A Novel Therapeutic Against HIV Using Human T Cell Immunoglobulin Mucin (TIM-3) Ligands to Modulate Immune Response

Tech ID: 25852 / UC Case 2008-028-0

INVENTION NOVELTY

Blocking human T cell immunoglobulin and mucin domain-containing molecule 3 (TIM-3) signaling can restore functionality to defective T cells in HIV-1 infected patients. Additionally, measuring TIM-3 provides clinicians with a novel way of evaluating, staging, and monitoring the progression of HIV infections.

VALUE PROPOSITION

T cell exhaustion is a state of functional impairment of CD4+ and CD8+ T cells that occurs during HIV-1 infection in which T cells lose their effector functions and proliferative capacity. Addressing the underlying causes of T cell exhaustion could be a promising therapeutic avenue for patients with HIV, as well as other chronic infections. Programmed death-1 (PD-1) was one of the first identified markers of exhausted T-cells during HIV-1 infection; however, not all dysfunctional cells display PD-1 and blocking PD-1 does not fully restore T cell function. UCSF researchers, along with their University of Toronto collaborators, have discovered the cell surface glycoprotein TIM-3 as a marker of exhausted T cells and that by blocking the TIM-3 pathway, they can restore T cell proliferative function and cytokine production to a greater degree than that seen with PD-1 blockage. Furthermore, TIM-3 and PD-1 are distinct populations of cells, so use of this invention in conjunction with PD-1 ligand therapy could be a powerful new treatment for HIV-1.

TECHNOLOGY DESCRIPTION

Researchers have showed that TIM-3 expression positively correlates with HIV-1 viral load and CD38 expression and inversely with CD4+ T cell count. Furthermore, TIM-3 is upregulated in CD8+ T cells during progressive HIV-1 infection. TIM-3 signaling suppresses effector functions of activated T-cells in HIV infections and its expression defines a distinct population of dysfunctional T cells with exceptional specificity. By blocking the interaction of TIM-3 with its ligands, these researchers were able to restore function in these T cells, resulting in increased proliferation and cytokine secretion. Thus, blocking TIM-3 could be a novel opportunity to reverse T cell anergy in HIV-1 infected patients, as well as patients with other chronic viral infections.

LOOKING FOR PARTNERS

To develop & commercialize the technology as HIV infection therapeutic

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OTHER INFORMATION

KEYWORDS

HIV, AIDS, TIM-3, T-cell immunoglobulin and mucin-domain containing-3, T cells, Viral infection, PD-1, T cell exhaustion

CATEGORIZED AS

- **Medical**
  - Disease: Infectious Diseases
  - New Chemical Entities, Drug Leads
  - Therapeutics

RELATED CASES

2008-028-0

STAGE OF DEVELOPMENT

Pre-clinical

RELATED MATERIALS

▶ R. Brad Jones, et al. Tim-3 expression defines a novel population of dysfunctional T cells with highly elevated frequencies in progressive HIV-1 infection. J Exp Med. 2008 Nov 24; 205(12): 2763-2779.

DATA AVAILABILITY

Under CDA / NDA

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,261,231	03/01/2022	2008-028
United States Of America	Issued Patent	9,416,165	08/16/2016	2008-028

Additional Patent Pending

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