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Short Communication

T-Cells in Action: The Non-Traditional Functions of T-Cells in Health and Disease

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DESCRIPTION

T-Cells, a type of white blood cell, are often associated with the adaptive immune response, where they play an important role in fighting off infections and diseases. However, recent search has revealed that T-cells have non-traditional functions beyond their classical role in immune surveillance. In the context of cellular oncogenes, T-cells have been found to exhibit unexpected behaviors, which have significant implications for understanding of cancer biology and immunotherapy [1-3].

One such non-traditional function of T-cells is their ability to interact with and regulate oncogenic transcription factors. Oncogenic transcription factors are proteins that are overexpressed or mutated in cancer cells, leading to the uncontrolled growth and proliferation of these cells. Study has shown that T-cells can recognize and bind to these oncogenic transcription factors, which in turn can lead to the suppression of their activity. This interaction has been observed in various types of cancer, including leukemia and lymphoma. For instance, T-cells have been found to recognize and inhibit the activity of the oncogenic transcription factor, which is commonly overexpressed in B-cell lymphoma [4-6].

T-cell responses for health and disease

Immunotherapy: Adoptive T-cell therapy involves in a patient's own T-cells, enhancing their activity against cancer cells and then infusing them back into the patient [7-9].

Vaccine development: Vaccines leverage T-cell responses to confer immunity without causing illness. For instance, the Human Papillomavirus (HPV) vaccine triggers T-cell memory, preventing HPV-related cancers.

Autoimmune disease management: Targeted immunosuppression and immune-modulating therapies aim to temper overactive T-cell responses in autoimmune diseases, alleviating symptoms and preventing tissue damage [10].

Another unexpected function of T-cells is their ability to modulate the epigenetic of cancer cells. Epigenetic modifications refer to the chemical changes that occur to DNA or histone proteins, which can affect gene expression without altering the underlying DNA sequence. In cancer cells, aberrant epigenetic modifications can lead to the silencing or activation of genes involved in tumor progression. Study has shown that T-cells can influence the epigenetic of cancer cells by altering the activity of epigenetic enzymes, such as histone modifiers and DNA methyltransferases. This can lead to the reactivation of tumor suppressor genes or the repression of oncogenic genes, ultimately contributing to the regulation of cancer cell growth and proliferation [11].

In addition, understanding the complex interactions between T-cells and other immune cells within the tumor microenvironment is important for developing effective immunotherapies. For instance, T-cell checkpoint inhibitors have shown significant potential in clinical trials by unleashing the anti-tumor activity of T-cells. However, resistance to these therapies can occur due to various mechanisms, including the suppression of T-cell activity by regulatory T-cells or the upregulation of inhibitory receptors on T-cells.

CONCLUSION

In conclusion, study has revealed that T-cells have non-traditional functions beyond their classical role in immune surveillance. In the context of cellular oncogenes, T-cells have been found to interact with and regulate oncogenic transcription factors, modulate epigenetic landscapes, shape the tumor microenvironment and regulate cellular senescence. These findings have significant implications for the understanding of cancer biology and immunotherapy. Further study is needed to fully elucidate the mechanisms underlying these non-traditional functions and to explore their potential therapeutic applications in cancer treatment.

REFERENCES

1. Junge S, Kloeckener-Gruissem B, Zufferey R, Keisker A, Salgo B, Fauchere JC, et al. Correlation between recent thymic emigrants and

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$CD31^+$ (PECAM-1) $CD4^+$ T cells in normal individuals during aging and in lymphopenic children. Eur J Immunol. 2007;37:3270-3280.

2. Kaech SM, Wherry EJ. Heterogeneity and cell-fate decisions in effector and memory $CD8^+$ T cell differentiation during viral infection. Immunity. 2007;27:393-405.
3. Klein L, Kyewski B, Allen PM, Hogquist KA. Positive and negative selection of the T cell repertoire: what thymocytes see (and don't see). Nat Rev Immunol. 2014;14:377-391.
4. Peters JH, Koenen HJ, Fasse E, Tijssen HJ, Ijzermans JN, Groenen PJ, et al. Human secondary lymphoid organs typically contain polyclonally-activated proliferating regulatory T cells. Blood. 2013;122:2213-2223.
5. Schenkel JM, Masopust D. Tissue-resident memory T Cells. Immunity. 2014;41:886-897.
6. Stritesky GL, Jameson SC, Hogquist KA. Selection of self-reactive T cells in the thymus. Annu Rev Immunol. 2012;30:95-114.
7. Clark RA. Skin-resident T cells: The ups and downs of on site immunity. J Invest Dermatol. 2010;130:362-370.
8. Cupedo T, Nagasawa M, Weijer K, Blom B, Spits H. Development and activation of regulatory T cells in the human fetus. Eur J Immunol. 2005;35:383-390.
9. Dejaco C, Duftner C, Grubeck-Loebenstein B, Schirmer M. Imbalance of regulatory T cells in human autoimmune diseases. Immunology. 2006;117:289-300.
10. Hori S, Nomura T, Sakaguchi S. Control of regulatory T cell development by the transcription factor Foxp3. Science. 2003;299:1057-1061.
11. Kaech SM, Wherry EJ. Heterogeneity and cell-fate decisions in effector and memory $CD8^+$ T cell differentiation during viral infection. Immunity. 2007;27:393-405.