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MESENCHYMAL STEM CELLS DERIVED EXTRACELLULAR VESICLES AMELIORATE THE INFLAMMATION IN RAT MODEL OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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SUMMARY

Application of mesenchymal stem cells (MSCs) ameliorate the pathological conditions of chronic obstructive pulmonary disease (COPD) in pre-clinical and clinical settings. However, cell-based therapy possesses the risk of occlusion in microvasculature or unregulated growth. For this reason, there is a need to find a new effective, and safer therapeutic approach. Extracellular vesicles (EVs) derived from MSCs have been extensively studied as a new therapeutic strategy towards cell-free based therapy and has been shown to reduce the inflammation in acute lung injury. Therefore, this research aims to elucidate the effect of MSCs derived EVs on the inflammation in rat model of COPD. Male sprague dawley rats (n=36) age 8-9 weeks were divided into 6 groups; Naïve, Cigarette Smoke, Self-healing, MSCs-EVs, MSCs, and MSCs-CM. Rats were exposed to cigarette smoke from 3 cigarettes,2 times a day at 2 hours interval, 7 days a week, for 12 weeks. The treatments (MSCs, MSCs-EVs, and MSCs-conditioned media (CM)) were given at week 13. Naïve and injury group were euthanized at week 13, while treatment groups and self-healing group were euthanized at week 15. Lungs from all groups were then subjected to histological analysis by using hematoxylin and eosin staining, and alcian blue-periodic acid Schiff (AB-PAS) staining. Reduction in peribronchial and perivascular inflammation, alveolar septal thickening associated with mononuclear inflammation, as well as decreased number of goblet cells were observed in all treatment groups as compared to injury and self-healing groups. MSCs, MSCs-EVs, and MSCs-CM treatment groups were also shown to ameliorate the loss of alveolar septa in emphysematous lung of COPD rats. These histological findings suggest that MSCs derived extracellular vesicles may become a promising new therapeutic approach similar to MSCs and MSCs conditioned media for the treatment of COPD.