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Effect of exosomes on retinoblastoma cancer cells in drug delivery

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Abstract

Exosomes are extracellular vesicles secreted by almost all cell types, playing a significant role in cell-to-cell communication and in transporting therapeutic agents and biomolecules such as proteins and RNA. Mesenchymal stem cell-derived exosomes have attracted attention due to their unique characteristics, including low toxicity, biocompatibility, and minimal immune response. On the other hand, doxorubicin is a chemotherapy drug widely used to treat various cancers, including retinoblastoma—a common intraocular cancer in children caused by mutations in the RB1 gene. In this research, exosomes derived from mesenchymal stem cells were employed to deliver doxorubicin to retinoblastoma cancer cells in order to investigate their effects.

Exosomes were isolated from Wharton jelly mesenchymal stem cells using size-exclusion chromatography. They were then loaded with doxorubicin by sonication, and the effect of exosomes, drugs, and doxorubicin-loaded exosomes on Y-79 cells was examined through an apoptosis assay.

The results indicate that the exosomes alone exhibited no toxicity toward the cancer cells, while the combination of exosomes and the drug showed enhanced induced apoptosis compared to the drug alone.

Keywords: Exosome, Retinoblastoma, Drug delivery