

THE ROLE OF MESENCHYMAL STROMAL CELL-DERIVED SECRETOME IN ENHANCING THE POLARIZATION OF ANTI-INFLAMMATORY (M2) FROM PRO-INFLAMMATORY (M1) MACROPHAGE PHENOTYPE IN OSTEOARTHRITIC CONDITION

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Introduction: Osteoarthritis, a chronic inflammatory disease of the joint has synovial inflammation as one of its common features that drives disease progression primarily due to the dysregulation of the macrophages. Macrophages are highly plastic, capable to polarize from M1 phenotype to M2 or vice-versa when exposed to opposing mediators. Thus, functional response of macrophage is dependent upon the microenvironmental stimuli it is exposed to. In an osteoarthritic condition, the exacerbated pro-inflammatory mediators in synovium released from both activated immune and resident cells, results in stimulating each other in a reciprocal manner that retains the positive feedback loop. Therefore, M1 macrophages maintain its pro-inflammatory phenotype delaying inflammatory resolution phase as well as M2 polarization. Thus, it is recommended to receive the resolving, anti-inflammatory stimuli from external source. MSC-derived secretome contains abundance of immunoregulatory, anti-inflammatory factors. On that note, MSC-secretome could be considered as a potential therapeutic measure to combat the pro-inflammatory cues to a certain extent by sourcing the necessary anti-inflammatory stimuli for M1 macrophage to obtain its resolving M2 phenotype.

Methodology: Articles were systematically searched from inception to May 2020 using online databases including Pubmed, SpringerLink, ScienceDirect and Frontiers. Keywords such as osteoarthritis, inflammation, macrophage, mesenchymal stromal cells and secretome were used to search the articles.

Results: Around 150 articles were retrieved using keywords mentioned and reviewed. Among all, Pubmed had more access to articles concerning the efficacy of MSC-secretome on macrophage polarization in presence of OA

Conclusion: From this review it could be inferred that, MSC-secretome factors target the macrophage in specific mechanistic pathway that causes its cellular transcriptomic reprogramming. Thus, MSC-secretome appears to be a potential stimulus polarizing anti-inflammatory M2-macrophage from the pro-inflammatory M1-phenotype in chronic inflammatory conditions like osteoarthritis.