

Non-Confidential Description - PSU No. 4037
“A Method to Enhance Skin Immune Response Against Infection”

Keywords/Field of Invention:

Chemokine receptor, skin infection, immune response, therapeutics

Background

Skin serves as an impressive barrier against infections. Despite constant exposure, tightly regulated skin immune cells tolerant harmless antigens, while mounting vigorous responses to pathogenic assaults. However, when these skin immune cells become dysregulated, incidences of skin disease increase. Therefore, manipulating the skin immune cells could help treat the skin diseases such as infections and cancers. The immune therapy could be also used in patients with the compromised immune system such as diabetics and those undergoing chemotherapy that are more susceptible to skin infections by bacteria, fungi and other pathogens.

Invention Description

Using a proprietary genetically modified mouse model, a group of Penn State researchers identified a critical chemokine that regulates the skin’s immune homeostasis. The researchers discovered that in the knockout mouse, an imbalanced presence and dysregulated functions of skin-resident T cells triggers an enhanced/prolonged innate and memory immune responses to skin stimulation. This enhanced immune response is specific in the skin but not in other internal organs.

Using various inflammation models, the researchers demonstrated that inactivating this regulator increases expression levels of pro-inflammatory immune-biomarkers such as TNF-alpha, IL-1beta and IL-17 and decreases the regulatory cytokine IL-10 in the skin. The researchers infected the knockout mice with *Leishmania major*, a skin parasite that survives by evading the immune system’s attack through manipulating immune cells in the skin. They found that the knockout mice had significantly enhanced immune responses at the infection sites and cleared the infection more rapidly than the control wild type mice.

Status of Invention

By regulating the presence and function of the skin-resident T-cells, the subject invention offers potential therapeutic value in developing new treatments for infections in the skin. Because of this regulator’s role in T-cell mediated skin immune response and resolution, the discovery of this target pathway may assist in the treatment of other skin-related diseases that could be suppressed by enhanced immune responses, such as cancers.

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