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## Defined MSC exosome with high yield and purity to improve regenerative activity

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### Abstract

Exosomes derived from mesenchymal stem cells (MSCs) have been studied as vital components of regenerative medicine. Typically, various isolation methods of exosomes from cell culture medium have been developed to increase the isolation yield of exosomes. Moreover, the exosome-depletion process of serum has been considered to result in clinically active and highly purified exosomes from the cell culture medium. Our aim was to compare isolation methods, ultracentrifuge (UC)-based conventional method, and tangential flow filtration (TFF) system-based method for separation with high yield, and the bioactivity of the exosome according to the purity of MSC-derived exosome was determined by the ratio of Fetal bovine serum (FBS)-derived exosome to MSC-derived exosome depending on exosome depletion processes of FBS. The TFF-based isolation yield of exosome derived from human umbilical cord MSC (UCMSC) increased two orders (92.5 times) compared to UC-based isolation method. Moreover, by optimizing the process of depleting FBS-derived exosome, the purity of UCMSC-derived exosome, evaluated using the expression level of MSC exosome surface marker (CD73), was about 15.6 times enhanced and the concentration of low-density lipoprotein-cholesterol (LDL-c), known as impurities resulting from FBS, proved to be negligibly detected. The wound healing and angiogenic effects of highly purified UCMSC-derived exosomes were improved about 23.1% and 71.4%, respectively, with human coronary artery endothelial cells (HCAEC). It suggests that the defined MSC exosome with high yield and purity could increase regenerative activity.

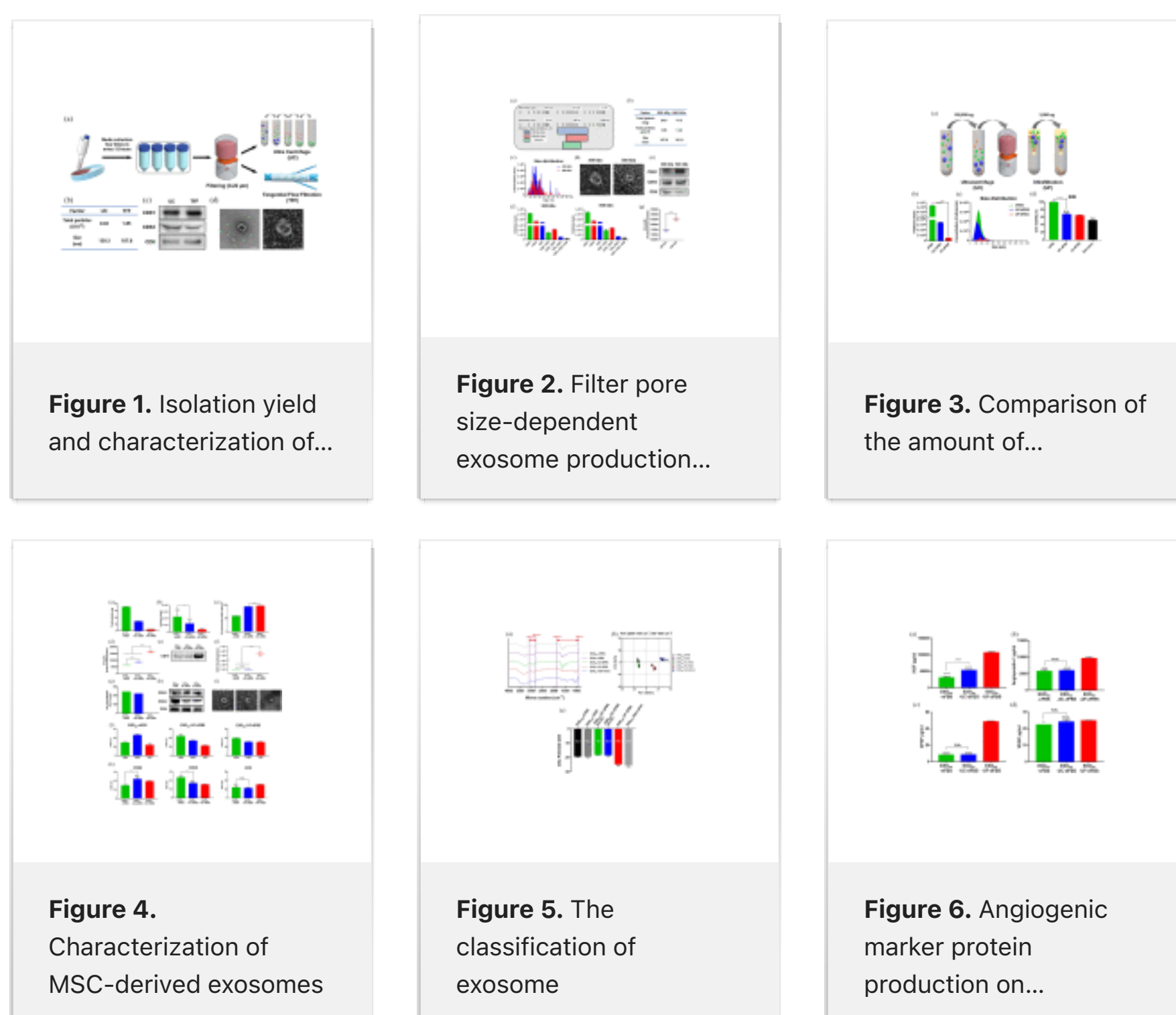
**Keywords:** Exosome; angiogenesis; isolation yield; mesenchymal stem cell (MSC); purity; wound healing.

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### Conflict of interest statement

Declaration of conflicting interests: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Figures



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