

Generating an ALDH Peptide(s)-DC Vaccine

TECHNOLOGY NUMBER: 7672

OVERVIEW

A dendritic cell (DC) vaccine that sensitizes T cells to cancer stem cells (CSCs)

- Confers preferential immunogenicity and cytotoxicity to cancer stem cells in vitro
- Elicits superior in vivo immunity when compared to other non-CSC-DC vaccines

BACKGROUND

Despite advances in the understanding of common solid malignancies, certain tumors are still a problem to treat with conventional modalities. Locally advanced cancers are at high risk for relapse and metastasis. The persistence of cancer stem cells (CSC) that are resistant to chemotherapy and radiation is one possible reason for this risk of relapse and metastasis. Aldehyde dehydrogenase 1 (ALDH1) has been found to be a cancer stem cell marker in several cancers. Dendritic cell (DC) vaccines directed toward ALDH have shown promise in targeting CSC, though the major limitation to the clinical use of the CSC-DC vaccine is the requirement for certain number of patient tumor tissues to isolate the ALDH high CSCs to prepare the cell lysate to generate the CSC-DC vaccine. Thus, a need exists to identify CSC associated peptide antigens that can be used for peptide DC vaccination.

INNOVATION

Researchers have successfully sorted ALDH high CSCs in immunocompetent murine models to prepare a dendritic cell vaccine which demonstrates excellent anti-tumor immunity. The peptides that have been generated show high binding affinity to T cell receptors when tested both in vitro and in vivo. The ALDH high CSC lysate dendritic cell vaccine (CSC-DC) demonstrates superior activity when compared to traditional ALDH low non-CSC-DC vaccinations. The vaccine exhibits efficacy in conjunction with other modalities such as surgery and radiotherapy in the treatment of established tumors. Investigators also report that CSC-DC vaccination is more efficacious in combination with check-point blockade.

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Category

Chemical Processes and
Synthesis
Life Sciences

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