

THE DIFFERENCE BETWEEN ACUTE AND CHRO INFLAMMATION

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Abstract: *Inflammation is a fundamental biological response of the immune system to harmful stimuli, such as pathogens, damaged cells, or irritants. It serves as a protective mechanism designed to eliminate the initial cause of cell injury, clear out necrotic cells and tissues, and initiate tissue repair. However, inflammation can manifest in two distinct forms- acute and chronic- each with different cellular mechanisms, durations, and physiological consequences. Understanding the distinction between acute and chronic inflammation is crucial for the diagnosis and management of various diseases.*

Introduction. inflammation plays a dual role in human health: it is essential for defense and healing, but when dysregulated, it contributes to disease pathogenesis. Acute inflammation represents the body’s immediate response to injury or infection, characterized by rapid onset and short duration. Chronic inflammation, on the other hand, develops when the acute phase fails to resolve or when the inflammatory stimulus persists, leading to long-term tissue damage and remodeling.

Acute Inflammation

Acute inflammation is a short-term process that typically lasts from a few hours to several days. It is primarily mediated by the activation of innate immune cells such as neutrophils, macrophages, and mast cells. The hallmark signs of acute inflammation are redness (rubor), heat (calor), swelling (tumor), pain (dolor), and loss of function (function laesa).

Key events in acute inflammation include:

1. **Vasodilation**- an increase in blood flow to the affected area.
2. **Increased vascular permeability**- leading to plasma protein leakage and edema.
3. **Leukocyte recruitment**- mainly neutrophils migrate to the site of injury.

Resolution of acute inflammation typically occurs through the removal of the offending agent and the activation of anti-inflammatory pathways that promote tissue repair.

Chronic Inflammation

Chronic inflammation is a prolonged inflammatory response that can last for weeks, months, or even years. It occurs when the acute phase fails to resolve or when there is

continuous exposure to harmful stimuli, such as persistent infections, autoimmune reactions, or exposure to toxic substances. Unlike acute inflammation, which involves mainly neutrophils, chronic inflammation is dominated by macrophages, lymphocytes, and plasma cells. Persistent cytokine release leads to tissue destruction, fibrosis, and angiogenesis. Chronic inflammation is associated with many diseases, including rheumatoid arthritis, atherosclerosis, diabetes, cancer, and neurodegenerative disorders.

Conclusion

The distinction between acute and chronic inflammation is fundamental to understanding immune system function and disease mechanisms. While acute inflammation is a protective and beneficial process, chronic inflammation is often pathological and contributes to numerous chronic diseases. Future research focusing on modulating the inflammatory response could lead to new therapeutic strategies for both acute and chronic inflammatory conditions.

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