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# Systemic Lupus Erythematosus: A Narrative Review

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**ABSTRACT**

SLE, also known as erythematous systemic lupus, is autoimmune disorders can harm of many other organs, including the kidneys, skin, joints, and central nervous system. Which illness is often more likely to affect childbearing women and members of particular racial groups. Although impairments in complement caused by a unique, inherited single gene are significantly linked to "SLE", the majority of individuals have a polygenic inheritance of the condition. Environmental factors like, UV radiation exposure, Epstein-Barr virus infection, and hormonal factors incorporate with genetics to create of the disease, may result at the level of cytokines, T cells, B cells, and macrophages in immunological dysregulation. Although milder cases are more frequently recognized when they present themselves, nearly half of them worsen over time to more serious disease. About 70% of patients experience relapses and remissions. Lupus erythematosus (lupus) is systemic, among the most serious autoimmune conditions, is reviewed in detail in this paper. Discussions include symptoms, risk factors, genetics, and epidemiology. Long-term survival of patients, averting flare-ups and harm to organs, as well as improving quality of life in terms of health are all objectives of treatment. Organ-threatening conditions typically require a longer course of less rigorous medication to solidify the response and prevent relapses after a first round of intensive immunosuppressive treatment to reduce disease activity.

## 1. Introduction

Disorders of the autoimmune system result in abnormally low or high immune system activation. Autoimmune illnesses are conditions in which an overactive immune system causes attacking and damaging its own tissues [1]. An unknown trigger may cause the immune system to begin producing antibodies, and these antibodies may start attacking the body's own tissues rather than combating pathogens. The immune system starts producing antibodies to attack healthy cells when it recognizes them as foreign invaders. It is thought to be the cause of an infection or sickness [2]. Treatment for autoimmune diseases frequently aims to reduce immune system activity. Various autoimmune diseases include when the immune system of the body attacks its own tissues and organs, it is said to have "lupus" (systemic lupus erythematosus) [3]. The joint, skin, kidney, blood, heart, and lungs problems as well as inflammation, edema, and swelling are the results of this overactive immune system. The symptoms and indicators of lupus might diverge widely from one person to another. Lupus frequently affects the kidneys, blood plus nerve cells, lungs, joints, and skeleton. Prednisone is a common therapy option as it is an oral steroid that reduces immune system function. When lupus autoantibodies damage the kidney structures that filter waste, lupus nephritis develops [4]. As a result, there may be blood and protein in the urine, elevated blood pressure, deteriorated kidney performance, or renal failure

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[5]. We will talk about risk factors such genetics, therapies, quality of life, and treatments in this review.

## 2. Pathogenesis of Disease:

SLE is significantly more common in women, and variations in the levels of progesterone or estrogen frequently correspond with the disease's presentation. hormones and gender play a significant a part in SLE. There may be additional components involved, such as contributions from the X chromosome [6,7]. Many questions about the immunological etiology of SLE remain unanswered. A growing understanding of the interaction innate immune system and the adaptive immunological system, an identification Among numerous families of receptors for pattern recognition, as well as the potential significance of the IFN type I pathway have all contributed to the knowledge that innate immune effectors and cells are major players in the SLE pathophysiology, despite the fact that lupus was initially thought to be an illness with an adaptive immune response [8,9].

Furthermore, there is a ton of proof showing that individual abnormalities in a wide range of biological processes and cell types can cause experimental lupus, indicating that the pathophysiology of lupus perhaps differs between individuals [10].

The quickening rate of developments in immunology as a whole has greatly benefited lupus research. It is severely analyzed how some of these new participants would affect SLE. Impaired complement regulatory proteins on lupus peripheral blood mononuclear cells, the balance between TH17 and regulatory T cells, invariant NK T cells and their modulatory role, and these factors are all important to pathogenesis and may also act as disease biomarkers [11,12,13].

## 3. Lupus symptoms and signs:

Your body's organs are almost all susceptible to lupus. Swollen knees, fever, persistent lethargy, and renal issues are a few lupus symptoms. Maybe someone else is itchy. Later on, other symptoms can develop, or certain existing symptoms might become less frequent. The symptoms of lupus also fluctuate, so you may not constantly feel them [14]. When you experience a remission from lupus, your symptoms get better. The indications of lupus include: Joint and muscle discomfort "The neck, legs, shoulders, and upper arms are typical locations for muscular soreness and edema"" [15,16].

1. Fever. Many lupus sufferers experience a fever greater above 100 degrees F. Fever is frequently brought on by illness or inflammation [17].
2. Rashes on your face, arms, hands, or any other area the part of your body is exposed to sunlight. A crimson, rash with wings that spans the cheeks and nose is one typical lupus symptom [18].
3. Chest discomfort when breathing deeply is brought on because of lung lining irritation [19].
4. Hair fall. Bald or patchy areas are typical. Infection or some medications may also result in hair loss [20].
5. Sensitive to the sun or light. The majority of lupus sufferers experience photosensitivity, or sensitivity to light. Some lupus sufferers may get rashes, a fever, extreme exhaustion, or joint discomfort after being exposed to light [21].
6. Problems with kidneys. 50% of lupus patients have the kidney-affected condition lupus nephritis [22].
7. Mouth sores, also known as ulcers, typically develop the cheeks, gums, and lips, even though it may happen on the roof of the mouth [23].

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8. Intense or protracted weariness. Even when you get adequate sleep, you could still feel worn out or exhausted. Another indicator of an impending lupus flare is fatigue [24].
9. Anemia. Anemia could be indicated by fatigue [25].
10. Memory problems. Some lupus sufferers claim to have memory loss or confusion issues [26].
11. bleeding clotting. Your chance of clotting may be higher. This can lead to heart attacks, strokes, blood clots in the legs or lungs, or recurrent miscarriages [27].
12. Eye illness. It's possible to get eyelid rashes, dry eyes, and eye irritation [28].

## 4. Risk Factors for SLE:

### 4.1. Environmental Factors and Heritability:

Smoking, medications, and ultraviolet radiation are well-known environmental variables connected to the pathogenesis of SLE. Autoantibodies against DNA and antiphospholipid (aPL) have been linked to smoking among all lupus-related autoantibodies. The vitamin D, EBV infections, air pollution, heavy metals, dietary factors and medications "Anti-DNA antibody production has been linked to Agents that block tumor necrosis factor (etanercept, infliximab, and adalimumab); all of these factors act as risk factors for SLE" [29]. With links in the human leukocyte antigen area, genetic diversity came first demonstrated to be significant in SLE. The factors that predispose people to lupus can now be attributed to over 25 genes. Several genes, including "IRF5, ITGAM, STAT4, BLK, BANK1, PDCD1, TNFSF4, TNFAIP3, SPP1," several Fcg receptors, and alleles in the major histocompatibility complex region a number of complement components, such as "C1q, C4 and C2" are well-established risk factors. Other loci may disclose novel disease processes while having no recognized purpose or obvious immune function [30,31].

## 5. Therapies:

Therapies that improve immune modulation have attracted a lot of attention recently as a way to normalize tolerance issues in autoimmune disease. Interest in Potential use of autologous mesenchymal stem cell transplantation cure for various immunologic driven diseases, including SLE, is growing [32]. The genetic and environmental interactions that lead to abnormal innate and adaptive immune responses are both tightly controlled, with excessive generation of autoantibodies and IFN, are key to understanding the pathogenesis of SLE and developing innovative treatments. Key pathogenic characteristics of SLE include abnormal lymphocyte activation brought on by shifting activation thresholds inefficient T-regulatory cell activity, or both [33]. The immune system's cells and molecules that have been targeted or are currently being evaluated for their therapeutic performance in SLE is depicted in chart [1]. Combination therapy that targets the System of innate and adaptive immunity possibly more successful in ensuring significant, long-lasting clinical improvements in SLE [34,35].

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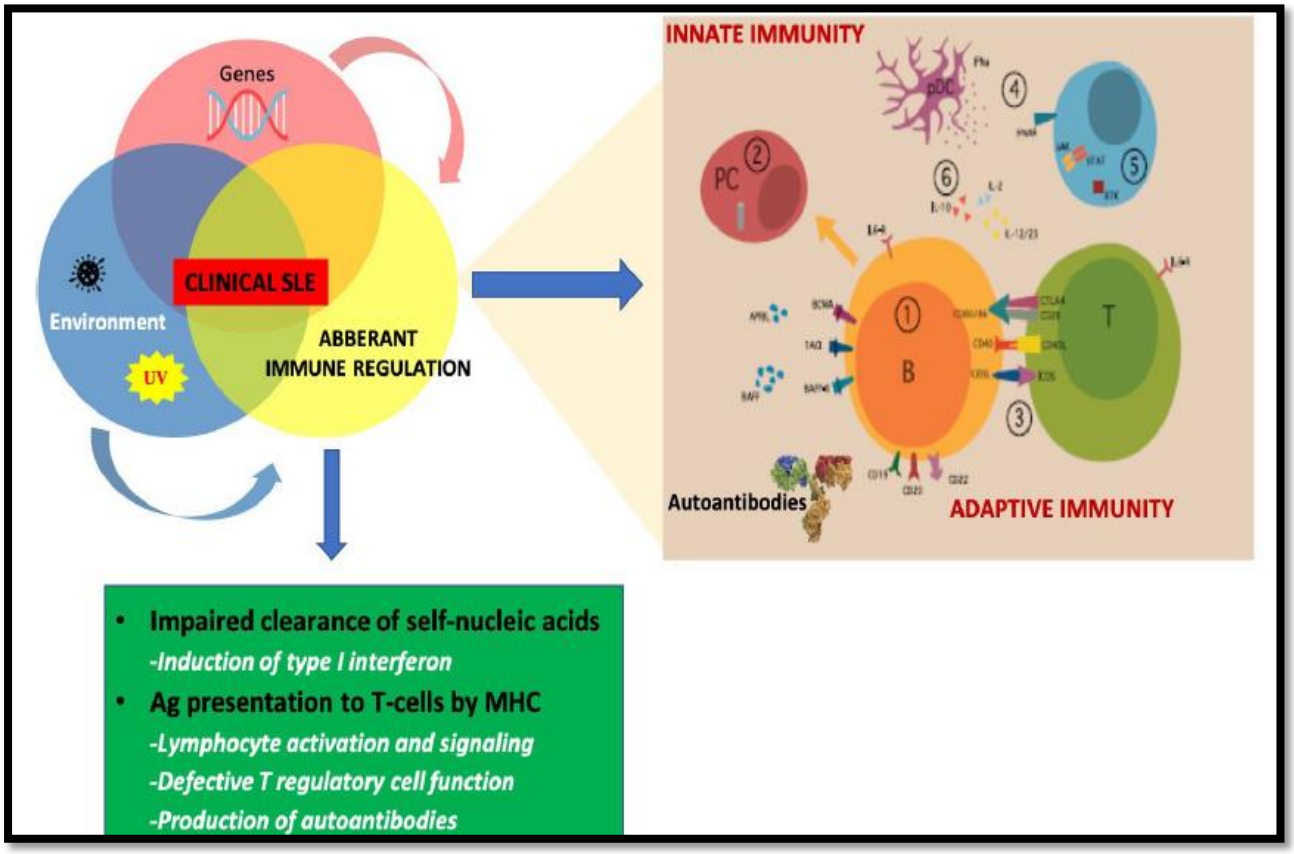


**Figure [1]:** Pathogenesis and innovative therapies for SLE [modified from Klavdianou *et al.*, 2020] [36]. ""APRIL, a proliferation-inducing ligand; BAFF, a B-cell activating factor; BTK, Bruton's tyrosine kinase; CD, a cluster of differentiation; ICOS, an inducible T-cell costimulatory; ICOSL, an ICOS ligand; IL, an interleukin; JAK, a Janus kinase; PC, a plasma cell"".

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