

Human umbilical cord-derived mesenchymal stem cells exhibit anti-tumorigenic effects in cancer cell lines in vitro

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ABSTRACT

Introduction: Human umbilical cord-derived mesenchymal stem cells (hUCMSCs) represent promising therapeutic tools for treating solid cancers. However, accumulating evidence suggests that the effects of hUCMSCs on tumour growth are controversial and the underlying mechanisms are poorly understood. Thus, in the present study, we elucidated the anti-tumour activity of hUCMSCs in H2170 (squamous cell carcinoma), LN18 (glioblastoma) and MCF7 (breast cancer) cells in vitro. **Methods:** The inhibitory effect of hUCMSCs on the growth of cancer cells and apoptosis were evaluated using MTS assay and flow cytometry, respectively. The expression of apoptotic-related genes was measured by the quantitative reverse transcription polymerase chain reaction (qRT-PCR). **Results:** Results from the viability assay showed that significant suppression ($p < 0.001$) of cell proliferation was observed after co-culturing all three cancer cell lines with the hUCMSCs and its conditioned medium. Furthermore, it was revealed that the hUCMSCs and their conditioned medium were able to significantly ($p < 0.001$) induce apoptosis to the H2170 and LN18 cells; however, the anti-cancer effects of MSCs were mildly seen for MCF7. We postulate that the effect of hUCMSCs on tumorigenesis might be through the secretion of paracrine factors. Consistently, gene expression analysis showed that hUCMSCs significantly upregulated the expression level of the apoptosis-related genes (BAX, BAD and APAF1) indicating the ability of hUCMSCs' to induce the intrinsic apoptosis pathway. **Conclusion:** Taken together, our findings demonstrate that hUCMSCs could inhibit both H2170 and LN18 cell tumorigenicity, thereby providing a promising candidate for using hUCMSCs for clinical treatment of patients with cancer.