Bone marrow-derived cells in haematogenous tumour metastasis: emerging targets for therapy.

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Abstract

Hematogenous tumor metastasis, the spread of cancer cells via the bloodstream, is a major cause of mortality in cancer patients. Recent studies have identified bone marrow-derived cells as key players in this process, contributing to the formation of pre-metastatic niches and facilitating the survival and growth of metastatic tumor cells. In this perspective, we will discuss the emerging role of bone marrow-derived cells in hematogenous tumor metastasis and the potential for these cells to serve as targets for therapeutic intervention.

Keywords: Bone marrow, Hematogenous tumor metastasis, Cancer cells.

Introduction

Hematogenous tumor metastasis involves a complex interplay between cancer cells and the surrounding microenvironment, including bone marrow-derived cells such as Myeloid-Derived Suppressor Cells (MDSCs), Tumor-Associated Macrophages (TAMs), and Mesenchymal Stem Cells (MSCs). These cells can promote tumor cell survival and growth by secreting growth factors, cytokines, and extracellular matrix components [1]. Additionally, they can create a favorable environment for metastatic tumor cell colonization by modulating the immune response and facilitating angiogenesis [2].

Several preclinical studies have demonstrated the potential for targeting bone marrow-derived cells as a therapeutic strategy for hematogenous tumor metastasis. For example, depletion of MDSCs using anti-GR1 antibodies has been shown to reduce lung metastasis in murine models of breast cancer [3]. Similarly, inhibition of TAMs using CSF1R inhibitors has been shown to reduce tumor growth and metastasis in preclinical models of ovarian cancer. Additionally, targeting the interaction between tumor cells and MSCs using small molecule inhibitors has been shown to reduce bone metastasis in preclinical models of prostate cancer.

Despite this promising preclinical result, translating these strategies to the clinic has proven challenging. One major issue is the heterogeneity of bone marrow-derived cells, which can have both pro- and anti-tumor effects depending on the context [4]. Additionally, targeting these cells may have unintended consequences, such as impairing the immune response to infection or injury. Therefore, identifying specific subsets of bone marrow-derived cells that promote metastasis and developing targeted therapies against these cells may be a more effective approach [5].

Conclusion

Bone marrow-derived cells play a critical role in hematogenous tumor metastasis and represent an emerging target for therapeutic intervention. However, further research is needed to fully understand the mechanisms by which these cells contribute to metastasis and to develop targeted therapies that are safe and effective. Moreover, developing strategies to identify patients who are at high risk for metastasis and who may benefit from these therapies will be critical for improving outcomes in cancer patients.

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