

THE RELATIONSHIP BETWEEN STRESS AND IMMUNITY

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Abstract: *This article explores the profound impact of psychological stress on the human immune system. It examines the biological transition from acute "fight-or-flight" responses to chronic stress, detailing how prolonged cortisol exposure suppresses white blood cells, impairs healing, and triggers chronic inflammation. The paper highlights the long-term health risks, including autoimmune disorders and cardiovascular diseases, and offers scientifically proven lifestyle strategies to mitigate stress and restore optimal immune function.*

Keywords: *chronic stress, immunity, cortisol, inflammation, lymphocytes, immune suppression, health management.*

In our fast-paced modern world, stress has become a chronic companion. While we often view stress as a purely mental or emotional burden, its physical toll is profound. One of the most critical systems affected by daily pressure is the immune system. Understanding how psychological stress alters our biological defenses is essential for maintaining long-term health.

When the brain perceives a threat, it activates the sympathetic nervous system and triggers the release of stress hormones, primarily cortisol and adrenaline. In the short term, this evolutionary mechanism is highly beneficial. It prepares the body to fight or flee, temporarily boosting certain immune functions to heal potential wounds.

However, modern stressors are rarely physical and rarely short-lived. Instead of escaping a predator, we face ongoing financial worries, demanding work schedules, and relationship conflicts. This shifts the body from acute stress into a state of chronic stress.

When stress becomes a permanent state, the constant flood of cortisol disrupts the body's natural balance. Over time, the immune system develops a resistance to cortisol. Because cortisol helps regulate inflammation, this resistance leads to an uncontrolled inflammatory response.

Chronic stress actively suppresses the immune system in several key ways:

Reduces White Blood Cells: Stress lowers the body's production of lymphocytes (white blood cells), including T-cells and Natural Killer cells, which are vital for fighting off viruses and tumors.

Slows Down Healing: Psychological stress impairs the body's ability to repair tissue, causing wounds to take significantly longer to heal.

Reactivates Latent Viruses: A stressed immune system struggle to keep dormant viruses in check, often leading to outbreaks of conditions like shingles or the Epstein-Barr virus.

Increases Vulnerability: With fewer defenses, the body becomes highly susceptible to common infections, such as the common cold, influenza, and respiratory illnesses.

The link between stress and immunity extends far beyond catching a seasonal cold. Prolonged immune dysregulation contributes to severe, chronic health conditions:

- **Autoimmune Diseases:** Chronic inflammation can confuse the immune system, causing it to mistakenly attack the body's own healthy tissues.

- **Cardiovascular Disease:** Permanent inflammation damages blood vessels and promotes the buildup of arterial plaque, increasing the risk of heart attacks and strokes.

- **Accelerated Aging:** Stress shortens telomeres, the protective caps on the ends of chromosomes. This accelerates cellular aging and degrades immune function prematurely.

Fortunately, the relationship between the mind and the immune system is a two-way street. Just as negative emotions can degrade immunity, proactive stress management can restore and protect it.

To buffer your immune system against the effects of stress, focus on these scientifically proven strategies:

Prioritize Sleep: Aim for 7 to 9 hours of quality sleep nightly to allow the immune system to rebuild.

Regular Physical Activity: Moderate exercise lowers circulating stress hormones and stimulates the circulation of immune cells.

Mindfulness and Meditation: Practices like deep breathing, yoga, and meditation actively lower the body's physiological stress response.

Maintain Social Connections: Strong emotional support systems significantly mitigate the biological impact of psychological pressure.

Stress is an unavoidable part of life, but it does not have to dictate your physical health. By recognizing the direct impact that mental pressure has on your immune defense, you can take conscious steps to protect both your mind and your body.

Modern society creates a chronic state of stress, in which the constant activity of adrenal cortex hormones suppresses immune system activity, weakens the body's resistance to infectious diseases, and facilitates the growth of various tumors. Early diagnosis is especially important, as delayed treatment or correction can lead to various serious somatic illnesses. These include demyelinating diseases and brain tumors (primarily those originating from the brain's own immune system). Latent herpes infection, which is activated by general immunosuppression, is the most common. Using imaging techniques, specialists diagnose minimal changes, often unexplained. The resulting pain and discomfort do not fit into the classic disease picture. Patients may maintain relative productivity, but since this condition is long-lasting, general depression and asthenia gradually develop. One of the causes and mechanisms of pathology associated with chronic stress is the level of the hormone cortisol. Its level in the body increases during acute stress, helping to cope with temporary danger. However, chronic stress leads to prolonged elevation of cortisol levels, which can deplete muscles, weaken bones, and disable the immune system. Immune system diagnostics are based on antibody titers. A disorder is detected by an imbalance in the cellular component of the immune system; interferon status reveals a decrease in interferon production in response to stimulation. It has been found that under stress, immune system tension and the activity of the body's natural defenses are reduced in people whose condition is characterized by despondency, despair, gloomy forebodings, fear, and anxiety. Conversely, the immune system is more resilient in people with an optimistic outlook.

During exhaustion, a significant role is played by the depletion of cellular depots and the release of immature forms of immune cells into the bloodstream, which are unable to fully respond to constant stress. In this case, the body's immune defense against tumor cells also becomes compromised. Thus, chronic stress leads to severe somatic diseases directly related to the immune system.

Treating psychogenic and somatic dysfunctions alters the established "homeostasis of ill health." Under these conditions, the immune system, like other body structures, operates in a stressed, self-depleting mode. Since the immune system is the most important defense system, a first-order system, its changes are always minimal. The body will continue to strive to supply the immune system with all its structural and morphological units.

Restoration of the structure and function of the immune system occurs gradually. Initially, cellular depots begin to replenish because, due to the reduced stress, there is no need for increased levels of immune cells in the periphery. This allows time for cellular elements to mature. Soon, the periphery is filled with mature immune cells, essential for the functioning of a healthy body. A reserve of mature

and maturing elements remains in the immune system's depots and organs for future acute stress. As psychophysiological functions recover, if exhaustion has not yet occurred and the sympathetic nervous system is dominant, relaxation or active correction can normalize immune function.

During exhaustion, relaxation procedures sharply increase the dominance of the parasympathetic nervous system, and the already weakened immune system is reduced. Therefore, it is necessary to adequately assess the patient's health and, if the body is exhausted, employ active correction methods or conduct treatment that supports the immune system. Treatment often begins with nutritional adjustments, replenishing energy potential, and addressing micronutrient and vitamin deficiencies. Herbal remedies and various natural immunostimulants can be widely used. Of greatest interest are recombinant cytokines and interferons, genetically engineered to be exact copies of human molecules produced by immune system cells.

In conclusion, it's important to note the importance of correcting the immune system's function. Although most people are genetically programmed for health, supported by an immune system capable of coping with virtually any disease, the influence of unfavorable factors in modern society, environmental factors, chronic stress, poor nutrition, and neglect of numerous viral diseases disrupt this program, primarily through suppression of the immune system. Dysfunctions and various somatic diseases occur only after the body's resistance is suppressed. When choosing a healing method, it is essential to assess the state of the immune system and include the necessary measures for its restoration in complex therapy; these measures significantly improve treatment outcomes.

References

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