy, efficient, and produces bi-specific antibodies on a large scale. With this method, the production of desired bi-specific antibodies for selection of many desired T lymphocyte subsets is feasible.

APPLICATIONS

- Tool to expand either CD4+ or CD8+ T lymphocyte subsets, and potentially to create custom bi-specific antibodies to isolate other subsets

ADVANTAGES

- Rapid method to produce bi-specific monoclonal antibodies in large quantities.
- Results in a single combination of heavy and light chains that produces the desired bi-specific antibody.
- Easy and cheap to make, comparable to the production of standard monoclonal antibodies of single specificity
- Allows researchers to isolate large amounts of CD4+ or CD8+ T-cells without separation methods, from very small numbers of starting cells

STATE OF DEVELOPMENT

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OTHER INFORMATION

KEYWORDS

research tool, bi-specific antibody, T lymphocyte subsets, hybridomas, large scale production

CATEGORIZED AS

- **Research Tools**
  - Antibodies

RELATED CASES

2008-247-0

A CD3/CD4 bi-specific antibody construct has been tested. This construct has been shown to produce a functional antibody that compares favorably with a CD3/CD4 bi-specific antibody produced using the existing practice.

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Endogenous Human Protein Nanoparticle-Based Immune-Focusing Antiviral Vaccine
- Novel Non-Antibody-Based Chimeric Antigen Receptor Against HIV That Also Protects Cells From Infection

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