Immune dysregulation in infection: Related disorders from autoimmunity to immunodeficiency.

Chougnet Mic*

Department of Cancer Immunology, University of Amsterdam, Amsterdam, Netherlands

Introduction

The immune system plays a vital role in defending the body against infections. However, in some cases, immune dysregulation can occur, leading to an inappropriate or inadequate immune response to pathogens. This dysregulation can have significant consequences, impacting the body's ability to control and clear infections effectively. This essay aims to explore the concept of immune dysregulation in infection, including its causes, mechanisms, and consequences. By understanding immune dysregulation, we can identify potential targets for therapeutic interventions and develop strategies to restore immune balance and enhance host defense against infections [1].

Causes of immune dysregulation: Immune dysregulation in the context of infection can arise from various factors, including genetic predisposition, environmental triggers, and dysfunctions within the immune system itself. Some common causes include:

Genetic factors: Certain genetic variations can predispose individuals to immune dysregulation. These variations may affect key immune regulators, such as cytokines, receptors, or signaling molecules, leading to altered immune responses. For example, mutations in genes associated with primary immunodeficiencies can result in impaired immune function, making individuals more susceptible to infections [2].

Immunosenescence: Aging is associated with changes in the immune system, a process known as older individuals may experience immune dysregulation due to decreased immune cell function, impaired antibody production, and alterations in immune signaling pathways. This can increase susceptibility to infections and reduce the effectiveness of vaccination.

Immunodeficiency disorders: Inherited or acquired immunodeficiency disorders, such as HIV/AIDS, can disrupt the normal functioning of the immune system. These conditions weaken immune responses, making individuals more susceptible to opportunistic infections that would otherwise be controlled by a healthy immune system.

Chronic inflammatory conditions: Chronic inflammatory conditions, such as autoimmune diseases, can lead to immune dysregulation. In these conditions, the immune system mistakenly attacks the body's own tissues, resulting in chronic inflammation. This inflammatory environment can impair the body's ability to effectively combat infections and create favorable conditions for pathogen persistence [3]. Immune dysregulation in infection can manifest through various mechanisms that disrupt the balance and coordination of immune responses. Some important mechanisms include

Hyperinflammation: Excessive and uncontrolled immune activation, often characterized by an exaggerated release of pro-inflammatory cytokines, can lead to hyperinflammation. This dysregulated inflammatory response, known as a cytokine storm, can cause tissue damage and systemic complications. Severe cases of viral infections, such as COVID-19, can trigger hyperinflammation, contributing to disease severity [4].

Immune exhaustion: Prolonged exposure to persistent or chronic infections can lead to immune exhaustion, where immune cells become functionally impaired or depleted. This exhaustion can result from continuous antigen stimulation, leading to decreased responsiveness and reduced effector functions of immune cells, such as T cells and Natural Killer (NK) cells. Immune exhaustion compromises the immune system's ability to eliminate infections effectively.

Dysfunctional regulatory mechanisms: Immune dysregulation can arise from defects in regulatory mechanisms that maintain immune homeostasis. Regulatory T cells (Tregs) play a crucial role in suppressing excessive immune responses and preventing immune-mediated tissue damage. Dysfunctional Treg cells or an imbalance between effector and regulatory immune cells can disrupt immune regulation, leading to inadequate control of infections.

Impaired phagocytic function: Phagocytes, such as neutrophils and macrophages, play a key role in engulfing and eliminating pathogens

The most well-known application of cancer immunology, where the immune system is used to treat cancer, is cancer immunotherapy. Cancer immunology is an interdisciplinary area of biology that examines the function of the immune system in the genesis and progression of cancer. Burnet and Thomas developed the concept of cancer immunosurveillance in 1957. They suggested that lymphocytes serve as sentinels, identifying and destroying continuously emerging, immature altered cells. Cancer immunosurveillance appears to be a crucial host defence mechanism that lowers cancer incidence

***Correspondence to:** Chougnet Mic, Department of Cancer Immunology, University of Amsterdam, Amsterdam, Netherlands, E-mail: Mic33@nki.nl

***Received:** 05-Jul-2023, Manuscript No. AACIR-23-104164; **Editor assigned:** 08-Jul-2023, Pre QC No. AACIR-23-104164(PQ); **Reviewed:** 22-Jul-2023, QC No. AACIR-23-104164; **Revised:** 24-Jul-2023, Manuscript No. AACIR-23-104164(R); **Published:** 28-Jul-2023, DOI: 10.35841/aacir-6.3.150*

***Citation:** Mic C. Immune dysregulation in infection: Related disorders from autoimmunity to immunodeficiency. J Clin Immunol. 2023;6(3):150*

rates by preventing carcinogenesis and maintaining constant cellular homeostasis. Moreover, it has been proposed that the primary role of immunosurveillance is to be a part of a broader process of cancer immuno editing [5].

References

1. Lederman MM, Funderburg NT, Sekaly RP, et al. Residual immune dysregulation syndrome in treated HIV infection. Adv Immunol. 2013;119:51-83.
2. Noroozi R, Branicki W, Pyrc K, et al. Altered cytokine levels and immune responses in patients with SARS-CoV-2 infection and related conditions. Cytokine. 2020;133:155143.
3. Thompson KB, Krispinsky LT, Stark RJ. Late immune consequences of combat trauma: a review of trauma-related immune dysfunction and potential therapies. Mil Med Res. 2019;6:1-3.
4. Bonnel AR, Bunchorntavakul C, Reddy KR. Immune dysfunction and infections in patients with cirrhosis. Clin Gastroenterol Hepatol. 2011;9(9):727-38.
5. Lai YC, Muscal E, Wells E, et al. Anakinra usage in febrile infection related epilepsy syndrome: an international cohort. Ann Clin Transl Neurol. 2020;7(12):2467-74.

Citation: *Mic C. Immune dysregulation in infection: Related disorders from autoimmunity to immunodeficiency. J Clin Immunol. 2023;6(3):150*