

AUTOIMMUNE DISEASES WHEN YOUR IMMUNE SYSTEM TURNS AGAINST YOU

Uma Kumar

THE human immune system is a complex network of specialised cells, tissues and organs that protects us from outside invaders like viruses, bacteria, etc. The inherent ability of the immune system to identify the body's own healthy cells and tissues prevents it from attacking them. But, under certain circumstances, the immune system fails to distinguish self from nonself resulting in loss of self-tolerance. The immune system starts mistaking its own healthy tissues as foreign and attacks them resulting in autoimmunity, which forms the basis for Autoimmune Diseases.

The prevalence of Autoimmune Diseases has increased over the past decades. Despite scientific advancements in the field, there is a dearth of good quality epidemiological data on each Autoimmune diseases.

Autoimmune diseases are more common in females with a female-to-male ratio ranging from 10:1 to 1:1. They can occur at any age but are more common during the reproductive years. The presence of one Autoimmune diseases in an individual increases the risk of developing another Autoimmune Diseases by 30-40%. There are more than 80 types of autoimmune diseases. They can be broadly categorised into two groups:

1. **Organ-specific disease** (involving only one organ) in which the immune response is directed toward antigens present in a single organ. Examples are autoimmune thyroiditis, myasthenia gravis,



Rheumatoid arthritis
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multiple sclerosis, Diabetes Mellitus Type I, etc.

2. **Systemic disease** in which the immune system attacks self-antigens in several organs e.g. systemic lupus erythematosus is characterised by inflammation of the skin, mucus membranes, joints, kidneys, brain, intestines, etc. Other examples include rheumatoid arthritis, SLE, scleroderma, Idiopathic inflammatory myositis, Sjogren's syndrome, vasculitides, Coeliac disease, inflammatory bowel disease, and sarcoidosis.

Risk Factors

Autoimmune diseases can develop in anyone with a genetic predisposition. It has been seen that a person with one autoimmune disorder has an increased risk of developing another by 30%. Certain factors that are known to increase the risk are as follows:

1. **Genetic:** Some autoimmune diseases run in families but it doesn't mean that Autoimmune Diseases are hereditary. A person might inherit genes that predispose him to an autoimmune condition but she/he will only develop disease when exposed to a combination of triggers, of which the majority are unknown. We do see an autosomal



Strabismus in a person with myasthenia gravis trying to open their eyes
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recessive pattern of inheritance of certain autoimmune diseases like type 1 diabetes mellitus, which is more common in whites, and systemic lupus erythematosus which tends to be more severe in African-Americans and Hispanic populations.

2. **Environmental factors:** Environmental factors can trigger autoimmunity in susceptible individuals. They account for up to 60-70% of all Autoimmune Diseases but only a few environmental factors have strong scientific back-up to support the fact that they can trigger autoimmunity like sunlight, certain

Autoimmune Diseases

1. Autoimmune diseases are not hereditary or infectious
2. Autoimmune disease can occur in any age group
3. They are common in females in the reproductive age group
4. Presence of autoimmune disease in family increases the risk by 30-40%
5. Autoimmune diseases are treatable.
6. Treatment is multidisciplinary, specialised and long term.

chemicals (pesticides, pristane, mercury, silica, etc), cigarette smoking, air pollution and viral or bacterial infections. However, the mechanism by which environmental factors contribute to Autoimmune Diseases remains largely unknown. Exposure to some of the environmental factors triggers the immune system to produce antibodies. Some of these antibodies are not able to differentiate between the causal agent and normal cells of the body and they start damaging the body's own normal tissues.

3. **Gender:** Most Autoimmune Diseases occur more frequently in women in their child-bearing years than men. Women are genetically predisposed to Autoimmune Diseases because of their sex hormones and the X chromosome. Genes representing immunity in an individual are located on the X chromosomes and women have double X chromosomes.
4. **Smoking:** It is a proven risk factor for the development of rheumatoid arthritis, systemic lupus erythematosus, primary biliary cirrhosis, etc. Smoking also affects the response to treatment and the outcome of Autoimmune Diseases. Smoking is known to modulate the immune system through many mechanisms, including the induction of the inflammatory response, immune suppression, alteration of cytokine balance, induction of apoptosis, and DNA damage that results in the formation of anti-DNA antibodies.
5. **Obesity:** The relationship between obesity, adipokines (compounds secreted by the fat tissue), and immune-related conditions like rheumatoid arthritis, type-1 diabetes, psoriasis, psoriatic arthritis, multiple sclerosis and Hashimoto thyroiditis has been known.
6. **Vitamin D deficiency:** Vitamin D is known to modulate immune responses. Its deficiency is found to be associated with an increased risk of loss of immune tolerance.

7. **Stress:** A few studies have proven the link between stress and autoimmunity.

Symptoms

There are a few general features that are generally seen during an ongoing immunoinflammation like fever, malaise, fatigue, arthralgia. Specific manifestations depend on the type of organ involvement. It is important to remember that the majority of autoimmune diseases involve many organs, particularly connective tissue diseases (SLE, Scleroderma, RA, Sjogren's syndrome, inflammatory myositis), vasculitis, etc.

The most common autoimmune rheumatological disease is rheumatoid arthritis which predominantly involves small joints of hands and feet with significant early morning stiffness of more than 30 minutes. If left untreated it results in deformity, disability, and death.

An autoimmune disease also increases the risk of comorbidities like cancer, stroke, mental illnesses, infections and risk of early mortality (shortened life span).

Diagnosis

There is no single specific test to diagnose Autoimmune Diseases and the symptoms can be confusing. That's because many autoimmune diseases have similar symptoms. Quite often the patient visits different medical specialities and doctors to get a diagnosis. Doctors often have a hard time diagnosing autoimmune diseases. Investigations in a patient with the autoimmune disease include basic and specialised blood tests, urine tests, and radiological investigations depending on the type of autoimmune disease and its extent.

Treatment Options

In most cases, the goal of treatment is to suppress (slow down) the patient's aberrant immune system. The choice of treatment of Autoimmune Diseases depends on multiple factors:

1. Type of disease
2. Extent of organ involvement and
3. Other associated medical illnesses.



Sjogren's syndrome
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Besides, the age of the patient, marital status and socioeconomic status also play a significant role in decision making. Depending on the type of Autoimmune Diseases, various classes of drugs e.g. immunosuppressive drugs (drugs that suppress immunity) or disease-modifying antirheumatic drugs with or without glucocorticoid are chosen. Treatment is usually lifelong.

Autoimmune Diseases are treatable conditions but require specialised multidisciplinary care. Long-term follow up is warranted. Many AID-related complications can be prevented or treated when the disease is diagnosed early enough.

Can Autoimmune Diseases be Prevented?

Prevention of a disease is possible only if the precise causative factors of the disease are known. Therefore, it may not be possible to prevent autoimmune diseases. But experts recommend the following to possibly decrease chances of Autoimmune Diseases:

1. No smoking
2. Regular exercise
3. Consumption of a healthy diet.
4. Explore food intolerances; avoid consuming foods that can cause issues with digestion and increase the chance of a flare-up of an existing autoimmune condition
5. Limit processed foods in the diet
6. Manage the stress level
7. Avoid toxins
8. Have a good sleep

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Dr Uma Kumar is Prof. & Head of Department, Rheumatology at All India Institute of Medical Sciences, New Delhi. Email: umaakumar@yahoo.co.in