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Mesenchymal/stromal stem cells: necessary factors in tumour progression

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Abstract

Mesenchymal/stromal stem cells (MSCs) are a crucial component of the tumour microenvironment (TME). They can be recruited from normal tissues into the TME and educated by tumour cells to transform into tumour-associated MSCs, which are oncogenic cells that promote tumour development and progression by impacting or transforming into various kinds of cells, such as immune cells and endothelial cells. Targeting MSCs in the TME is a novel strategy to prevent malignant processes. Exosomes, as communicators, carry various RNAs and proteins and thus link MSCs and the TME, which provides options for improving outcomes and developing targeted treatment.

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Stromal Co-Cultivation for Modeling Breast Cancer Dormancy in the Bone Marrow

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Abstract

Cancers metastasize to the bone marrow before primary tumors can be detected. Bone marrow micrometastases are resistant to therapy, and while they are able to remain dormant for decades, they recur steadily and result in incurable metastatic disease. The bone marrow microenvironment maintains the dormancy and chemoresistance of micrometastases through interactions with multiple cell types and through structural and soluble factors. Modeling dormancy in vitro can identify the mechanisms of these interactions. Modeling also identifies mechanisms able to disrupt these interactions or define novel interactions that promote the reawakening of dormant cells. The in vitro modeling of the interactions of cancer cells with various bone marrow elements can generate hypotheses on the mechanisms that control dormancy, treatment resistance and reawakening in vivo. These hypotheses can guide in vivo murine experiments that have high probabilities of succeeding in order to verify in vitro findings while minimizing the use of animals in experiments. This review outlines the existing data on predominant stromal cell types and their use in 2D co-cultures with cancer cells.