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# Nanotechnology approaches to systemic lupus erythematus

**Naga Chandrika Pallam [1], S. Rani [2], L. Devikamma[3], Dr. P. Neeraja[4], Dr. M. Ravi Kumar[5]**

*Department of Pharmaceutics, Geethanjali College of Pharmacy, Hyderabad, Telangana 501301, India*

**Corresponding Author: M. Ravi Kumar**
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## ABSTRACT

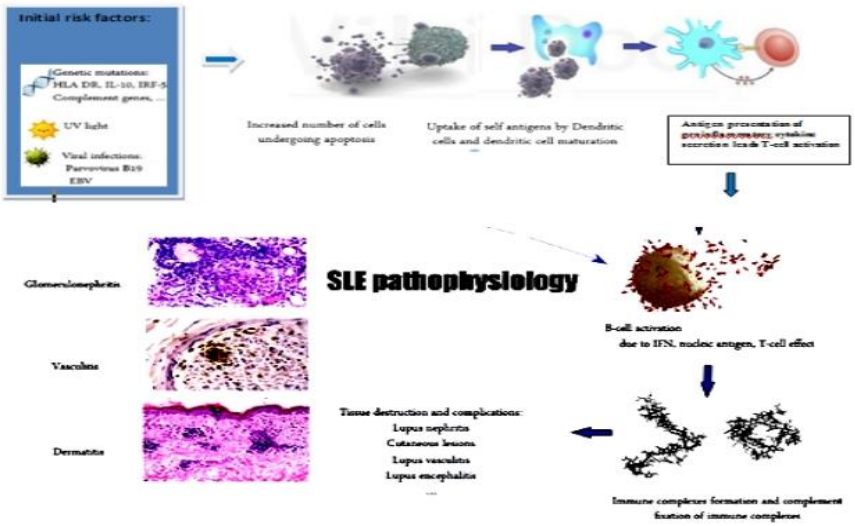
Systemic lupus erythematous is a autoimmune disease which is a chronic multisystemic heterogenous disease caused by self-destruction of system by production of autoantibodies due to self-antigens. Novel therapeutic approaches are necessary to treat SLE despite tremendous advancements in therapeutic alternatives and greater understanding of the pathophysiology. An innovative approach that may significantly improve the treatment of serious diseases is immune system modulation based on nanotechnology. Therapeutic delivery may be enhanced by nanoparticle-based delivery systems that target inflammatory tissue or a particular cell for drug administration. Non-steroidal anti-inflammatory drugs, antimalarials, corticosteroids, and cytotoxic/immunosuppressive drugs have all been used to treat SLE in the past, but perhaps more recently, the focus has focused on developing biological agents that can inhibit autoreactive B cells, prevent cytokine signalling, and promote the growth of regulatory T cells. In this review article is being discussed about new technical approaches to treat the systemic lupus erythematous. In 2020, the U.S. market for drugs for Systemic lupus erythematosus (SLE) is anticipated to be worth $50.8 million. With a predicted market size of US$46.9 million by 2027 and a CAGR of 5.7% from 2020 to 2027, China, the second-largest economy in the world, is expected to be the fastest-growing region.

**Keywords:** Systemic lupus erythematous, autoimmune disease, B cells, nanotechnology

## INTRODUCTION

SLE is a systemic lupus erythematous refers to autoimmune disease attack on own body healthy cells and causes inflammation and tissue damage. All autoimmune diseases are not life threatening diseases, but when neglect or improper treatment leads to cancerous. The causes of autoimmune diseases are still specifically unknown, main trigger is stress, improper healthy lifestyle and depression. Autoantibodies to nuclear antigens are produced in high titers, and the illness is characterised by B cell hyperactivity and poor T-cell function. SLE-related to associated proteins like the small nuclear ribonucleoprotein (snRNP) particle, autoantibodies exhibit distinct characteristics of diversification. B cells are being targeted in SLE due to their significant role in the disease's pathophysiology.

## Pathophysiology of SLE




SLE targeted immunotherapies mechanism of actions on B-cell depletion (B-cell targeted therapies), Modulation of costimulatory molecules, Anti-cytokine therapies, mTOR inhibitors, Immune-modulating peptides and Non-specific immunotherapy

### *Novel drugs developed on SLE*

Novel drugs developed on SKE are Cyclosporin A, Sirolimus, Mycophenolate mofetil, Abetimus sodium, Prasterone, Bindarit, Statins (Simvastatin, Atorvastatin), Edratide, P140 (IPP-201101), Abatacept, Rituximab, Ocrelizumab, Belimumab, Atacicept, Infliximab, Etanercept, AMG 811, Sifalimumab (MEDI-545), Rontalizumab (RhuMab IFN-□, RG7415), AGS-009, Tocilizumab and Eculizumab.

### *Nanotechnology Delivery*

Nanotechnology Delivery approaches are mycophenolic acid to DCs, , siRNA nanocarriers complex-based (siRNAs complexed with polyethylene glycol-poly (L-lysine)-polymers, Dycophenolic acid (MPA) encapsulated inside nanolipogels, Dycophenolic delivery via Biodegradablenanoparticulate, CD45RO-coated NPs (Lipid nanoparticles), Anti-IgD monoclonal antibodies (mAbs) conjugated with dextran molecule, and SPIO linked to the iC3b/C3d binding region of CR2, and LIF-loaded nanoparticles. Clinical investigations are evaluating nanovaccine delivery technologies: Synthetic Vaccine Particles (SVP$^{TM}$), Nanoparticular emulsion-based adjuvant, Bacterium-like particles, Vaxfectin® adjuvant:cationic lipid-based Liposomes, Poloxamer CRL1005+DNA, Advax: D-inulin MPs on parentral and mucosal (IN)

## CONCLUSION

Systemic lupus erythematous is a autoimmune disease which is most promisingly treated with B-cell depletion by using nanomedicine.

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