Significant development of Mesenchymal Stem Cell therapy in chickens: Meta-Analysis of published articles till 2022

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Objective: Mesenchymal stem cells (MSCs) are multipotent stem cells capable of differentiation into fat, muscle, bone,and closely related lineages and express specific and unique cell surface markers. They can be used as an avian culture model better to understand myogenic, adipogenic, and osteogenic pathways. Moreover, MSCs could also be used as a model to study various physiological and developmental processes in avian and other species. They are helpful for better understanding the pathogenic potential of the mineralization during osteogenesis, infectious bursal disease virus, and interactions between MSCs as a feeder layer to other cells. MSCs are also crucial for immunomodulatory cell therapy.This meta-analysis summarizes current knowledge about the general characterization of MSCs and their application in chickens.

Materials & Methods: Three databases (Google Scholar, PubMed, and Scopus) were searched for published articles on Mesenchymal Stem Cell therapy in chickens from 2015 to 2022. Eighteen related articles with complete abstracts were included in this study. Diseases like chicken dermatitis and Infectious Bursal Disease Virus have been analyzed with a 95%confidence interval.

Results & Conclusion: Based on the results, bone marrow-derived MSCs (BM-MSCs) in coculture with hematopoietic progenitor/stem cells (HPCs/HSCs) can helpregulate and expand the hematopoiesis process using the 3D-culture system in future research. Based on our meta-analysis results, MSCs' several advantages, including strong proliferation, immune-modulatory properties, and ready availability, make them a suitable model in stem cell research.MSCs can reduce cell injury by the synergistic action of small molecules and extracellular vesicles secreted by MSCs to maintain tissue homeostasis. Studying the physiological functions of MSCs can improve their application in regenerative medicine and increase our knowledge to understand their biological behavior better. The key characteristics defining MSCs have been their capacity for colony formation, the potential for self-renewal, expression of surface markers, and multi-lineage differentiation.Based on these findings, we may conclude that MSCs can provide a helpful model in the chicken stem cell research field.

Keywords: Mesenchymal Stem Cell, therapy, chickens, Meta-Analysis,Poultry, Bone-marrow.