

REVIEWER'S REPORT

Manuscript No.: IJAR-58397

Title: Molecular Mechanisms of Stem Cell–Derived Exosomes in Myocardial Regeneration and Cardiac Remodelling in Heart Failure.

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality	Excellent			
Techn. Quality	Excellent			
Clarity		Good		
Significance	Excellent			

Reviewer's ID: Dr. Sumathi

Detailed Reviewer's Report

1. Stem cell-derived exosomes are microscopic vesicles secreted by stem cells (like MSCs or iPSCs) that act as biological messengers. They deliver healing proteins, lipids, and genetic material to damaged tissues. Widely studied in regenerative medicine, they offer a "cell-free" alternative to stem cell therapies, reducing risks like immune rejection or tumor formation.
2. Extracellular vesicles (EVs) are lipid-bound nanoparticles released by cells to transport proteins, lipids, and genetic material. Acting as an intercellular messaging system, they are increasingly researched as targeted drug delivery vehicles, diagnostic biomarkers, and regenerative therapeutics in oncology, immunology, and neurology.
3. Mesenchymal stem cell (MSC) exosomes are microscopic, membrane-bound vesicles (30–150 nm) naturally secreted by MSCs. Acting as biological messengers, they transfer functional proteins, lipids, and genetic material (e.g., mRNA, microRNAs) to target cells. They are highly researched in regenerative medicine as a cell-free alternative to stem cell therapies.

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- 4. Induced pluripotent stem cell (iPSC) exosomes are microscopic, cell-free vesicles packed with growth factors, proteins, and RNA. They offer the powerful regenerative benefits of stem cells without the risk of tumor formation. Researchers are exploring them to repair damaged tissues, heal skin, and reduce inflammation.**
- 5. Myocardial regeneration aims to replace lost or damaged heart muscle cells (cardiomyocytes) with new, functional tissue. Because adult human cardiomyocytes have virtually no intrinsic ability to divide and regenerate after a heart attack, the heart typically heals by forming rigid scar tissue, which can ultimately lead to heart failure.**
- 6. Anti-fibrotic remodeling involves halting the pathological accumulation of extracellular matrix (ECM) and scar tissue while promoting healthy tissue regeneration. Therapies target fibroblast activation, shift macrophage polarization (from pro-inflammatory to reparative), and deploy engineered biomaterials.**
- 7. Mitochondrial bioenergetics is the study of how cells transform nutrients into usable energy (ATP) through cellular respiration. It governs the entire process of how mitochondria extract energy, maintain cellular redox balance, and act as dynamic signaling factories vital for overall human health and metabolism.**
- 8. Epigenetic reprogramming is the process of erasing and remodeling chemical marks (like DNA methylation and histone modifications) on the genome. It resets cellular identity during embryonic development or rejuvenates aged cells without altering the underlying DNA code.**
- 9. Precision cardiovascular medicine shifts away from one-size-fits-all treatments to tailor cardiac care based on an individual's genes, environment, and lifestyle. It utilizes artificial intelligence, comprehensive "omics" (genomics, proteomics), and biomarker profiling to optimize disease prevention, diagnosis, and treatment for heart-related conditions.**
- 10. Translational regenerative therapy focuses on moving laboratory discoveries (from "bench to bedside") into viable clinical treatments. It uses stem cells, gene therapy, and tissue engineering to repair or replace diseased cells and organs. The goal is to cure—rather than just manage—conditions like Parkinson's disease, diabetes, and severe tissue damage.**

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- 11. Key words are excellent.**
- 12. Abstract is impressive.**
- 13. Review part is excellent with awesome pictures.**
- 14. But have to include and show result and discussion parts with values.**
- 15. Summary and conclusion points also be added.**
- 16. References should be with alphabetical order.**
- 17. After those changes can be published in your journal.**