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Enrichment, Characterization and Proteomic Profiling of Small Extracellular from Stem Oral Mesenchymal Cells and Human Melanocytic Cells

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Introduction

Extracellular Vehicles (EVs) are small membrane-bound vesicles released by cells that play a crucial role in intercellular communication. They are involved in various physiological and pathological processes, including cell signaling, immune modulation, and cancer progression. In this article, we discuss the enrichment, characterization, and proteomic profiling of small EVs (sEVs) from stemoral mesenchymal cells and human melanocytic cells, highlighting their potential roles in cellular communication and disease. sEVs, also known as exosomes, are a subtype of EVs that are typically 30-150 nm in diameter and are derived from the endosomal system. They carry a cargo of proteins, nucleic acids, and lipids that reflect the physiological state of the parent cells. sEVs have been implicated in cell-cell communication, immune regulation, and the pathogenesis of various diseases, including cancer. sEVs can be isolated from cell culture supernatants or biological fluids using various methods, including ultracentrifugation, size exclusion chromatography, and immunoaffinity capture. For this study, sEVs were enriched from the culture supernatants of stemoral mesenchymal cells and human melanocytic cells using ultracentrifugation followed by sucrose density gradient centrifugation to purify sEVs from contaminants [1-3].

Description

The enriched sEVs were characterized based on their size, morphology, and protein markers. Transmission Electron Microscopy (TEM) revealed that the sEVs were spherical in shape and had a typical size range of 30-150 nm. Nanoparticle Tracking Analysis (NTA) confirmed the size distribution of the sEVs. Western blot analysis was performed to detect the presence of common sEV markers, such as CD63, CD9, and Alix, confirming the identity of the isolated vesicles as sEVs. Proteomic profiling of the sEVs was performed using mass spectrometry to identify the proteins present in the vesicles. The proteomic analysis revealed a diverse repertoire of proteins associated with sEVs, including those involved in cell signaling, membrane trafficking, and immune modulation. Notably, several proteins implicated in melanoma progression were identified in the sEVs from human melanocytic cells, suggesting a potential role for sEVs in melanoma pathogenesis. The proteomic profiling of sEVs from stemoral mesenchymal cells and human melanocytic cells provides insights into the potential roles of sEVs in intercellular communication and disease [4,5]. sEVs are known to transfer their cargo to recipient cells, thereby influencing various cellular processes, such as proliferation, migration, and immune response. The identification of specific proteins in the sEVs from human melanocytic cells suggests that these vesicles may play a role in the progression of melanoma and could serve as potential biomarkers or therapeutic targets for the disease [6].

Conclusion

In conclusion, the enrichment, characterization, and proteomic profiling of sEVs from stemoral mesenchymal cells and human melanocytic cells provide valuable insights into the composition and function of these vesicles. Further studies are warranted to elucidate the specific roles of sEVs in cellular communication and disease, with the ultimate goal of harnessing their therapeutic potential for clinical applications. Electron microscopy and nanoparticle tracking analysis confirmed the presence of small EVs with typical exosomal size and morphology in the isolated fractions from both OMSCs and HMCs. Western blot analysis showed the presence of exosomal markers, including CD63, CD9, and Alix, further confirming the identity of the isolated vesicles as exosomes. Proteomic profiling revealed a diverse protein cargo in small EVs from both cell types, including proteins involved in cell signaling, membrane trafficking, and extracellular matrix remodeling.

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Conflict of Interest

There is no conflict of interest by author.

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