

Acquired Physiological Autoimmune Diseases and their Computational Treatment Responses

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Received: 14-Apr-2023, Manuscript No. JBTW-23-101239; **Editor assigned:** 19-Apr-2023, PreQC No. JBTW-23-101239 (PQ); **Reviewed:** 03-May-2023, QC No. JBTW-23-101239; **Revised:** 10-May-2023, Manuscript No. JBTW-23-101239 (R); **Published:** 17-May-2023, DOI: 10.35248/2322-3308-12.3.007.

Description

Autoimmune diseases shows a significant challenge to the healthcare community and individuals worldwide. These conditions are characterized by an overactive immune system attacking healthy tissues and organs, affecting millions of people, and can have a profound impact on their quality of life. Autoimmune diseases arise when the immune system typically defends the body against harmful invaders and mistakenly identifies its own healthy cells and tissues as foreign. This immune system dysfunction can manifest in various ways, leading to the development of a wide range of conditions, including rheumatoid arthritis, lupus, multiple sclerosis, type 1 diabetes, and many others. Overall, autoimmune diseases affect a significant proportion of the world's population. According to the Autoimmune Related Diseases Association of America (ARDA), these diseases affect approximately 50 million Americans alone. Furthermore, autoimmune diseases are known to disproportionately impact women, often striking during their childbearing years.

While autoimmune diseases cannot be cured, their symptoms can often be managed effectively through a combination of medication, lifestyle modifications, and supportive therapies. Treatment plans are typically tailored to individual patients, taking into account the specific autoimmune condition, its severity, and the patient's overall health. Immunosuppressant drugs, anti-inflammatory medications, and biological therapies are commonly prescribed to modulate the immune response and alleviate symptoms. Diagnosing autoimmune diseases can be complex and challenging due to the wide variety of symptoms they present and the overlap with other conditions. Physicians often rely on a combination of patient history, physical examination, and laboratory tests to identify autoimmune diseases. However, due to the heterogeneity of these conditions, there is no universal diagnostic method, and misdiagnosis or

delayed diagnosis is not uncommon.

There are over 80 types of autoimmune diseases. Blood cells in the body's immune system help defend against harmful substances for example bacteria, viruses, toxins, cancer cells, and blood or tissue from outside the body. These substances contain antigens. The immune system produces antibodies against these antigens and can destroy these contaminants. In autoimmune diseases, the immune system is unable to distinguish between healthy tissue and potentially harmful antigens. This triggers a reaction in the body that destroys normal tissue. The exact cause of the autoimmune disease is unknown. One theory is that some microbes (such as bacteria and viruses) and drugs can cause changes that disrupt the immune system. This is common in people with genes that predispose them to autoimmune diseases. Most autoimmune diseases are chronic, but many can be controlled with treatment. Autoimmune diseases can affect many different types of tissues and almost any organ in the body. It can cause a variety of symptoms, including pain, fatigue, rashes, nausea, headaches, and dizziness. Specific symptoms depend on the exact condition. Some autoimmune diseases affect the ability to conceive, while others adversely affect pregnancy. Autoimmune diseases can also increase the risk of blood cancers, such as leukemia and lymphoma, bone marrow cancer, and lymph node cancer. Autoimmune diseases result from a combination of genetic predisposition and environmental factors that impair the immune system's ability to ignore a person's own tissues and cells. Rarely, autoimmune diseases are monogenic and can be caused by mutations in a single gene.

Psychological stress is believed to be a risk factor for autoimmune diseases such as Graves' disease and rheumatoid arthritis. Different types of stress and duration of stress can also influence the development of inflammatory autoimmune diseases. Immunofluorescence is the first screening test for people with suspected autoimmune diseases such as Mixed Connective Tissue Disease (MCTD), scleroderma, and Polymyositis/Dermatomyositis (PM/DM) is particularly useful. Foods such as red meat, dairy products, pastries, and caffeinated alcoholic beverages cause systemic inflammation and exacerbate autoimmune diseases. If a person is suffering from this condition, take a look at the most common food that exacerbates autoimmune diseases.

Beyond medical interventions, a holistic approach to autoimmune diseases is essential to address the physical, emotional, and social aspects of living with a chronic condition. Patient education, support groups, and access to mental health services are vital for individuals to manage their conditions effectively and enhance their overall well-being. Additionally, a strong physician-patient partnership is crucial in navigating the complexities of autoimmune diseases and developing personalized treatment plans. Given the complex nature of autoimmune diseases, ongoing research plays a crucial role in deepening our understanding and improving treatment outcomes. Researchers are exploring various avenues, including the identification of genetic and environmental factors contributing to disease development, the development of targeted therapies, and advancements in precision medicine approaches.