OPEN ACCESS Freely available online

Lupus: Open Access

Short Communication

Unveiling the Intricate Role of Exosomes in the Pathogenesis of Systemic Lupus Erythematosus

Dawei Cui*

Department of Blood Transfusion, The First Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China

DESCRIPTION

Systemic Lupus Erythematosus (SLE) is a chronic, systemic, and severe autoimmune disease affecting numerous systems. SLE patients have a low quality of life and a high death rate, and they are more prone to acquire comorbidities such as cardiovascular and respiratory illness, infections, cancer, and osteoporosis

Also, women are more prone than males to develop SLE [1]. SLE is currently treated using biological medicines, which give relief while reducing the usage of glucocorticoids. Patients with SLE nevertheless require long-term drug-based maintenance, which frequently has harmful side effects. Long-term usage of glucocorticoids can also cause people to develop mental problems such as depression [2].

Exosomes, as a targeted carrier, may lower medication concentrations in the human body and drug toxicity build-up. Several processes are thought to be involved in the etiology and pathophysiology of SLE, although their precise roles are unknown. Exosomes have a crucial role in innate and adaptive immunity, are involved in numerous physiological and pathological SLE processes, and aid in immunological homeostasis maintenance. The role of exosomes in SLE has received more attention in recent years [3-4]. This review discusses exosomes, their immunomodulatory role and mechanism, and their potential as a new SLE therapeutic target, as well as new avenues for research into SLE pathophysiology and biotherapy. Exosomes are tiny and able to traverse the vessel wall and extracellular matrix without being phagocytized by mononuclear macrophages. Exosomes have molecules like CD55 and CD59 on their surface to protect them from complement and coagulation factors. As a result, CD55 and CD59 can keep exosomes stable. Exosomes have exceptional features as intercellular transport vesicles, including not triggering the immune system, avoiding destruction, conveying endogenous bioactive compounds, lengthy persistence and bridging various biological barriers.

SLE therapy aims to improve patients' long-term prognosis and quality of life by treating symptoms, reducing damage build-up, and limiting medication adverse effects. Immunotherapy for autoimmune disease patients typically lasts their entire lives. Continuous drug usage might result in significant adverse responses and side effects. Treatment options for SLE patients have been constantly upgraded in recent years.

Hydroxychloroquine (HCQ) at a dosage of no more than 5 mg/kg is routinely used for SLE therapy. During chronic maintenance treatment, Glucocorticoid (GC) dosages should be lowered to 7.5 mg and removed if feasible, and the judicious use of immunomodulatory such as methotrexate, azathioprine, and mycophenolate can speed the progressive reduction and removal of GC. Belimumab should be explored if extra renal illness is chronically active or flares up. Rituximab (RTX) is prescribed for a number of organ-threatening, refractory diseases. Early therapy can successfully halt disease development and enhance the long-term quality of life of patients [6].

Exosome-based drug delivery has received a lot of attention. The optimum treatment method is to lower the needed medication concentrations by their focused distribution, limiting harm build-up and reducing adverse effects. Several experimental strategies for injecting particular medications into exosomes and attaining targeted exosome-based treatment have been developed.

While exosomes offer great potential as medication transporters, they do have significant limitations. The first problem is determining how to collect and purify the exosomes. Presently, the most prevalent approach for separating exosomes involves ultrafiltration, immuno affinity, and ultracentrifugation.

Differential ultracentrifugation is still the gold standard for exosome separation; however it causes mechanical damage and takes a long time. The recent development of cutting-edge biosensors for exosome detection and analysis has piqued the interest of researchers due to their speed, convenience, minimal sample needs, and high sensitivity and specificity, allowing for substantial advances in exosome separation and detection [7].

Biosensor-based detection and analysis were shown to be far superior to standard approaches, which may hasten the investigation of exosomes for the treatment of SLE. Yet, due to the unique physical and chemical characteristics of protein molecules, as well as the absence of exosome categorization for

Correspondence to: Dawei Cui, Department of Blood Transfusion, The First Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, China, E-mail: dweiui@zju.edu.cn

Received: 06-Jan-2023, Manuscript No. LOA-23-22487; **Editor assigned:** 10-Jan-2023, Pre QC No. LOA-23-22487 (PQ); **Reviewed:** 31-Jan-2023, QC No. LOA-23-22487; **Revised:** 08-Feb-2023, Manuscript No. LOA-23-22487 (R); **Published:** 15-Feb-2023, DOI: 10.35248/2684-1630.23.8.229

Citation: Cui D (2023) Unveiling the Intricate Role of Exosomes in the Pathogenesis of Systemic Lupus Erythematosus. Lupus: Open Access. 8:229.

transport, injecting them into exosomes remains problematic. However, a novel sort of synthetic exosome has been described that may be injected with therapeutic membrane proteins and soluble protein cargo. As a result of overcoming these challenges, exosome-based medication delivery to target cells is now achievable. Nevertheless, exosome features alone were unable to facilitate tailored delivery of foreign cargo to target organs. To improve exome targeting, relevant technologies that are still under development will be necessary [8].

CONCLUSION

Exosomes play crucial roles in the onset and course of SLE *via* numerous molecular processes that greatly affect its progression. Exosome research is ongoing, and it may be able to administer medications for long-term usage with low side effects for the treatment of SLE. Pharmacologists and drug developers are becoming interested in exosomes as possible medication carriers.

Exosomes have been demonstrated to offer significant benefits in targeted medication and biomolecule delivery for a variety of disorders, making them great candidates for the treatment of SLE and other autoimmune diseases. While exosomes have significant drug-carrying potential, they also have limitations, such as a lack of extremely sensitive exosome detection methods and standardized extraction and purification procedures, as well as challenges in actively introducing protein molecules into exosomes. Exosome research is still in its early stages, and more study has to be done. Yet, a greater knowledge of exosome biology and function will expand their use as medication carriers in the treatment of human illnesses.

REFERENCES

1. Tsang-A-Sjoe MWP, Bultink IEM. New developments in systemic lupus erythematous. Rheumatology. 2021;60:vi21-vi28.
2. Song L, Wang Y, Zhang J, Song N, Xu X, Lu Y. The risks of cancer development in Systemic Lupus Erythematous (SLE) patients: A Systematic review and meta-analysis. Arthritis Res Ther 2018;6:270.
3. Ruaro B, Casabella A, Paolino S, Alessandri E, Patané M, Gotelli E, et al. Trabecular bone score and bone quality in systemic lupus erythematous patients. Frontiers Med. 2020;7:574842.
4. Kuo CF, Chou IJ, Rees F, Grainge MJ, Lanyon P, Davenport G, et al. Temporal relationships between systemic lupus erythematous and comorbidities. Rheumatology. 2019;58:840-848.
5. Więsik-Szewczyk E, Rutkowska E, Kwiecień I, Korzeniowska M, Sołdacki D, Jahnz-Różyk K, et al. Patients with common variable immunodeficiency complicated by autoimmune phenomena have lymphopenia and reduced Treg, Th17, and NK cells. J Clin Med. 2021;10:3356.
6. Barber MRW, Drenkard C, Falasinnu T, Hoi A, Mak A, Kow NY, et al. Global epidemiology of systemic lupus erythematous. Nat Rev Rheumatol. 2021;17:515-532.
7. Fanouriakis A, Tziolos N, Bertsias G, Boumpas DT. Update on the diagnosis and management of systemic lupus erythematous. Ann Rheum Dis 2021;80:14-25.
8. Sil S, Dagur RS, Liao K, Peeples ES, Hu G, Perisamy P, et al. Strategies for the use of extracellular vesicles for the delivery of therapeutics. J Neuroimmune Pharmacol. 2020;15:422-442.