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Mesenchymal stem cell's secretome promotes selective enrichment of cancer stem-like cells with specific cytogenetic profile

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ABSTRACT

Cancer stem cells (CSCs) are responsible for tumour initiation, metastasis and cancer recurrence, however the involvement of microenvironment is crucial. Here, we have analyzed how human mesenchymal stem cells (MSCs)-derived conditioned medium (CM) affect colon and melanoma CSCs enrichment and maintenance. Our results strongly suggest that the secretome of CM-MSCs selects and maintains subpopulations with high expression of CSCs markers and ALDH1 activity, low proliferation rates with G1 phase arrest, and notably retain *in vivo* these properties. Cytogenetic analyses indicated that CM-cultured cells contain alterations in chromosome 17 (17q25). Subsequent SKY-FISH analyses suggested that genes located in 17q25 might be involved in stem-cell maintenance. The characterization of secreted proteins present in CM-MSCs revealed that four cytokines and seven growth factors are directy linked to the CSCs enrichment reported in this study. Further analyses revealed that the combination of just IL6 and HGF is enough to provide cancer cells with better stemness properties. In conclusion, this study demonstrates how specific chromosomal alterations present in CSCs subpopulations might represent an advantage for their *in vitro* maintenance and *in vivo* stemness properties.